


# The National Blood Service

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL  
HC 6 Session 2000-2001: 20 December 2000





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# executive summary

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## Background

- 1 The National Blood Authority - a special health authority of the NHS - runs the National Blood Service and is responsible for the collection and distribution of blood components in England and North Wales. The availability of blood is essential to the NHS, and many people owe their lives to transfusions that were made possible by voluntary donations of blood.
- 2 Since its creation in 1993, the National Blood Service has been reorganising to effect the change from a regional to a national service, and aspects of this process led to some concerns among users and employees. In August 1997, the Secretary of State commissioned a review of the clinical concerns raised about the Service's proposals to transfer processing and testing of blood from Liverpool to Manchester. The report led to the dismissal of the Service's chairman and chief executive. The National Blood Service completed its transition to a national organisation in April 2000.



### The National Blood Service

Was set up in 1993, and in 1994 took over the services previously run by individual regional health authorities.

Is responsible for collecting, processing and testing blood components and distributing them to hospitals.

The Service operates:

- 15 blood centres (until April 2000 organised into three zones);
- The International Blood Group Reference Laboratory; and
- The Bio Products Laboratory

Some 5,300 people are employed by the National Blood Service.

In 1998-99 it:

- Collected 2.4 million voluntary blood donations from 1.9 million people;
- Supplied blood for around 800,000 transfusions; and
- Spent £241 million



- 3 The emergence of variant Creutzfeldt-Jakob disease has led the government to make two changes to the way the Service operates:
  - It extended the use of leucodepletion - the removal of white cells - for all blood destined for transfusion, by 31 October 1999, to reduce the theoretical risk to recipients of donated blood of human to human transmission of the disease. The Service reports that leucodepletion results in a one per cent loss of donations, and costs £60 million a year.
  - It required the Bio Products Laboratory, which had used British plasma to manufacture blood products, to obtain all its plasma from non-UK sources. This has lost the Service income of around £25 million a year that it received for supplying plasma to the laboratory. From 1999-2000, the Service has recovered that loss through prices for blood components charged to hospitals. Ministers have yet to decide on the future role of the Bio Products Laboratory.
- 4 We focused on how well the National Blood Service performed and the action it was taking to improve its efficiency and effectiveness. We excluded the Bio Products Laboratory from our examination because of the consideration currently being given to its future. We obtained most of the evidence for our findings by undertaking a census of blood bank heads at NHS hospitals; conducting interviews and examining documents at the National Blood Service and the NHS Executive; and commissioning a survey of the public to determine attitudes towards blood donation. Also, in examining safety issues, we placed reliance on the inspection and licensing work of the Medicines Control Agency.

## Overall Conclusions

- 5 The National Blood Service has taken a long time to complete the transition to its national role, although there are clear signs that it is now doing so. Since its establishment, it has had to cope with the emergence of variant Creutzfeldt Jakob disease.
- 6 Responses to our census and current data on collection of blood from donors and delivery to hospitals indicate that the Service is performing as well as, and in many areas better than, it was before its establishment as a national service. There were restrictions in the supply of blood to hospitals in 1998-99, and the Service acted promptly to avoid any repetition in 1999-2000. There are also effective measures in place to ensure that blood is safe for transfusion. Users were broadly satisfied with the service provided and the responsiveness of the organisation.
- 7 Information provided by the National Blood Service indicates that, between 1995-96 and 1998-99, the Service cut its costs by some 5.4 per cent in real terms. The National Blood Service's current performance indicators have, however, a number of weaknesses that prevent them from forming a complete and appropriate basis for accountability to the NHS Executive, or for the direction and management of the Service's business. There is scope for improving or developing performance indicators for overall efficiency and for other areas of its work, such as meeting hospital demand, wastage, safety and promotion of the optimal use of blood in hospitals.

# Recommendations

- 8 Building on the improvements brought about since the creation of the National Blood Service, particularly in supply and safety, we identified a number of areas where the Service could make further changes. Our detailed conclusions are set out on pages 14, 24, 30 and 36 our recommendations are at paragraphs 9 to 14.

## On meeting hospitals' demands for blood, medical advice and support

- 9 Hospitals need medical support and advice on transfusion matters so that they can put into practice measures developed to reduce transmission error and use blood more effectively. We recommend that the Service increases further the number of hospitals it involves in clinical audits to widen awareness of good practice.
- 10 Because the results of scientific and medical research projects have not routinely been widely disseminated, there is a risk that hospitals will not be aware of findings that could improve patient care, and that full benefit will not be derived from those projects. We therefore recommend that the Service uses more active ways of disseminating information, for example through post-graduate lectures, or by publishing results on its website, to enable the findings to reach a wider audience.
- 11 The Service employs a number of mechanisms that aim to secure responsiveness to users. But users' complaints are not subject to the same central monitoring and control as are those from donors. Without such management, there is a risk that users' complaints may not be given the priority they merit and that remedial action may be delayed. To ensure that the National Blood Service takes speedy and appropriate action in dealing with users' complaints, we recommend that the Service sets targets for responding to them; and monitors performance against those targets and the action taken to deal with the cause of the complaints.

## On encouraging people to give blood

- 12 The Service currently collects sufficient blood to meet hospital demand. But, unless it continues to recruit and retain a substantial body of regular donors, there is a risk that collections may decline. Our survey of public attitudes to donation highlighted groups likely to donate and approaches that might continue to attract new donors. But retaining donors is a considerable challenge. Some factors that put donors off, such as the fear of needles, are largely outside the Service's control, although it can influence other factors, such as the time it takes to give blood. We recommend that, to keep the number of donors lapsing to a minimum, the Service (i) addresses further the factors that inhibit donation, for example by reducing the time it takes to donate blood; and (ii) sets more demanding donor care performance targets, for example for the proportion of donors waiting longer than 30 minutes before registration and screening.

## On managing efficiency and performance

- 13 The National Blood Service has improved the efficiency of its operations. To improve further, and keep blood prices charged to the NHS to a minimum, the Service needs to:
  - examine and harmonise best working practices across its operations in order to ensure that it is able to operate at consistent levels of efficiency
  - apply its improved procurement practice to cover all the classes of goods and services it uses to secure further economies; and
  - make fuller use of its unit cost information and of new or improved approaches by (i) comparing unit costs across the Service, and investigating differences to identify good practice; and (ii) comparing its performance with that of other blood suppliers - in the other home countries and elsewhere - and with other organisations engaged in similar collection, testing, or distribution activities in the public and private sector.
- 14 Unless the Service has relevant performance indicators, it will lack the information it needs to identify and deal with aspects of its activities that require attention. The Service's senior management recognise the importance of good performance indicators, and set up a working group that identified indicators relating to donor care. However, other activities and aspects of the Service are not at present represented in the performance indicators; and there is a lack of measures of efficiency that would provide the Board, managers, the NHS Executive and users with the information they need. We recommend that the Service undertakes a comprehensive review to establish which performance measures (including measures of efficiency) would provide useful indicators of success or warnings of failure for the purposes of management and accountability. This should lead to it adopting high level indicators, with targets, supported by indicators and targets tailored to local needs and circumstances.
- 15 The National Blood Service welcomes the broad thrust of these recommendations, and plans to encompass them in the design and implementation of the new management structures and systems, which is currently taking place.



### Role of the National Blood Service

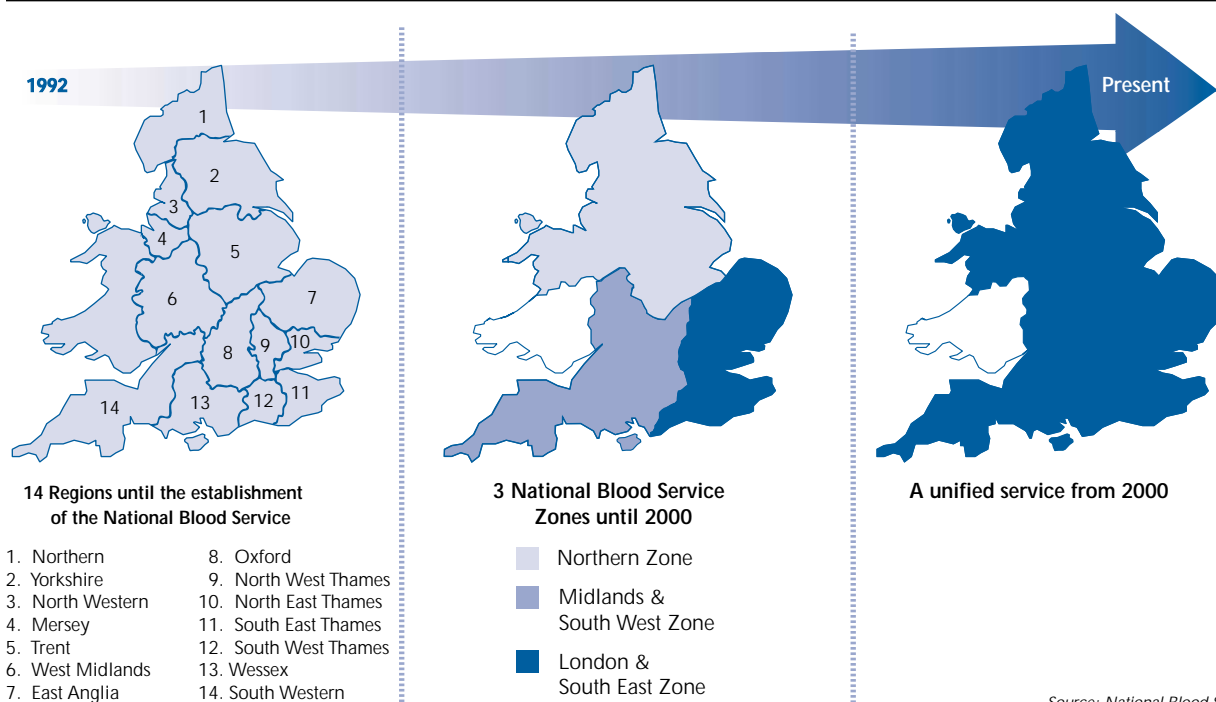
- 1.1 The availability of blood is essential to the NHS. Hospitals use blood and blood components to treat patients, deal with accident victims and enable many elective procedures, such as hip replacements. Many people owe their lives to transfusions that were made possible by voluntary donations of blood.
- 1.2 The National Blood Service collects blood from donors, and supplies processed and tested blood components and products to NHS hospitals and those in the independent sector. In 1998-99, 1.9 million people gave 2.4 million donations of blood; and around 800,000 people received blood transfusions.

### Organisation, functions, objectives and accountability

#### Organisation

- 1.3 The National Blood Authority - a special health authority of the NHS - runs the National Blood Service and is responsible for the collection and distribution of blood components in England and North Wales. The Authority was set up in 1993, and in 1994 took over responsibility for 15 regional blood transfusion centres from regional health authorities. It employs some 5,300 people and spent £241 million in 1998-99.
- 1.4 Blood transfusion centres collect, process, test, store and distribute donated blood, and during the period of the study were organised into three zones (London and South East, Midlands and South West, and Northern). **Figure 1**

**1** Changing Blood Service boundaries since 1992



Source: National Blood Service

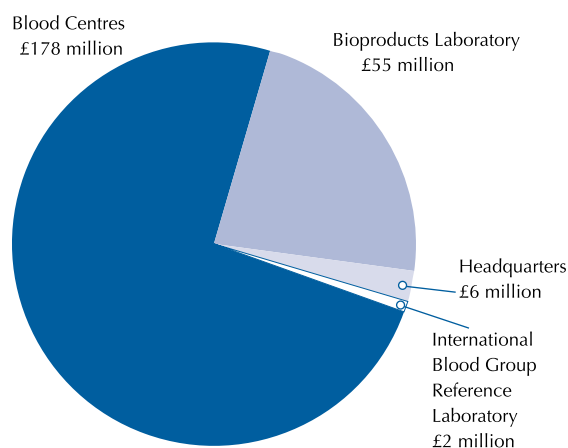
shows for England and Wales the organisation up to 1993, from 1994 to 1999 and from 2000. The National Blood Service also operates the International Blood Group Reference Laboratory and the Bio Products Laboratory, which makes therapeutic blood products from plasma. **Figure 2** shows how much the National Blood Service spends on each of its divisions (i.e. blood centres, International Blood Group Reference Laboratory, the Bio Products Laboratory and its headquarters).

## Functions

1.5 The Authority's statutory functions are set out in Statutory Instrument 587 of 1993, as amended by SI 589 of 1994. They are:

- The provision of laboratories for the manufacture of blood products and for other purposes.
- Collecting, screening and processing blood and its constituents and supplying blood, plasma and other blood products for the purposes of the health service.
- The preparation of plasma fractions and other products for therapeutic, diagnostic and other purposes.

### 2 National Blood Service Expenditure 1998-99



Source: National Blood Service

- Research and development in plasma protein fractionation and for other purposes.
- The manufacture of blood grouping re-agents and other related re-agents.
- The supply of products prepared or manufactured above for the purposes of the health service.
- The promotion, by advertisement or otherwise, of the giving of blood or its constituents for the purposes of the health service, with a view in particular to maintaining an adequate number of persons who are willing to give blood or its constituents for those purposes.

## Objectives

1.6 The National Blood Service's main objective, as set out in its 1999-2000 operational plan and agreed with the Secretary of State, is:

*to collect and process enough blood to meet hospital demand and to work with hospitals to ensure the optimum use of blood.*

1.7 The National Blood Authority's other objectives for 1999-2000 are set out in **Figure 3**.

### 3 National Blood Authority's Principal Objectives for 1999-2000

- Maintain the core business.
- Improve the rate of donor retention.
- Continue progress on achieving the optimum use of blood.
- Ensure the total availability of leucodepleted blood components by 31 October 1999.
- Continue the development of nucleic acid testing with a view to the availability of frozen and labile components as soon as possible.
- Improve good manufacturing standards across the service.
- Ensure an adequate supply of blood components and services over the millennium period.
- Improve staff performance and motivation.
- Strengthen the leadership of the National Blood Service

Accountability

- 1.8 The Chairman is accountable to the Secretary of State for Health and the Chief Executive is accountable to the Board of the National Blood Authority and is an accountable officer to the Chief Executive of the NHS. The National Blood Service collects and supplies blood in North Wales in accordance with service agreements with the NHS Trusts in that area.
- 1.9 Safety standards for blood components, which follow European directives, are the responsibility of the Secretary of State, who is advised by a departmental committee, the Advisory Committee on the Microbiological Safety of Blood and Tissues for Transplantation. The Medicines Control Agency monitors safety standards on his behalf through a programme of inspections upon which the licensing of National Blood Service blood centres is based.
- 1.10 In 1995, the Department of Health established the National Blood Service Users Group for a fixed period ending 31 March 1998. The purpose was to enable representatives of healthcare professionals who were reliant on the National Blood Service to monitor its performance. In particular, they were to focus on the commitments the National Blood Authority had given on maintaining or improving delivery times and providing the specialist services required by hospitals. The Secretary of State for Health required the Group to report to him annually and to bring to the Authority's attention any problems that could not be resolved at a local level.

1.11 **Figure 4** sets out the lines of accountability within, and surrounding, the National Blood Service.

Collection, processing, safety and distribution of blood components and products

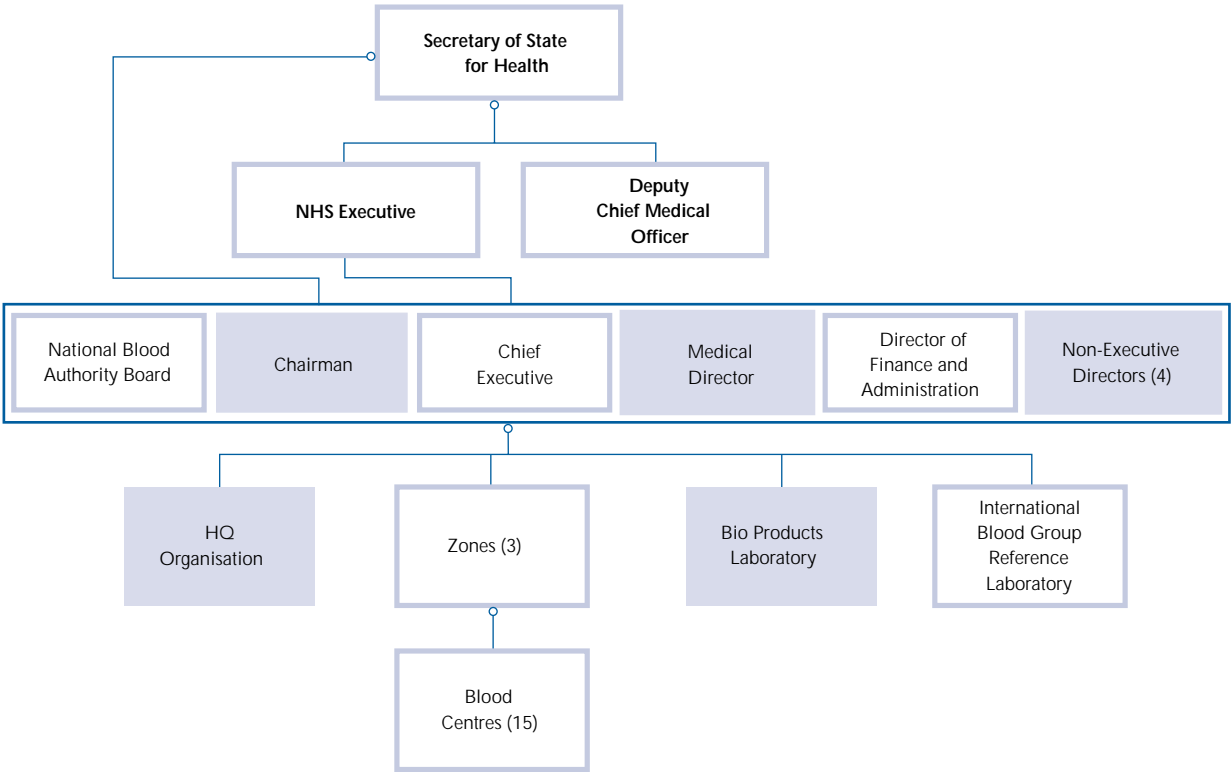
Collection

1.12 Collecting blood involves recruiting and retaining blood donors; inviting them to donor sessions; providing mobile and permanently-based teams of staff to conduct donor sessions; and transporting donated blood to the blood centre. **Figure 5** sets out the stages blood passes through from collection from donors to delivery to hospitals.

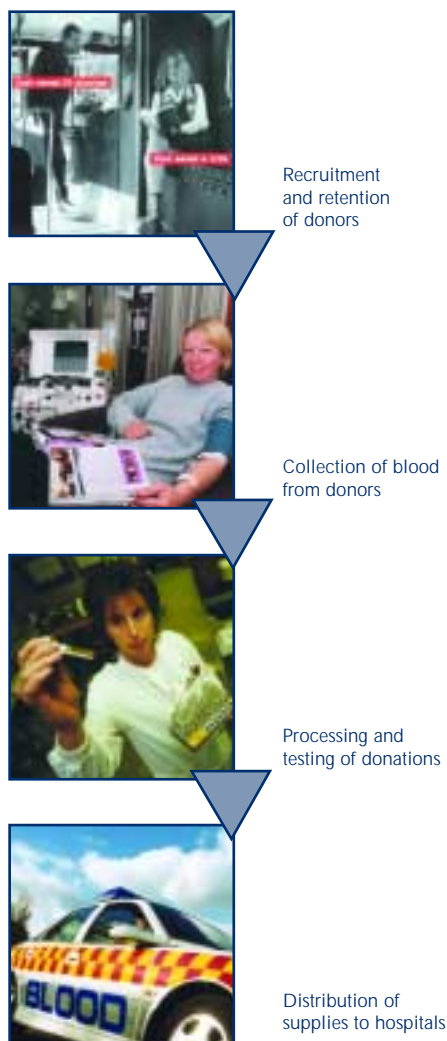
Processing

1.13 Blood processing breaks blood down into its constituent parts - red cells, platelets and plasma. Additional processing results in some 20 major forms of component (Appendix 1). **Figure 6** describes the three main constituents of blood and their medical uses. Processing blood involves some losses.

4 The National Blood Service: Lines of Accountability during the period of the study



## 5 The main Blood Service processes



## 6 The three main constituents of blood and their medical uses

### PLASMA

Description: The fluid in which blood cells are suspended. It acts as a carrier for the blood cells and contains factors such as immunoglobulin (antibodies), albumin and clotting factors.

Direct uses in patient care: coagulation and treatment of severe burns

### Platelets (contained in buffy coat)

Description: small discs of tissue that enable coagulation and the contraction of clots.

Direct uses in patient care: blood diseases e.g., leukaemia, to assist in clotting

### Red cells

Description: the most numerous type of blood cell, containing the red pigment haemoglobin that facilitates the transport of oxygen necessary for respiration

Direct uses in patient care: anaemia, surgical and traumatic blood loss (open heart surgery, liver transplant, heart bypass)

**Figure 7** shows the losses of blood between collection and transfusion. The National Blood Service holds stocks of processed components at blood centres and transports them to hospitals in response to orders from hospital blood banks.

## Safety

1.14 The National Blood Service ensures the integrity of its blood components during collection, processing and distribution of blood by:

- at the collection stage, **screening** donors to ensure that the potential donor is in good health, to protect the recipient from any ill effect through transmission of diseases or drugs by blood transfusion, and to protect the donor from any harm;
- **testing** donated blood for HIV, Hepatitis B and C and Syphilis;
- **pursuing "good manufacturing practice"** - the standards of the pharmaceutical industry - in processing and distribution; and
- after distribution, providing hospitals with **advice** on transfusion medicine.

## Distribution

1.15 The National Blood Service transports blood from its blood centres to hospitals in response to routine and specific orders, and to emergency requests (which the Service aims to deliver within two hours). The Service makes some 200,000 deliveries a year, half routine and half in response to specific requests, with around 2,500 emergency deliveries.

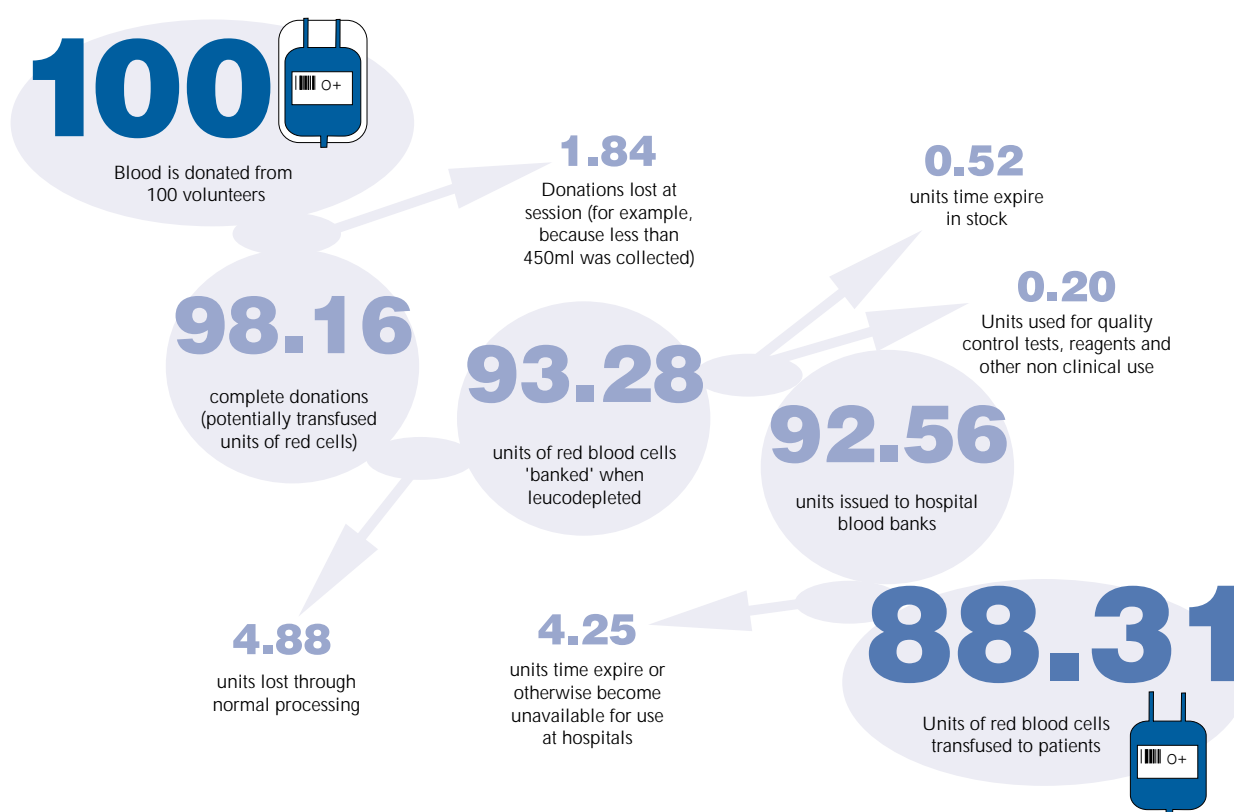
## Recent events affecting the National Blood Service

1.16 Since its creation the National Blood Service has faced two major challenges which have had an effect on the operation and development of the service. The first was a consequence of its creation: the need for a reorganisation to effect the change from a local to a national service. The second has been the emergence of variant Creutzfeldt-Jakob disease.

## Organisational changes

1.17 The Statutory Instruments of 1993 and 1994 that set up the National Blood Authority and transferred the blood centres from individual regional health authorities provided for the creation of a single national service. This necessitated restructuring, and the National Blood Authority retained a firm of consultants, Bain & Co, to

### 7 Process losses from collection to transfusion



Source: National Blood Service



advise it on how to proceed. Bain & Co recommended structural changes and identified opportunities for performance improvements. However, the way in which the Service implemented certain changes, in particular the scaling down of the Liverpool Blood Centre, led to considerable concerns among users and employees. Consequently, in August 1997, the Secretary of State appointed Professor John Cash to review the clinical concerns raised about the Service's proposals to transfer bulk processing and testing of blood from Liverpool to Manchester. Professor Cash's key conclusions and recommendations are summarised at Appendix 2. Following publication of the report in March 1998, the Secretary of State dismissed the National Blood Authority's chairman. Subsequently, a special committee of the National Blood Authority decided to dismiss the chief executive. The chairman received no compensation for loss of office. The chief executive received six months pay (to which he was contractually entitled) and an out of court settlement for breach of contract by the National Blood Authority. In addition, the Authority made a lump sum payment on his behalf to the NHS Pensions Agency.

1.18 The National Blood Service completed its transition to a national organisation in April 2000.

1.19 Following agreement with the NHS Executive, the National Blood Service introduced national pricing and a national service agreement with effect from April 1999. Up to that time, prices varied, and were negotiated locally by blood centres and the hospitals they supplied; and each Trust had its own locally negotiated contract with its local blood centre.

## Variant Creutzfeldt-Jakob Disease

1.20 In July 1998, the government announced that it would extend the use of leucodepletion - the removal of white cells to reduce the risk of infection from variant Creutzfeldt-Jakob Disease - for all blood destined for transfusion. This was to reduce the theoretical risk to recipients of donated blood of human to human transmission of variant Creutzfeldt-Jakob Disease. The announcement followed a recommendation from the Spongiform Encephalopathy Advisory Committee that leucodepletion should be undertaken on a precautionary basis. Leucodepletion brings other benefits; for example, it significantly reduces the incidence of febrile transfusion reaction and reduces the risk of cytomegalo virus infection in susceptible patients such as new-born babies and some cancer and leukaemia patients. Leucodepletion is mandatory in some, though not most, other European countries, including France and Austria.

1.21 The National Blood Service reports that leucodepletion results in a one per cent loss of donations, and costs £60 million a year.

1.22 As part of the precautions against any risk of transmission of variant Creutzfeldt-Jakob disease, the government also accepted in February 1998 the advice of the Committee on Safety of Medicines that plasma for the manufacture of blood products should be obtained from non-UK sources. This was because the theoretical risk that variant Creutzfeldt-Jakob disease could be transmitted could not be discounted; and there was no test that could be applied to donors to detect the presence of the infective agent.

1.23 This change also had financial implications for the Service. Up to then, the Bio Products Laboratory had used British plasma to manufacture products, such as the factor VIII used for the treatment of haemophiliacs. But the Bio Products Laboratory now imports plasma from the USA, and the Service has therefore lost the income of £23 million (1998-99) that it would have received from supplying the laboratory. To smooth the disruptive effect on the NHS of this change, the NHS Executive made good that loss by increasing the Authority's cash limit in 1998-99. In 1999-2000 the cost was recovered from hospitals using blood in accordance with normal arrangements, that is within the prices for cellular components (red cells and platelets). The total extra cost to the Bio Products Laboratory was about £5 million in 1999-2000. Following this major change, the Treasury, the Scottish Office and the Department of Health set up a joint review of UK blood product manufacturing in autumn 1998 to consider its future. Its preliminary results were put to ministers in July 1999, and a further submission was made in February 2000 with recommendations for the next stage of the review. The aim is to complete the review by March 2001.

## Hospitals' use of blood

1.24 There are considerable variations in the way hospitals use and manage blood stocks. The National Blood Service and the Department of Health consider that the adoption of best practice has the potential to reduce significantly the overall demand for blood components. The NHS cannot yet estimate the scale of that reduction. But the National Blood Service's national blood stocks good practice report, due to be published in April 2001, will enable estimation of some elements.

1.25 The Chief Medical Officer has launched an initiative - "Better Blood Transfusion" - aimed at improving the way hospitals use blood. This sets out, among other matters, the need for, and role of, hospital transfusion committees. In December 1998, he set out the action hospitals should take, and the NHS Executive intend to audit progress in 2000-01 (Appendix 3). The National Blood Stocks Project, which began in January 1998, is a further initiative concerned with hospitals' use of blood. The project was set up by the National Blood Service and involves its working alongside 22 hospitals. It aims to improve the management of blood stocks through greater collaboration between the Blood Service and hospitals. The National Blood Service considers the project has been successful in underlining the value and importance of collaboration. A further 24 hospitals have asked to participate in the next phase of the project.

## Why we examined the National Blood Service

1.26 We examined the performance of the National Blood Service because:

- the availability of blood is essential to patients;
- since the creation of the National Blood Authority in 1993, the National Blood Service has been undergoing major structural changes that attracted some criticism; and
- there had been shortages of blood during 1998.

## The scope of our examination

1.27 We examined:

- the performance of the National Blood Service in meeting hospitals' demands of the service (Part 2);
- the National Blood Service's effectiveness in encouraging people to give blood (Part 3);
- the mechanisms for securing the safety of the Service's blood components (Part 4); and
- the measures the National Blood Service was taking to improve its efficiency and monitor its performance (Part 5).

1.28 We excluded the use of blood by hospitals from the scope of our examination. Efficient use of so scarce a resource is a crucial element in keeping supply and demand in balance, but we sought to avoid any duplication with the Chief Medical Officer's continuing work in the area. We also excluded the Bio Products Laboratory, because of the joint review that was being undertaken at the same time by the Treasury, The Scottish Office and the Department of Health.

1.29 Our report is based on evidence collected in 1999 through:

- a census of blood bank heads at NHS hospitals;
- a survey of the public to determine attitudes towards blood donation;
- interviews and examination of documentation at the NHS Executive, the National Blood Service headquarters and at its zones and blood centres;
- a review of existing donor research;
- an examination and comparison of unit costs, within the National Blood Service;
- reliance on the work of the Medicines Control Agency.

1.30 A chronology of the main events referred to in this report is at Appendix 4 and details of our methodology are at Appendix 5.

1.31 We benefited from the comments of a panel of experts, whom we thank for their important contribution. The panel members are listed at Appendix 6.

# Part 2

Is the National Blood Service meeting hospitals' demands for blood, medical advice and support?

## Conclusions

- In 1998-99, the National Blood Service experienced some difficulty in achieving its core target of meeting, in full, hospitals' demand for blood components. But it delivered sufficient to avoid major problems. It took steps to ensure that it could meet foreseeable demand; and in 1999-2000 it met 99.76 (effectively 100) per cent of hospital demand.
- Blood bank heads were satisfied with the range of components and services; and arrangements are in place to ensure that requests for additional services will be met where users make a good case for them.
- Many blood bank heads told us that their hospitals were affected by occasional distribution failures in 1998. However, the total number of such failures was a low proportion (less than 0.5 per cent) of all deliveries made. The timeliness of routine and emergency deliveries was generally good, although not always convenient.
- The National Blood Service has in place arrangements for securing delivery of blood to the sites where it is required. It can and does move blood strategically to iron out surpluses and shortfalls as part of a national stock management process. And it has recently drawn up a national contingency plan based on identified threats that could lead to local interruptions to supply. It has also prepared and tested local plans for coping with major incidents requiring blood components.
- It is clearly important that the National Blood Service minimises wastage and losses of blood prior to issue to hospitals, through whatever cause. It has been successful in containing losses through components going out of date, although there is a continuing, and unavoidable, tension between maintaining sufficient stocks and minimising wastage. In 1998-99 the Service did not achieve its targets for minimising other losses, mainly because of additional process losses associated with the introduction of large-scale leucodepletion. That impact continued into 1999-2000, although performance in the year was better than the revised target.
- There is increasing focus on the use of blood in hospitals. This use is outside the direct control of the National Blood Service; and, for that reason, providing medical support and advice to hospitals is an important role for the Service. National Blood Service consultants' expertise and contributions have earned considerable respect from hospitals; and their performance ratings have improved slightly since 1994. Further scope for the development of their role remains, particularly involvement in clinical audit and ensuring visibility during visits to hospitals.
- There are a number of indicators measuring performance of aspects of the National Blood Service's medical support for hospitals. But none of them measures the Service's contribution to securing the optimal use of blood, a responsibility it shares with the wider NHS. We consider that a higher level measure should also be developed for the shared responsibility. This task could form part of the agenda for the new National Transfusion User Group.
- Procedures are in place to ensure that all new scientific and medical research is properly considered before being funded, although some older less relevant projects were still being funded during the course of our study. The Service could improve the way it disseminates the results of its scientific and medical research.
- There are mechanisms - the national service agreement, the National Commissioning Group for Blood, the National Blood Service Users Group and the complaints procedure - set up to secure the National Blood Service's responsiveness to the requirements and concerns of its users. The future of an important element of those mechanisms - the National Blood Service Users Group - has been under review. The Department of Health decided in April 2000 to set up a successor body, which would function from April 2001. The National Blood Service does not monitor the content and handling of users' complaints as closely as it does those from donors.

2.1 This part of our report examines how well the National Blood Service performs in terms of:

- meeting demand for blood;
- providing effective medical support and advice;
- targeting medical and scientific research; and
- responding to users.

2.2 A key part of our methodology (Appendix 5) was a census of consultant haematologists or senior medical laboratory officers in charge of hospital blood banks. This repeated a survey by Bain & Co in 1994 (paragraph 1.17), whom the National Blood Service retained to advise it on structural changes and performance improvements. Our 1999 census of the same group therefore indicated both current performance and how performance had changed since 1994.

2.3 The National Blood Service uses 28 performance indicators for measuring achievement against targets; 11 of them relate to this part of the report. A detailed list is at Appendix 7. The National Blood Service set up the indicators in April 1996 in consultation and agreement with the NHS Executive. It intended them to be used as high level performance measures for the purposes of accountability. Within each section of this part of the report we highlight the indicators and performance against the associated targets.

## Is the National Blood Service meeting demand for blood?

### The Service's current ability to supply blood components to hospitals

2.4 The National Blood Service estimates its requirements for donated blood as part of its annual business planning process, and in consultation with hospitals. It determines how much each of its three zones should collect; and the zones in turn prepare programmes of blood collection sessions that will deliver the estimated quantities of blood.

2.5 The Service has a high level target for supply: it aims to meet 99.51 per cent, rather than 100 per cent, of hospital demand for blood and blood components. In 1998-99, it fell short of that target, and reported meeting 93.74 per cent of demand. The Service and the NHS Executive agreed on a target below 100 per cent because the indicator records all instances where the Service does not fulfil hospitals' orders in their entirety, for whatever reason. The National Blood Service provides hospitals with clinical advice as well as blood components, and may advise that there is a preferable clinical alternative to the component ordered. Where hospitals agree to such a substitution, the indicator will record the fact that the Service did not fulfil the original order.

2.6 At its accountability review with the NHS Executive in April 1999, the Service accepted that the 1998-99 indicator reflected the broad picture of supply, which had been restricted for a limited part of the year. But it contended that the actual shortfall was less than reported, because of the element of double counting that arose when the Service negotiated hospitals' orders down, and hospitals increased subsequent orders to make up for the shortfall. **Case Study 1** demonstrates the impact postponement of deliveries has on the performance indicator. The National Blood Service is seeking a better indicator of its ability to meet hospital



## Case Study 1: The impact of shortages on the performance measure for meeting demand

### During the time of shortage

- 1 When there was a shortage of blood components during 1998, the Blood Service rationed supply by negotiating with hospitals to agree a reduction of their order, and delivered the reduced amounts. For the purpose of the performance indicator, the quantity of blood components delivered was measured against the original order. So, where a hospital's normal order was for 20 units, and the negotiated delivery was 15, the indicator would register a shortfall of five units - that only 75 per cent of demand had been met.

### When the Blood Service's stocks had recovered

- 2 When the Blood Service's stocks recovered, hospitals were able to restore their holdings by increasing their orders. The hospital that had accepted a shortfall of five units could order 25 units (that is, five units more than its normal daily order - hospitals normally order to maintain pre-determined stock levels). If the Blood Service met the order, the hospital would have received the quantity it needed - 40 units.

### Overall impact on the performance indicator

- 3 In this example, even though the hospital had received all the blood it required, the system would record only 89 per cent satisfaction of demand, because over the two days the National Blood Service supplied 40 units against orders for 45.

## 8 Frequency of supply failures that cause hospital blood stocks to fall below the level hospitals consider safe

| Frequency  | Percentage of respondents |      |
|--|---------------------------|------|
|  | 1994                      | 1999 |
| Never  | 12                        | 9    |
| Rarely - less than once a year                   | 36                        | 31   |
| Less than once a month but more than once a year | 29                        | 53   |
| More than once a month                           | 23                        | 7    |

Source: Bain & Company's report "National Blood Service Strategy", June 1994 (1994 data) National Audit Office census of blood bank heads (1999 data).

## 9 Aggregated ratings of achievement of full availability of blood components in widespread use

| Component             | Availability rated on a scale of 1 to 10, where 1 is poor, and 10 is excellent |      |
|-----------------------|--|------|
|                       | 1994<br>(Where reported)   | 1999 |
| Red cells             | 9.0  | 8.1  |
| Platelets             | 8.0  | 7.7  |
| Fresh frozen plasma   | See note   | 8.5  |
| Cryoprecipitate       | See note   | 8.6  |
| Paediatric components | See note   | 8.2  |

Note: Bain & Company did not report on the ratings for fresh frozen plasma, cryoprecipitate, or paediatric components.

Source: Bain & Company's report "National Blood Service Strategy", June 1994 (1994 data) National Audit Office census of blood bank heads (1999 data).

demand and now uses the broader concept of the necessity to impose supply restrictions to supplement the indicator.

- 2.7 The National Blood Service responded to its failure to achieve its delivery target in 1998-99 by making its main objective for 1999-2000 "to maintain the core business". The Service's business plan states that demand for blood components and related services must be met throughout the year and that all other objectives are subsidiary to this. Against the target of 99.51 per cent, it met 99.76 per cent of demand, and there were no supply restrictions during 1999-2000.

- 2.8 As a result of the supply restrictions in 1998-99, seven hospitals told us that they had cancelled or deferred a few operations because they had insufficient blood components. Other hospitals deferred minor procedures, such as "top-up" transfusions for patients suffering from chronic anaemia. Three quarters of hospitals reported no cancellations or deferrals of surgery as a result of shortages of blood components.

- 2.9 The responses to our census by the heads of hospital blood banks indicated that shortfalls in supply of blood components had a relatively small impact on patient care because hospitals held stocks of blood, in some cases on a substantial scale. On average, blood banks held 153 units at any one time in 1999, a significant increase over the 118 units in 1994. Sixty per cent told us that they were put in the position at least once a year where the National Blood Service's inability to fulfil demand led to their blood bank stocks falling below levels they considered safe to sustain all routine procedures (Figure 8). There is no defined "safe" level; it is for hospitals to make their own assessment of what that level should be. Some 33 Trusts complained formally to the National Blood Service about shortages of blood components in 1998. But the proportion where such problems occurred more than once a month fell sharply between 1994 and 1999.

- 2.10 Two initiatives are addressing the use and management of blood stocks: the Chief Medical Officer's "Better Blood Transfusion" initiative aimed at improving the way hospitals use blood (paragraph 1.25); and the National Blood Service's "National Blood Stocks Project" aimed at achieving the right balance between locally held hospital stocks and those held by the Service (also paragraph 1.25). During the first two phases of the National Blood Stocks Project, seven of the 22 participating hospitals reduced their stock holding levels following comparison with their peers.

- 2.11 Figure 9 sets out the 1994 and 1999 ratings for individual blood components in widespread regular use. Hospitals rated the National Blood Service's performance at achieving full availability of blood components quite highly - above 7.5 out of 10. But, in

two areas where comparisons can be made with the outcome of the survey undertaken by Bain & Co in 1994, levels of satisfaction had fallen.

## Range of blood components and services

2.12 In our census, most blood bank heads were satisfied with the range of blood components provided by the Service. On a scale of 1 to 10, they rated the range of components at 8.8 compared with Bain & Company's 1994 survey rating of 8.6. Twenty eight per cent did, however, suggest further components that would be useful. For example 10 per cent saw a need for virally inactivated fresh frozen plasma. Hospitals can request components outside the normal range; the Service has procedures for considering such requests, though they are not uniform throughout the country. Where the Service supplies additional components, it charges to cover its costs. Sixty eight per cent of blood bank heads said they had discussed their component needs with the Service. This may, however, under represent the number who have been involved in such discussions, since many of the 68 per cent reported having been involved in discussions on component needs at technical and advisory groups, and at other groups where most, if not all, users routinely meet National Blood Service staff. Of those who said they had had such discussions, 89 per cent had either reached agreement, or were still in discussion.

2.13 The Service also provides diagnostic services to hospitals, such as identifying rare blood groups and diagnosing blood diseases of unborn children; and non-diagnostic services, such as enabling autologous predeposit of blood and tissue and bone banking. In response to our census, blood bank heads rated these diagnostic and non-diagnostic services fairly highly with a score of 8.3 out of 10 (very similar to the 8.26 in the 1994 Bain survey). Only six blood bank heads said they needed additional diagnostic services, with two citing antibody screening for bone marrow donors.

Seven Trusts said they needed autologous predeposit, but that it was not available to them, and four others indicated that they wanted other non-diagnostic services. We found evidence of only one complaint in 1998 from Trusts about the range of products or components available.

## The Service's ability to maintain supply of blood in the medium to long term

2.14 Over the last three years, trends in the relationship between supply of and demand for blood suggest that seasonal tendencies to collect more blood at certain times of the year and less at others are becoming more marked. Also the emerging long-term trend showed demand growing more quickly than collection, made worse by the predicted additional two per cent process loss arising from leucodepletion (now reassessed at one per cent). Had those trends continued, they could have led to serious shortages in blood from summer 2000. The National Blood Service recognised and took action to avoid this by increasing their collection of O negative blood, both absolutely and as a proportion of all blood collected, and by working to influence hospitals' use of O negative blood ([Case Study 2](#)).

## Accuracy of order filling

2.15 The National Blood Service makes some 200,000 deliveries of blood a year, half routine and half in response to specific requests. The number of incidents reported in our census indicates that, in 1998, the Service fulfilled accurately all but a very small proportion (less than half of one per cent) of hospital orders. But those failures affected almost half of all Trusts served. In 1998, distribution and administrative arrangements were the third most common subject of complaint, with hospitals making a total of 620 complaints to the Service. These complaints covered incorrect component, incorrect expiry date, incorrect labelling and supply of expired, or nearly

### Case Study 2: Action taken by the National Blood Service to avoid shortages of blood

As part of its 1999-2000 business planning cycle, the National Blood Service examined supply and demand trends and concluded that, without corrective action, it would be likely to have to restrict the supply of O negative blood at some time in that year.

#### The Problem

The main problem was that hospitals used a higher proportion of O negative (up to 12 per cent) than existed in the donor population or the population at large (10 per cent). It is used disproportionately because O negative blood is suitable for transfusion to recipients of any blood group. Hospitals may therefore request and use O negative components for patients with less common blood groups. By doing so, they can avoid the need to maintain stocks of, and estimate demand for, components from those groups.

#### Action Taken

The National Blood Service has approached this problem in two ways: it has tried to increase its O negative stocks by targeting O negative donors, including lapsed ones, when requesting donations. And it has tried to influence demand by opening discussions with those hospitals that used the most disproportionate amounts of O negative blood. In addition, the National Blood Stocks project has worked to see to what extent it can influence hospitals' management of blood stocks. The Blood Service has found that the combined impact of these activities has been to achieve the necessary increase in O negative collections and stock levels without a corresponding increase in stocks of groups for which there is less demand. They were thus able to meet demand and build stocks during 1999-2000 while collecting fewer donations of blood than they had originally planned.

expired, component. In our census, 106 blood bank heads reported instances of orders not being met satisfactorily, of whom:

- twenty reported components, particularly platelets, being delivered with "use by dates" that - although current - were older than they had specified. Platelets have a shelf life of only five days, and demand is sporadic, making it difficult to ensure that stock is always on hand to meet orders. Red blood cells have a shelf life of 35 days, but the Service finds hospital blood banks unwilling to take components that are close to their "use by date"; and
- twenty reported the Service supplying red cells that were not compatible with the blood groups ordered.

## Timeliness of deliveries

2.16 Although most deliveries of blood are used initially to replenish hospital stocks, late deliveries can create difficulties for hospitals and may cause treatment to be delayed. In our census, 82 per cent of blood bank heads rated timeliness of deliveries as good, although 18 per cent said that delivery times did not always match the requirements of clinical practice. Almost three-quarters of hospitals had discussed delivery times with the Service, and two thirds had reached satisfactory agreement. A few hospitals did, however, complain to the Service about the late delivery of components. In 1998, the London and South East Zone received 107 complaints, the Midlands & South West Zone 21; and the Northern Zone 15 (14 of which concerned one centre). One aim of the recent management restructuring was to provide a clearer focus on customer service. The Service expects this to lead to further improvements in the timeliness of deliveries.

2.17 The Service aims to make all emergency deliveries within two hours of the request, and achievement against that target is one of the service's high level performance indicators. In 1998-99, it achieved that target in 99.82 per cent of cases, and in 1999-2000 99.81 per cent. The total number of emergency deliveries increased from 2,251 in 1998-99 to 2,573 in 1999-2000; and the number falling outside the two hour limit increased from four to five. In their responses to our census, blood bank heads reported that emergency

deliveries took an average of 53 minutes from request to delivery. The average satisfaction score for the Service's handling of emergency requests was 8.4 out of 10, an improvement over the 8.0 recorded in 1994.

## Strategic control of blood stocks

2.18 As reported at paragraph 2.15, blood components have a limited shelf life. The Service must, therefore, manage stocks carefully to avoid wastage. It has a high level target for wastage: no more than 0.76 per cent. In 1998-99, it performed better than target, keeping wastage down to 0.36 per cent. However, increased donations in early 1999 led to an increase in blood stocks, which was maintained throughout 1999-2000. The Service expected this planned increase in stock levels to lead to higher levels of wastage. It therefore retained its target of no more than 0.76 per cent. In the event, it strengthened its stock management procedures, for example by monitoring the age profile of stocks and rotating them; and reported that it kept losses through time expiry down to 0.56 per cent in 1999-2000.

2.19 The Service also has high level targets for wastage or loss from all causes (Figure 10). Those targets are cast in terms of the percentage of donations that result in completed donations, additions to stocks of blood at blood centres and issues to hospitals. In the case of the two targets relating to events after collection, performance in 1998-99 fell short of the target, mainly because of additional process losses associated with the introduction of large-scale leucodepletion. That impact continued into 1999-2000, although performance in that year was better than revised target.

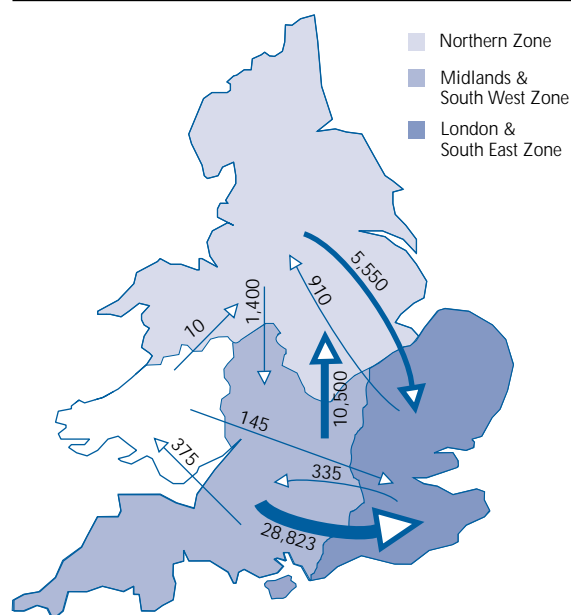
2.20 The National Blood Service takes a strategic approach to handling stocks of blood components. In some parts of the country, the supply of blood exceeds demand, and in others demand exceeds supply. Since its inception, the National Blood Service has operated on the principle that there is no inherent reason why demand and supply should be balanced locality by locality. It considers that there are economic and social reasons for not doing so - people give blood as a resource for the benefit of fellow citizens wherever it might be needed, not just locally. It therefore treats blood as a national resource. The National Blood Service collects and banks

### 10 Reported performance against wastage and loss targets

| Measure   | 1998-99         |                      | 1999-2000       |                      |
|---|-----------------|----------------------|-----------------|----------------------|
|   | Target per cent | Reported Performance | Target per cent | Reported Performance |
| Donations resulting in completed donations                                | 98.02           | 98.00                | 98.00           | 98.16                |
| Donations resulting in blood being added to National Blood Service stocks | 94.94           | 93.74                | 93.00           | 95.03                |
| Donations resulting in blood being issued to hospitals                    | 94.34           | 92.32                | 91.00           | 93.25                |

Source: National Blood Service

# 11 Units of blood moved between zones in 1999 by the National Blood Service



Source: National Blood Service

it locally, and the majority is used locally, but the Service also moves blood between centres and zones to iron out surpluses and shortfalls as part of a national stock management process. It moved a total of 41,000 units of blood in 1998, and 48,000 in 1999 (Figure 11). The Midlands and South West Zone provided the bulk of the exports, amounting to over 80 per cent of the total in 1999.

2.21 At the time of our visits in 1999, only one blood centre, Southampton, had analysed the risk of supply being interrupted and produced a contingency plan, though they had not maintained their plan and it was some 18 months out of date. The Service has since developed contingency plans to deal with events that might interrupt its supply of blood components to hospitals. Each centre now has a local plan based on the same model, tailored to fit local circumstances. The Service activated the plans in September 2000, when supplies of road fuel were under threat (Case Study 3).

2.22 All centres have plans for coping with major incidents that could create a need for blood components. Blood centres in the Midlands and South West and London and South East Zones operate zonal plans, which are subject to routine testing. In the Northern Zone each of the centres has a separate major incident plan.

## Case Study 3: Action taken to ensure continuing supplies of blood to hospitals during the September 2000 fuel shortage

### Background

- 1 During the week beginning 10 September 2000, there were blockades of oil depots, and deliveries of road fuel were interrupted. The National Blood Service took measures to maintain all necessary services to patients, and to ensure that the Service was not the cause of any restriction in patient care.

### Actions taken

- 2 The Service had good stock levels of blood components (sufficient for four to five days), and benefited from a positive response from donors, staff and hospitals. In some locations, it holds its own stocks of fuel and supplies other parts of the NHS, and in others it relies on the NHS for its supply. There were therefore no immediate difficulties in maintaining the supply of blood components to hospitals. But the Service planned on the basis that it could take until the end of September before full normal availability of fuel supplies was restored.
- 3 Acting in concert with the NHS as a whole, the National Blood Service activated its Disaster Contingency Plan with effect from 1100 on 15 September. It had the key objective of ensuring that component stocks, and in particular platelets, were maintained. It identified the areas under threat (collections of donations; processing, testing and issuing; delivery to hospitals; and obtaining essential consumables, for example blood packs and test kits). The main thrust of the plan was to focus all the work of the Service on essentials, for example by delivering donated blood to the nearest blood centre; minimising the number of ad-hoc deliveries; ceasing all trials and development of new systems; ensuring that key staff were able to get to work; and encouraging hospitals to increase temporarily their stockholdings of blood components.
- 4 The plan set up a command and control organisation which named individuals at HQ, zone and blood centre level who would provide 24 hour management cover and would monitor manage and report on key indicators, such as staffing, donation collection, component issues and deliveries, and availability of blood components, fuel supplies, critical equipment and consumables.

### Outcome

- 5 The National Blood Service achieved its aim and key objective by maintaining supplies to hospitals and avoiding causing any restrictions to patient care. If the national problems with fuel supply had continued, the Service would not have acted alone to secure its supplies, but would have been part of a NHS-wide solution.

## Does the National Blood Service provide effective medical support and advice?

2.23 An important role of National Blood Service consultants, reiterated in the 1995 Plans for the Future of the National Blood Service and in the 1998 circular "Better Blood Transfusion", is to maintain contact with, and advise and disseminate information to, users. This role recognises the shared responsibility for ensuring the optimal use of a scarce, voluntarily donated national resource. National Blood Service involvement in blood transfusion matters in hospitals may be through membership of the hospital transfusion committee, participation in or initiation of clinical audits, through visits and talks or lectures to groups at the hospital, or through being available to provide medical advice or support.

## Hospital transfusion committees

2.24 Hospital transfusion committees are multi-disciplinary groups that have a key role in clinical practice, clinical audit and feedback and in education and training relating to blood transfusion matters. And the Service's consultants were active in encouraging their establishment. At March 1999, 81 per cent of eligible hospitals had a transfusion committee. The Circular "Better Blood Transfusion" made hospital transfusion committees mandatory from March 1999 for all NHS Trusts where blood is transfused. By March 2000, the proportion with such committees had risen to 91 per cent. The National Blood Service has three high level performance indicators that relate to hospital transfusion committees (Figure 12).

2.25 In our census of blood bank heads, we asked whether such involvement was useful to hospitals, and almost all responded that it was (Figure 13). This represented a marked improvement over the 1994 survey, when about three quarters found the Blood Service's involvement useful.

## Clinical Audit

2.26 Clinical audit is a process in which doctors, nurses and other healthcare professionals systematically analyse the care and treatment they provide to patients; and is an integral part of clinical governance. The National Blood Service has two high level performance indicators relating to clinical audits concerning the use of blood components or services. For 1998-99, as in the preceding two years, these targets were set on the basis that National Blood Service consultants would be carrying out, or be involved in, audits on their own initiative. After consideration, the Service decided that this approach did not make the best use of clinical audit. It therefore moved during the year towards fewer audits covering more hospitals. Hence the failure in 1998-99 and 1999-2000 to meet the target for the number of audits, and the success in beating the target for the number of hospitals involved (Figure 14). Blood bank heads' responses to our census indicated that the National Blood Service had increased the proportion of clinical audits they were involved in from about a third in 1994 to a half in 1999 (Figure 13).

## Visits, talks and other support

2.27 In 1998-99, the National Blood Service started to report the number of hours of teaching delivered by its consultants. It did so to establish the scale of that activity, to inform any future target setting. In the event, the Service did not set such a target. It has now allocated four clinical sessions (half-days) a week for each of its full time consultants to user hospital focused work, and proposes to develop outcome measures to ascertain the impact of that work. In 1998-99,

### 12 National Blood Service Performance Indicators: Reported involvement in hospital transfusion committees

| Indicator   | Target for 1998-99 | Performance |           |
|---|--------------------|-------------|-----------|
|   |                    | 1998-99     | 1999-2000 |
| Percentage of NHS hospitals with a transfusion committee  | 64%                | 81%         | 91%       |
| Percentage of hospital transfusion committees with National Blood Service consultant representation | 92%                | 93%         | 94%       |
| Number of attendances at hospital transfusion committees  | 160                | 371         | 470       |

Source: National Blood Service

### 13 National Audit Office census findings on the National Blood Service's involvement in transfusion matters within hospitals

|  | 1994<br>Per cent | 1999<br>Per cent |
|--|------------------|------------------|
| Where the hospital has a transfusion committee, the National Blood Service is involved in it   | 52.0             | 87.0             |
| The National Blood Service's involvement in the Transfusion Committee is useful to the hospital  | 77.0             | 96.9             |
| Where clinical audits pertaining to the use of blood components or services have been conducted at hospitals, the National Blood Service participated in or initiated them | 36.0             | 49.2             |
| The National Blood Service hold meetings to update clinicians on developments in transfusion practice  | 58.0             | 69.1             |

Source: Bain & Company's report "National Blood Service Strategy", June 1994 (1994 data) National Audit Office census of blood bank heads (1999 data).

### 14 National Blood Service Performance Indicators: Reported involvement in clinical audit

| Indicator  | Target for 1998-99 | Performance |           |
|--|--------------------|-------------|-----------|
|  |                    | 1998-99     | 1999-2000 |
| Number of audits undertaken at NHS hospitals             | 96                 | 67          | 56        |
| Number of NHS hospitals involved with at least one audit | 160                | 210         | 239       |

Source: National Blood Service



consultants delivered 958 hours of teaching and, in 1999-2000, 902 hours; this information was derived from data provided by those consultants. In their responses to our census, some 70 per cent of blood bank heads told us that the National Blood Service held meetings at their hospitals to update clinicians on developments in transfusion practice. This represented an increase in activity compared with 1994 (Figure 13).

2.28 Taken together, attendance at hospital transfusion committees, participation in clinical audits and teaching commitments represent a sizeable programme of visits to hospitals. And almost all (94 per cent) of respondents to our census who were aware of having been visited said those visits were helpful. However, seven per cent of blood bank heads said they were not aware of any visit in the previous two years, and a further eight per cent either did not know when the last visit was, or described it as being "a long time ago". The National Blood Service accepts that, where the blood bank head is not a doctor, he or she might not always be aware of visits made by the Service's consultants. The Service considers, however, that effective liaison is secured through other contacts that take place between blood centres and blood bank heads.

2.29 Over 90 per cent of blood bank heads responding to our census regarded National Blood Service consultants as experts in transfusion medicine, and contacted them when they needed advice on that subject, although many respondents said they would also contact other consultants and experts. These figures represent a small improvement over the results of the 1994 Bain survey. On a scale of 1 to 10, blood bank heads rated clinical advice on transfusion medicine at 8.4. Almost all (97 per cent) of those who offered an opinion of the usefulness of their point of contact at the National Blood Service for medical matters put it in a range between useful and essential.

2.30 The Service recognises that it needs effective consultants to enable it to deliver a high quality service. It has, therefore established joint posts - medical staff also holding university appointments, for example - and attached research and development responsibilities to jobs, in an effort to attract higher calibre doctors.

## Is the National Blood Service investment in scientific and medical research well targeted and disseminated?

2.31 In 1998-99 the National Blood Service spent £2.5 million (excluding non-NHS funding) on scientific and medical research. It does not undertake long term, intrinsically expensive, research into areas such as blood substitutes, but has left such research to the pharmaceutical industry. The Service considers that the limited funds available to it for research and development mean that it cannot cover the entire field, and the NHS Executive supports this view.

2.32 In 1996, the National Blood Service undertook an audit of all research activity then current and rated projects according to their quality and appropriateness to the needs of the Service. They also established a procedure for obtaining approval to proceed with research work. This requires those wishing to undertake research to submit an application to a Projects Board, which meets annually. We found, however, that some older projects, for example research into the immunology of cold blood, that had been rated as being of limited relevance, were continuing to receive funding at the time of our audit.

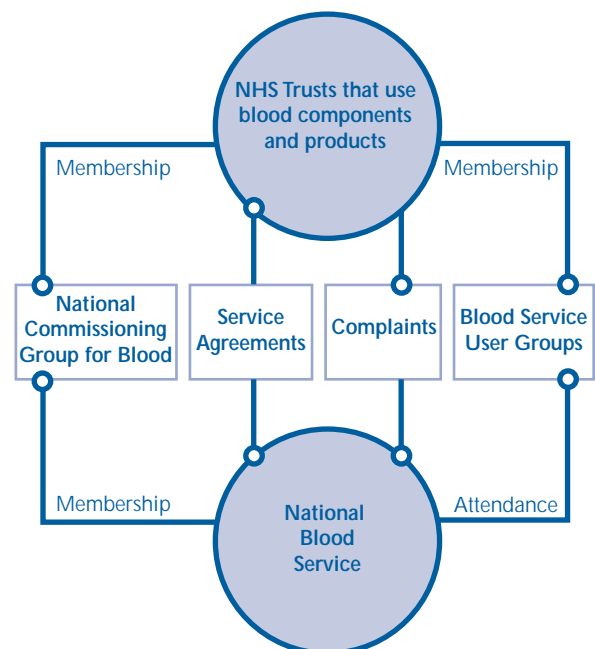
2.33 Effective dissemination of research results adds value to the research work by placing the material at the disposal of a wider audience. There is evidence, however, that the findings of research are not being communicated to all who may need or wish to know. Most dissemination has been through restricted channels, such as publication as peer reviewed papers in journals, through the British Blood Transfusion Society, or during liaison meetings with NHS colleagues. Fifty one per cent of respondents to our hospital census said that they received information on National Blood Service research and all of those except two said that they found the information useful. But 44 per cent said that they did not receive such information. The Service needs to consider using existing channels more intensively, and how to use other channels of communication, such as through postgraduate lectures, or by publishing results on its website.

## Is the National Blood Service responsive to its users?

2.34 The National Blood Service is accountable to its users - NHS Trusts using blood components and products - through the national service agreement, the National Commissioning Group for Blood and the National Blood Service Users Group; and through the operation of a complaints procedure (Figure 15). Eighty per cent of blood bank heads responding to our census considered that the Blood Service was accountable to users. Nine out of 10 of those considered that accountability was through the service agreement; and seven out of 10 that Trusts' representation on National Blood Service Users Groups also secured accountability.

2.35 Following agreement with the NHS Executive, the National Blood Service introduced a national service agreement and national pricing from April 1999 (paragraph 1.19). The national service agreement is the core agreement between NHS Trusts and the local blood centre for the provision of blood components. It sets out standards of service and prices; provides for local additions to the agreement; and prescribes how the parties should resolve any difficulties. The first national service agreement was originally intended to cover 1999-2000 only. The Executive's intention was for the National Commissioning Group for Blood to review its operation, and then to move to a longer term agreement from 2000-01. Although that remains their intention, the longer term agreement is not yet in place.

### 15 The National Blood Service's accountability to its users



2.36 The National Blood Service discusses its pricing plans with the National Commissioning Group for Blood. The Group includes representatives from the Department of Health, the NHS and the National Blood Service and provides an opportunity for users to call on the Service to justify its pricing proposals before agreeing to them.

2.37 The Department of Health established the National Blood Service Users Group in 1995 to enable users to monitor the performance of the National Blood Service. The Group was to have a limited life, and held its last meeting in April 1999 (paragraph 1.10). The three Zonal Blood User Groups continue to operate, however, because the Department consider there is a need for users to be actively involved, a view supported by our census findings. And they are represented on the National Commissioning Group for Blood.

2.38 In his final report to the Secretary of State, the Chairman of the National Blood Service Users Group recommended that user groups should have a wider role in determining blood transfusion practice, and that a user group for the future should be based on local blood transfusion committees, which should provide the membership of the zonal groups. In April 2000, the Department of Health asked the National Blood Service to coordinate and oversee the work of ensuring consistent national practice on the safe and effective use of blood. The blood user groups would be central to this work.

2.39 The Department propose to establish a National Transfusion User Group to succeed the National Blood Service Users Group. This body will include representatives from the regional groups, the Serious Hazards of Transfusion Scheme, the medical royal colleges, the National Blood Service and the Department of Health. The three zonal groups will be succeeded by eight regional blood transfusion user groups. Those regional groups will be represented on the National Commissioning Group for Blood, to enable users to continue to be involved in discussions on blood prices and the national service agreement. The Department also intend the National Transfusion User Group to develop links with national groups that are developing guidelines, such as the National Institute for Clinical Excellence. They aim to have the structure in place by March 2001.

#### 16 Main topics of users' complaints in 1998

| Topic                                   | London and South East Zone | Midlands and South West Zone <sup>1</sup> | Northern Zone | TOTAL |
|---|----------------------------|---|---------------|-------|
| Packaging                               | 129                        | 563                                       | 1057          | 1749  |
| Direct antiglobulin test positive blood | 83                         | 294                                       | 260           | 637   |
| Distribution                            | 335                        | 147                                       | 138           | 620   |

Note 1: The numbers for Midland and South West Zone relate to the year December 1997 to November 1998.

Source: National Audit Office analysis of National Blood Service data

2.40 It is open to hospitals to complain to the National Blood Service if they consider that they have received a substandard service. Zones reported having received 3,661 complaints from users in 1998. The problems that attracted most complaints concerned packaging (paragraph 4.13) direct antiglobulin test (DAT) positive blood and distribution (paragraph 2.15) (Figure 16). Blood that is DAT positive is safe for use, but hospitals cannot cross-match it with patients' blood, because DAT positive blood interferes with the cross-matching process. The National Blood Service does not test for DAT positive blood, as no question of safety is involved and the condition is uncommon. The problem shows up in the cross-matching process, and the National Blood Service refunds the cost of such blood when it has been supplied to hospitals.

2.41 The National Blood Service does not manage or monitor users' complaints as closely as it does those from donors. The zonal management boards did, however, monitor the number and nature of such complaints, and the action taken to deal with them.

# Part 3

How effectively does the National Blood Service encourage people to give blood?

## Conclusions

- Although the National Blood Service experienced some difficulty in 1998-99 in meeting in full hospitals' demands for blood components, it collected sufficient donations of blood in 1999-2000 to avoid such problems and increase the stocks held at blood centres.
- While it has undertaken regular qualitative surveys of people's attitudes towards its campaigns, the Service has been less active in carrying out quantitative surveys. Our quantitative survey of the public highlighted the potential for increasing the pool of donors and the benefits to be gained from addressing the time constraints people operate under and the need to stem the loss of donors through bad experiences of giving blood.
- The Blood Service goes to some lengths to encourage donors to continue giving blood. It monitors its handling of complaints from donors and performance indicators for donor care during donation sessions.
- Although the Service's performance in 1998-99 was better than the targets set for donor care, the volume of complaints increased. This increase may in part have been a result of a greater confidence on the part of donors that their complaints would be taken seriously. But it also indicates a need for the Service to reduce the time it takes to give blood, a point that also emerged from our survey of attitudes to blood donation; and the Service is taking action to deal with this.

- 3.1 This part of our report examines how well the National Blood Service performs in terms of encouraging people to give blood.
- 3.2 Securing the co-operation of blood donors is essential to the National Blood Service. The Department of Health's *"Plans for the Future of the National Blood Service"* (1995) recognised that donors are the foundation of the National Blood Service and announced steps to improve its service to donors.
- 3.3 The Service maintains a record of existing donors, and invites them to attend donor sessions. Not all donors continue to give blood after their first donation, however, and existing donors lapse for many reasons, including becoming ineligible. The Service needs therefore to recruit and retain donors. It does so through the use of publicity and through care of existing donors.
- 3.4 The National Blood Service uses 28 performance indicators for measuring achievement against targets (Appendix 7); seven of them relate to this part of the report. Its performance indicators for collection, recruitment and retention are at [Figure 17](#). The targets for collection were set before the beginning of the year, on the basis of forecast need. Failure to hit the target in 1998-99 did lead to some supply difficulties (paragraphs 2.5 to 2.9). But the amount collected in 1999-2000 was sufficient to meet demand and increase stocks held at blood centres.

## Publicity and Research

- 3.5 Until recently, the Service's publicity has largely taken the form of posters and advertising campaigns in the press and local radio and public relations events. In 1998-99 as a whole, the Service did better than its target for new donors enrolled, and lost fewer donors through lapsing than it had expected. But, importantly, it failed to meet its target for donations (Figure 17). The National Blood Service reported at its annual accountability review that the shortfall resulted from obtaining fewer

### 17 Reported performance against collection targets

| Aspect of Collection   | Target for<br>1998-99 | Performance |           |
|--|-----------------------|-------------|-----------|
|  |                       | 1998-99     | 1999-2000 |
| Percentage of donors bled to target (that is, the extent to which the collection target is achieved) | 100%                  | 96.29%      | 97.06%    |
| New donors enrolled  | 318,750               | 408,043     | 442,550   |
| New donors attending   | 285,000               | 279,409     | 268,739   |
| Lapsed donors  | 297,189               | 218,116     | 196,863   |

Source: National Blood Service

donations than planned in autumn 1998, probably because of the poor weather. In early 1999, it commissioned a television advertising campaign. During the campaign, which was associated with the introduction of a national call line, there was a 26 per cent increase in blood collection and the number of new donors enrolled was 104 per cent above the normal number for that period.

- 3.6 There was a significant difference between the numbers of new donors enrolled and new donors attending in 1998-99 and 1999-2000 (Figure 18). This difference arose because enrolment is an expression of interest in becoming a donor, and not all of the people making that expression actually give blood. In 1997-98, 75 per cent of those who enrolled donated blood, by 1999-2000 the proportion had fallen to 60 per cent. This is not at present a serious problem for the National Blood Service. Its policy, for reasons of safety and cost-effectiveness, is to retain existing donors; and it has become more successful at containing the numbers of lapsed donors. If the trend of a falling rate of conversions from enrolment to donation continues, however, the Service will need to ensure that a balance is struck so that its use of existing donors does not diminish the altruism that prompts new individuals to express an interest in donation.



- 3.7 The National Blood Service has regularly commissioned research into donor attitudes to campaigns: beforehand to gain assurance that the campaign will be effective, and afterwards to assess its impact. We identified 21 surveys since 1989. Most of that research was qualitative - based on a small number of in-depth interviews and group discussions. Three research surveys were quantitative - using samples of a sufficient size to enable firm conclusions to be drawn about the national population as a whole. Two of the three quantitative surveys were about specific issues and only one, carried out in 1989, attempted to establish the attitude of the whole adult population towards blood donation in general.
- 3.8 As there had not been a full quantitative survey of donors for 10 years, we commissioned a survey of behaviour and attitudes among adults towards giving blood to identify strengths in the present system and opportunities for planning further development. That survey confirmed findings from the Service's qualitative surveys, and provided some new insights. We have supplied the detailed results to the National Blood Service. A summary of those results is set out [opposite](#). Our research methodology is set out at Appendix 8.

## Donor Care

- 3.9 The Service recognises that it is important that the experience of giving blood is a good one, as the quality of that experience can have a material effect on donors' future willingness to give blood. For that reason, it measures and monitors donors' satisfaction with their treatment by the Service, through continuing surveys of donors attending sessions. The National Blood Service has set performance targets for waiting times and donor satisfaction. In 1998-99, performance against each of the three targets was better than the standards ([Figure 18](#)). The patient satisfaction indicator recorded an improvement in 1999-2000. There was, however, some deterioration in the proportion of donors waiting longer than the target times.
- 3.10 In 1999, the National Blood Service launched a project "Donor 2000". This had two elements: analysing its database to understand better the attributes of donors; and implementing initiatives to recruit and retain donors. The main outcomes of the research were that it identified the groups from which the most reliable donors come and confirmed that it is more efficient to retain existing donors than to recruit new ones. The Service is introducing initiatives that aim to improve the experience of giving blood and attitudes towards it, by for example ensuring that reception staff at donor sessions are sympathetic and informative. The key improvement promised in the 1995 Plans for the Future of the National Blood Service was to develop its present range and pattern of collection sessions to make blood donation easier and more convenient for donors. The National Blood Service is introducing area based teams, particularly in the Midlands and South West Zone, to encourage recruitment and retention of donors ([Case Study 4](#)).
- 3.11 Since 1996, the National Blood Service has had a national complaints policy that is in line with the rest of the NHS. The three zones deal with complaints from donors in accordance with zonal operating policies. These policies contain some minor differences from the national policy; and the newly appointed Director of Services to Donors and Director of Public and Customer Services propose to revisit the way they operate.
- 3.12 The Board retains oversight of complaints from donors. Each zone submits a quarterly return showing the number of complaints received and the number cleared within specified timescales. They do not, however, report on how long it has taken to respond to the substantial proportion of complaints that were not cleared within 20 days.

### 18 Reported performance against targets for donor care, 1998-99

| Aspect of care  | 1998-99            | Performance         |                       |
|---|--------------------|---------------------|-----------------------|
|   | Target<br>Per cent | 1998-99<br>Per cent | 1999-2000<br>Per cent |
| Donors waiting longer than 30 minutes before registration and screening | 7.3                | 6.0                 | 9.1                   |
| Donors taking longer than 40 minutes to reach the bleed bed             | 9.8                | 8.7                 | 10.3                  |
| Donors satisfied (as derived from satisfaction surveys)                 | 90                 | 93.5                | 99.7                  |

Source: National Blood Service

### Case Study 4: Area-based blood collection teams

In the past, blood collection teams were mainly based on blood centres, with individual teams working on a rotational basis at a number of collection venues, thus dealing with different panels of donors.

Area-based teams are, as their title implies, based at locations remote from the blood centre to which they are attached. For example, there are teams attached to Plymouth Blood Centre that are based at Dorchester, Exeter, North Devon, Taunton and Truro. Those teams alone collect blood from within their designated areas.

The National Blood Service considers that giving area managers and their teams responsibility for particular geographic areas enhances customer service by developing a sense of identity between teams and their specific areas and groups of donors. The Service expects the introduction of area-based teams to encourage recruitment and retention of donors, and to strengthen links with general practitioners and local hospitals.

### Summarised results of the National Audit Office survey of attitudes to blood donation

**The most important positive finding** was that almost everyone (96 per cent of the population) accepted that there was a continuing need to give blood. The National Blood Service therefore does not have to put a lot of effort into selling the merit of giving blood. Other important positive points were:

- the population is highly responsive to prompts to donate blood, 10 per cent of donors responding to various forms of advertising and 19 per cent to direct requests from the National Blood Service;
- a third of those who had ever been donors said they faced no obstacle when they last gave blood. And the result was better for recent donors: 40 per cent said they faced no obstacle;
- only nine per cent of non-donors said they simply did not wish to give blood and only one per cent of lapsed and non donors said they would be motivated by payment;
- there was little regional variation in the proportion of the population that said they donated, which indicates that the National Blood Service is, geographically, providing reasonably equal opportunity to give blood;

Other findings indicate that **there may be potential for increasing the pool of donors, and donations:**

- a quarter of non-donors said they would probably or definitely give blood. Ten per cent of lapsed and non-donors said they did not know how to give. This indicates scope for increasing donation through informing people how to give. Twelve per cent of people said that if they were to give blood they would ask their GP or local hospital;
- compared with the general population, recent donors were more likely to be Londoners than people in other regions. And Londoners were most likely to say that they would arrange to give blood at their place of work. These results may indicate the strength of industrial sessions in London, and that there is an opportunity for organising more industrial sessions.
- three per cent of the population said that they would find out how to give blood by using the Blood Service national 0345 telephone number. When prompted, 18 per cent said they were aware that there was a number;
- recent donors are more likely to be aged 25-44. This suggests that donors in that group are likely to give more often than other groups;
- younger donors (aged 17-34) are considerably more influenced to give blood as a result of advertising than any other age group, providing the potential for cost-effective, targeted advertising;
- one in five donors suggest that the most influential prompt to giving blood is direct contact with the Blood Service, yet only one in ten 17-24 year olds are influenced in this way. This indicates that there may be scope for more direct activity with this age group;
- there are significant differences between the regions among those adults who claim they will probably or definitely give blood in the future: London, the South East, the South West and the West Midlands are well above the national average;
- "ineligibility" is given by one third of adults as the main reason for not donating, although fewer than half of those had been specifically advised by a doctor, or the Blood Service, not to donate;
- time constraints were cited as an obstacle to giving blood by a third of adults. This suggests that time saving measures such as work place sessions and reduced waiting times could prove effective.

Some of the findings were, however, less reassuring:

- a third of non-donors said they would definitely not give blood. This is worse than in 1989 when a fifth would definitely not give. In terms of age groups, this response was most prevalent among 55 to 69 year olds, most commonly for medical reasons (which may well be insuperable);
- five per cent of lapsed donors - seven per cent of lapsed donors with no intention to give again - cited bad experiences at the hands of the National Blood Service;
- twenty-two per cent of non-donors fear giving blood, with 20 per cent fearing needles;
- older donors are more likely to lapse. A third of lapsed donors attribute their lapsing to illness.

3.13 In 1998-99, the National Blood Service received 5,349 complaints from donors, equivalent to one complaint for every 448 donations. This represents an increase of some 10 per cent over 1997-98, when there was one complaint for every 493 donors bled. This outcome does not necessarily imply a deterioration in standard of service; it may reflect an increase in public confidence in the openness and responsiveness of the Service. Also in 1998-99, the National Blood Service acknowledged 79 per cent of complaints within two days and cleared 66 per cent within 20 working days; the performance in clearing complaints is broadly in line with that of the NHS as a whole. Each of the 1998-99 results for responsiveness represented a deterioration in performance from the previous year (Figure 19). But the 1999-2000 outcomes indicate that there was an improvement in the proportion cleared within 20 working days.

#### 19 Reported performance in handling donors' complaints

| Indicator   | Performance in |         |           |
|---|----------------|---------|-----------|
|   | 1997-98        | 1998-99 | 1999-2000 |
| Total complaints received                               | 4,846          | 5,349   | 7,792     |
| Ratio of Complaints to Donors                           | 1:493          | 1:448   | 1:311     |
| Acknowledged within the target time of two working days | 84%            | 79%     | 79%       |
| Cleared within 20 working days                          | 75%            | 66%     | 80%       |

Source: National Blood Service

3.14 The National Blood Service considered that the increase in complaints in 1998-99 was largely due to teething problems associated with the establishment of the national call centre. It acknowledged, however, that the underlying trend was upwards, in common with the NHS as a whole. The most frequent subject of complaints is delays at donor sessions. The National Blood Service has taken action to deal with this, for example by introducing appointments at static sites in 1999-2000, and their planned extension in 2000-2001 to mobile collection sessions.

3.15 The Service expects to address performance against the targets for dealing with complaints when the new organisation is in place; and is likely to establish a formal performance indicator in 2000-01 to aid the management of this aspect.

minutes



# Part 4

Are National Blood Service components safe?

## Conclusions

- The number of verifiable deaths linked to unsafe blood components is very low in relation to the number of transfusions made, although any fatality is regrettable. With minor exceptions, there are comprehensive arrangements for securing the safety of blood components, and the Medicines Control Agency has confirmed their efficacy. As safety is of such great importance, we consider that the Service should establish a high level indicator to allow monitoring of safety performance.
- Hospital users reported a high level of satisfaction with the quality of National Blood Service components and services, though there were problems with the packaging and labelling of blood components which the Service is tackling. It has recently adopted a national quality strategy, which represents an important move forward.



- 4.1 This part of our report examines how well the National Blood Service performs in terms of the safety of blood components.

## Deaths caused by unsafe blood

- 4.2 Receiving blood can be hazardous. The National Blood Service has, however, no high level indicator of safety performance. In our census, blood bank heads reported a total of seven verifiable fatal incidents to recipients in the six years 1993 to 1998 caused by unsafe blood components supplied by the National Blood Service. During that time, some five million transfusions were made. The Service is not aware of any donation-related deaths in that period.
- 4.3 The Serious Hazards of Transfusion Scheme is a confidential voluntary reporting system for major transfusion events in the UK and the Republic of Ireland. Although independent, it is funded by UK blood services. The Scheme has been running for three years and, by 1998-99, participation had grown to 78 per cent of hospitals transfusing blood. The December 1998 health circular "Better Blood Transfusion" (Appendix 3) recommended that, from March 1999, all NHS Trusts where blood is transfused should participate in the Scheme. The two main reporting categories are "non-infectious" (for example, wrong blood transfused) and "infectious" (for example viral or bacterial contamination). In their 1998-99 Annual Report, published in April 2000, the Serious Hazards of Transfusion Steering Group reported seven deaths definitely attributable to transfusion and nine possibly so attributable. Two of the definitely attributable deaths were due to bacterial infection and one from viral contamination (Hepatitis B). The other deaths were unrelated to blood component processes outside the hospital. The Steering Group's report concluded that blood transfusion is now extremely safe, but vigilance is needed to ensure correct identification of blood and patient; and recommended the evaluation of computerised identification systems.

## Action taken by the National Blood Service to secure safety

- 4.4 The National Blood Service takes a wide range of measures to secure safety.
- 4.5 The European Select Committee of Experts on Quality Assurance in Blood Transfusion Services produce and publish the "Guide to the preparation, use and quality assurance of blood components, 5th edition" (Council of Europe Publishing, January 1999). The United Kingdom Blood Transfusion Service and the National Institute for Biological Standards and Control prepare more detailed professional guidelines for the UK entitled "Guidelines for the blood transfusion services in the United Kingdom".
- 4.6 All blood centres maintain copies of the guidelines, and treat them as the authoritative source of rules on safety. The guidelines are not, however, detailed in the sense that they prescribe the precise action to be taken at each site. They set out to provide a framework on which blood centres should assemble standard operating procedures. The guidelines require blood centres to:
- Screen donors in accordance with the National Blood Service's guidance on Medical Assessment of Donors. The screening consists of a haemoglobin test, completing a tick-box questionnaire and, for new and lapsed donors, an in-depth interview with a nurse or, on occasion, a doctor. The purpose of this screening is to ensure that the potential donor is in good health, to protect the recipient from any ill effect through transmission of diseases or drugs by blood transfusion and to protect the donor from any harm. One in five new donors and one in nine regular donors are deferred;
  - Test donated blood for HIV, hepatitis B and C and syphilis; and

- pursue "good manufacturing practice" - the standards of the pharmaceutical industry - in all processing and storage.

4.7 Good manufacturing practice is specified in the "Guide to the preparation, use and quality assurance of blood components". It requires assurance systems, including:

- the ability to trace all donations to the donor and to the recipient. Using its computer system, PULSE, the National Blood Service identifies the donor's name with the blood given. That link is maintained throughout the collection, testing and processing stages. Should any problems with the blood donated arise, either at the hospital where the blood is transfused, or through further information coming available to the National Blood Service, the blood transfused can be traced back to the donor, and the blood donated can be traced through to the recipient.
- the operation of quality control procedures. The National Blood Service subjects the operation of its procedures for collecting, testing and processing blood to internal quality audit. The procedures are derived from the guidance described at paragraph 4.5, but are not in all cases identical throughout the National Blood Service. They may be national, zonal, or centre procedures. Zonally led audits check performance against those procedures and the zones follow them up to ensure that centres take remedial action to deal with the weaknesses they found. There are variations between centres and zones in procedures and in the frequency of internal quality reporting: some reports are monthly, some quarterly.

4.8 The Service has adopted a national quality strategy that recognises the importance of key inputs such as staff training (Figure 20). The quality strategy does not separately provide for external assessment. The Commission for Health Improvement will, however, review the Service's implementation of clinical governance as part of its rolling programme. The Medicines Control Agency makes an assessment of aspects that are covered by good manufacturing practice. And the NHS's corporate governance framework requires the National Blood Service to assess other aspects of quality and produce plans for improvement. Although the basis of the corporate governance framework is self-assessment, there is a requirement for verification by the external auditors. The process should therefore deliver independent scrutiny of the effectiveness of the quality strategy.

## 20 The National Blood Service's quality strategy

1 The National Blood Service has a quality policy that states:

"The purpose of the National Blood Service is to help save and improve patients' lives with components derived through the generosity of volunteer, unpaid donors, and the provision of associated services.

We will:

- Identify and meet the needs of our customers, especially donors and patients.
- Continually review and improve all of our activities.
- Meet, or exceed the requirements of legislation and agreed standards.
- Train and involve all staff to help us achieve our purpose."

2 The aim of the quality strategy is to enable the Service to meet its stated quality policy.

3 The quality strategy requires:

- the Service's senior management to accept that quality compliance and improvement is essential to the Service, thereby bringing about a cultural change;
- the service to ensure that the guidance following the White Paper, "The New NHS", and the consultation paper, "A First Class Service: Quality in the New NHS" on quality and clinical governance is put into effect. Clinical governance is to provide the driving force for the organisation's measurable quality improvement;
- a sufficient trained and dedicated workforce, and sufficient other resources to delivery quality;
- that the structure of the organisation ensures that it takes full advantage of advice from quality professionals.

4 The requirements of clinical governance are reinforced by a Statutory Duty of Quality introduced in the Health Act 1999. The Duty was extended to the National Blood Authority in April 2000. The Authority's work in implementing clinical governance (as a practical manifestation of its Duty of Quality) will be subject to external review by the Commission for Health Improvement.

Source: National Blood Service

## Medicines Control Agency inspections

4.9 The National Blood Service's activities must comply with the Medicines Act 1968. The Medicines Control Agency is responsible for safeguarding public health by ensuring that all medicines on the UK market meet appropriate standards of safety, quality and efficacy, which it achieves through a system of licensing, inspection, enforcement and post-marketing surveillance. The Agency inspects National Blood Service sites to ensure that blood centres are operating in compliance with the law, and with the principles of good manufacturing practice. All of the Blood Service's collection, processing, testing and storage activities are licensed.

4.10 The Medicines Control Agency focuses on individual blood centres on a rolling programme, and produces a report to the National Blood Service following each inspection. It does not carry out an overall review of the Service. The Agency told us that standards at blood

centres had improved greatly since the establishment of the National Blood Service. The Agency reports to the Service where there are failures to maintain best practices. The most common weaknesses it found at blood centres in 1998 and 1999 related to poor record keeping; and centres have taken action in response to those findings ([Case Study 5](#)).

### Case Study 5: Action taken by the National Blood Service to rectify failures to comply with good manufacturing practice at a blood centre

The Medicines Control Agency has a rolling programme of inspection of blood centres. Where it finds weaknesses that are "critical", that is of an unacceptable standard, it requires remedial action within a specified time. If such action is not taken, the Agency may remove the centre from the National Blood Service's licence.

#### The Problem

When the Agency inspected a centre in April 1998, it found six practices and procedures it classified as critical. For example:

- records of recall requests and despatch of recalled blood components were missing
- there had been no investigation of a missing unit of blood
- There were no written standard operating practices for many of the operations and procedures carried out in the hospital services department.

In addition, it found one "major" and 11 "other" weaknesses.

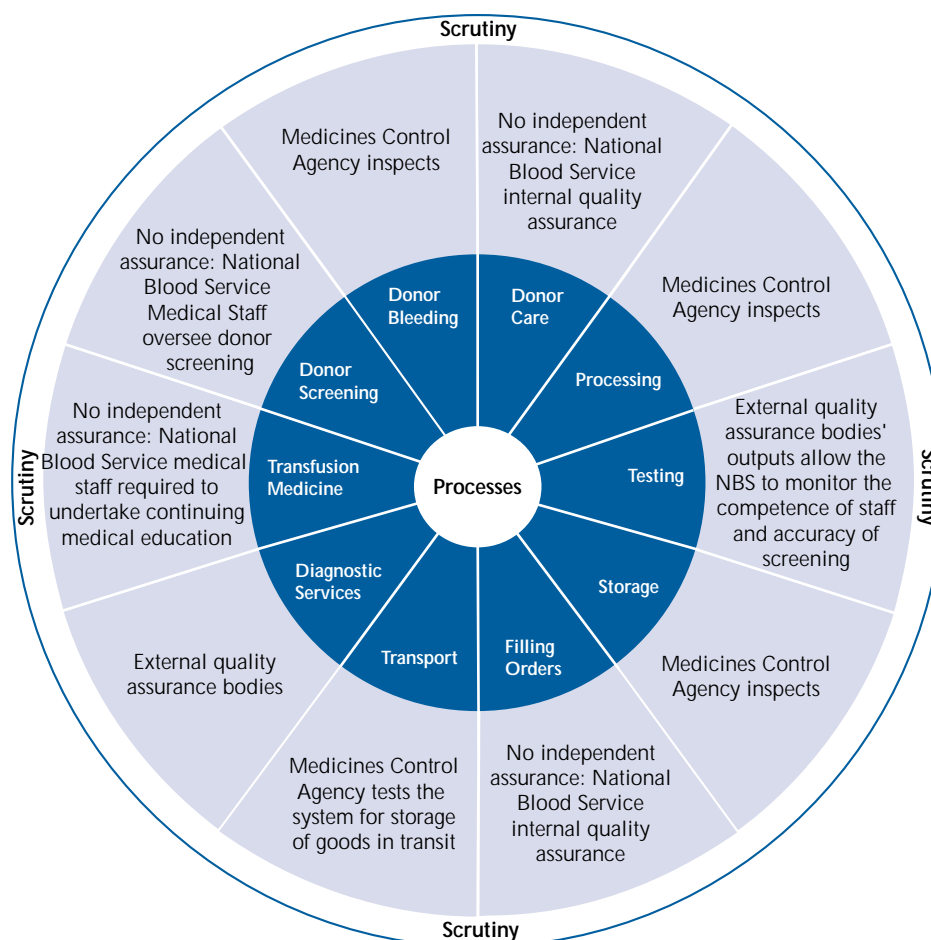
#### Action Taken

Following the report, the quality manager for the blood centre prepared a corrective action plan, setting out the action planned to deal with, or rectify, each of the failings. The action in respect of the examples above was:

- In the case of recalled blood components, a review of recent recalls was carried out. This revealed that the recall procedure was not always followed correctly. Quality staff prepared additional standard operating procedures, and trained staff on their operation. In addition, they identified a problem with the IT system, and arranged for the supplier to provide modified software.
- Quality staff prepared and implemented a standard operating procedure for the investigation of discrepancies.
- Quality staff undertook a review of hospital services standard operating procedures at the Centre. They identified the need for 34 additional standard operating procedures, and for modifications to the existing 16. They set a timetable for production and implementation of the additional procedures, and for training staff in their operation; and brought in expertise to help with the process. They also set out procedures for monitoring progress against the timetable, which involved senior staff at the zonal HQ.

The Medicines Control Agency inspected the centre again in November 1998. On that occasion, it reported no critical or major failures.

## 21 Scrutiny of National Blood Service Activities



Source: National Blood Service

## Accreditation

4.11 With minor exceptions, all the Service's activities associated with collection, processing, testing, distribution, diagnostic testing and transfusion medicine are subject to a degree of independent scrutiny or accreditation. **Figure 21** sets out in broad terms the ways in which the Blood Service obtains independent quality assurance. Appendix 9 sets out in more detail the arrangements for independent scrutiny and accreditation.

## Quality of Blood Components

4.12 The Blood Service has no high level indicator of the quality of its blood components. In response to our census, blood bank heads rated the quality of the National Blood Service's blood components highly (**Figure 22**). For this purpose, "quality" means the extent to which components are suitably labelled and packaged and meet the standards set out in the National Blood Service's components portfolio.

4.13 Users did, however, criticise the packaging of fresh frozen plasma, and rated its quality less highly than that of other components. Sixty five of the 99 blood bank heads who reported component quality falling below their expectations mentioned packs of fresh frozen plasma splitting, or their labels becoming detached on thawing. And unsatisfactory packaging was the most frequent cause of users' complaints to the Blood Service in 1998. Where labels are lost, there would be no trail from donor to recipient, so the component has to be disposed of unused. The National Blood Service recognises that frozen components are particularly vulnerable to mis-handling, and has made changes to operating practices (**Case Study 6**).

4.14 Over half of all users' complaints to the National Blood Service concerned quality of components. In all, the Service received 2,460 complaints on quality in 1998. But there were indications that the volume of such complaints fell as the year progressed. One hundred and forty three blood bank heads told us they had discussed their expectations concerning quality of components with the Service. As noted at paragraph

## 22 Aggregated ratings of quality for blood components in most widespread regular use

| Component             | Quality rated on a scale of 1 to 10, where 1 is poor, and 10 is excellent |               |
|-----------------------|---|---------------|
|                       | Per cent 1994<br>(Where reported)   | Per cent 1999 |
| Red cells             | 9.0   | 9.0           |
| Platelets             | 8.5   | 9.0           |
| Fresh frozen plasma   | See note  | 7.8           |
| Cryoprecipitate       | See note  | 8.8           |
| Paediatric components | See note  | 9.0           |

Note: Bain & Company did not report on the quality ratings for fresh frozen plasma, cryoprecipitate, or paediatric components.

Source: Bain & Company's report "National Blood Service Strategy", June 1994 (1994 data) National Audit Office census of blood bank heads (1999 data).

2.12, this figure may under represent the number who have been involved in such discussions. Many of those who said they had discussed their expectations with the Service reported having been involved in discussions about quality at technical and advisory groups, and at other groups where users routinely meet National Blood Service staff. Sixty five of the 143 blood bank heads considered that they had reached satisfactory agreement. But 15 had not reached agreement and the remainder were still in discussion.

## Quality of diagnostic and non-diagnostic services

4.15 In our census, blood bank heads rated the quality of diagnostic and non-diagnostic services (see paragraph 2.13) at 8.0 out of 10, marginally below the 1994 score of 8.2.

### Case Study 6: Action taken by the National Blood Service to improve packaging of Fresh Frozen Plasma

#### The Problem

In their responses to our census, 65 blood bank heads told us of packs of fresh frozen plasma splitting, or labels becoming detached on thawing.

#### Action Taken

The National Blood Service pointed out that it is a characteristic of PVC plastic used for packaging fresh frozen plasma that, when frozen, it loses its flexibility and becomes susceptible to breakage. The Service told us that, to minimise damage, it keeps under constant review its handling and packaging techniques. It obtains its packs from a number of manufacturers and regularly talks to them to ensure that where practicable it takes advantage of innovations.



### Conclusions

- The National Blood Service forecast that a £10 million (at 1995-96 prices) reduction in its budget between 1995-96 and 1998-99 would follow reorganisation. The Service provided material that indicates that it has made combined cash and efficiency savings of £8.3 million, equivalent to cutting its costs by 5.4 per cent over three years. But there is insufficient detail in the National Blood Authority's audited accounts to ascertain the accuracy of the figures.
- The National Blood Service has found that differences in staff terms and conditions, which predate the establishment of the National Blood Authority, have inhibited its ability to adopt best practice throughout the Service. Negotiations to standardise those terms and conditions have been unsuccessful to date.
- The three zones inherited variations in practice from the 14 regional health authorities that ran the blood centres until 1994. And, although there has been much harmonisation since then, some regional variations in practice have persisted, for example in approaches to collecting blood. The recent reorganisation should provide an opportunity for the Service to identify best practice and adopt it nationally.
- The Service has made good progress in introducing systematic procedures for purchasing goods and services that are yielding savings it estimates at over £3 million a year. Implementing those changes is a continuing process.
- The National Blood Service has developed, and is continuing to refine, unit costs for key activities and components. The Service used these for comparisons within zones, but there was little evidence of comparisons between zones. Although there are differences in the zones' cost bases, internal cost comparisons and further examination of variances have the potential to identify best practice and thus help keep costs down.
- The Service has not compared operational practices with other blood suppliers or with other organisations involved in similar collection, testing, or distribution activities. Although such comparisons must be made with due care, they are a potential source for identifying good practice.
- The National Blood Service's current performance indicators do not form an adequate basis for accountability to the NHS Executive, or for the direction and management of the Service's business. To do so they need to concentrate on the core activities of the organisation. The Service intends to address those indicators relating to donor services as part of its restructuring. There is, also, scope for improving or developing high level performance indicators for overall efficiency and for other areas of its work, such as meeting hospital demand, wastage, safety and promotion of the optimal use of blood in hospitals. These high level indicators could in turn be supported by indicators and targets for subsets of the work and for different localities.

- 5.1 Parts 2, 3 and 4 of our report looked at the National Blood Service's performance in meeting hospitals' demands for sufficient safe blood and associated services. This part examines what action the Service has taken to ensure that it manages its activities efficiently.
- 5.2 The National Blood Service uses 28 performance indicators for measuring achievement against targets; two of them relate to this part of the report. A detailed list is at Appendix 7.

## How efficient is the National Blood Service?

### Reducing overall costs

- 5.3 About three-quarters of the Service's expenditure on its core service is made up of salaries and wages (£81.5 million in 1998-99) and consumable supplies (£51.5 million). Appendix 10 sets out these and other components in detail. **Figure 23** sets out the main components of expenditure from 1995-96 to 1999-2000. The increase in expenditure in 1999-2000 is largely accounted for by the greater use of leucodepletion, which cost an additional £44.1 million in that year.

**23** Main components of National Blood Service Expenditure (excluding the Bio Products Laboratory and the International Blood Group Reference Laboratory), 1995-96 to 1999-00

| Component               | 1995-96   | 1996-97   | 1997-98   | 1998-99   | 1999-2000 |
|-------------------------|-----------|-----------|-----------|-----------|-----------|
|                         | £ million | £ million | £ million | £ million | £ million |
| Salaries and Wages      | 70.6      | 77.7      | 76.9      | 81.5      | 95.0      |
| Consumable supplies     | 42.8      | 44.8      | 44.5      | 51.5      | 65.0      |
| Other                   | 40.3      | 40.1      | 46.6      | 51.0      | 75.0      |
| TOTAL                   | 153.7     | 162.6     | 168.0     | 184.0     | 235.0     |
| TOTAL at 1995-96 prices | 153.7     | 157.5     | 158.4     | 169.1     | 209.7     |

Source: National Blood Service data

### Savings achieved from reorganisation

- 5.4 In their 1995 document "Plans for the future of the National Blood Service", the Department of Health forecast that reorganisation of the Service would bring about a reduction of £10 million in the annual budget by 1998-99 (**Figure 24**).
- 5.5 Information that the National Blood Service has provided indicates that the Service has cut its costs by £8.3 million, although that sum cannot be independently verified. The National Blood Service's assessment of core expenditure in 1998-99 was

**24** Forecast savings expected to arise from reorganisation

|  | 1995-96<br>£000 | 1996-97<br>£000 | 1997-98<br>£000 | 1998-99<br>£000 |
|--|-----------------|-----------------|-----------------|-----------------|
| Blood collection and issuing including two new blood banks   | 150             | 320             | (1,670)         | (2,840)         |
| Development of R&D   | 0               | 80              | 100             | 45              |
| Improved clinical support to hospitals                       | 0               | 250             | 390             | 390             |
| New IT System  | 0               | 940             | 770             | (670)           |
| Consolidation of administration                              | 860             | 990             | (3,150)         | (3,470)         |
| Specialist services  | 0               | 0               | (460)           | (1,020)         |
| Processing and testing                                       | 190             | 460             | (1,330)         | (2,450)         |
| <b>Total change from previous year</b>                       | <b>1,200</b>    | <b>3,040</b>    | <b>(5,350)</b>  | <b>(10,015)</b> |
| <b>Forecast National Blood Service Budget<sup>2</sup></b>    | <b>£154m</b>    | <b>£157m</b>    | <b>£148.6m</b>  | <b>£144m</b>    |
| <b>Actual National Blood Service expenditure<sup>2</sup></b> | <b>£153.7m</b>  | <b>£157.5m</b>  | <b>£158.4m</b>  | <b>£169.1m</b>  |

Notes: 1. All costs are expressed at 1995-96 prices.  
2. Excluding Bio Products Laboratory and International Blood Group Reference Laboratory.

Source: Plans for the future of the National Blood Service, Department of Health, 1995

£184 million (£169.1 million at 1995-96 prices). The Service identified adjustments to make that expenditure properly comparable with that for 1995-96, which yielded an adjusted figure of £145.4 million at 1995-96 prices. This indicated that the Service cut its costs by some £8.3 million (5.4 per cent) over the three year period. The National Blood Service calculated the core expenditure figures for 1995-96 and 1998-99 by deducting from its total expenditure its assessment of the elements attributable to the Bio Products Laboratory and the International Blood Group Reference Laboratory. Because the Service does not provide segmental reporting, those figures are unaudited, and we have relied on the Service's assurance that those elements were as stated. Details of the calculations leading to the savings figure are at Appendix 11.

## Reducing the unit cost of blood supplied to hospitals

5.6 The National Blood Service seeks to optimise, rather than maximise, efficiency in the collection of blood. It could in theory secure greater efficiency, in the short term at least, by restricting the collection of blood to high-yield low-cost sessions and by making more frequent calls on reliable donors. However, because blood is donated free and on a voluntary basis, there is a risk that such a move would in the longer term be a substantial demotivator for donors, who might feel they are being taken advantage of and lose confidence that the service is safe and convenient. And it might reduce the scope to encourage new donors. There is therefore a balance to be struck between maximising the efficiency of blood collection, recognising the legitimate interest of blood donors and meeting hospitals' demands.

5.7 As noted at paragraph 3.2, the Department of Health's 1995 "*Plans for the Future of the National Blood Service*" announced that the Service was developing the present range and pattern of blood collection sessions to make donation easier and more convenient for donors. But the current terms and conditions which apply to National Blood Service staff vary across the country, limit flexibility for session planning and reduce the opportunities to lower the costs of collection and make it more convenient for people to give blood. These variations in staff terms and conditions of service date from before the establishment of the Service as a national organisation, when it was run by separate regional health authorities. In 1997, the National Blood Service opened negotiations with staff to vary the national conditions, but proposals were rejected in March 1999. The Service intends to reopen negotiations.

5.8 In the meantime, Midlands and South West Zone and to a lesser extent Northern Zone have introduced local arrangements, such as multi-skilling and area-based teams. Multi-skilling has the benefit of utilising all members of the team rather than relying on specialisation, which can, for example, leave the driver with nothing to do during the session. Area based teams are explained at paragraph 3.10.

5.9 The National Blood Service has two high level measures of efficiency (**Figure 25**). Both of these relate to the staff costs of blood collection, and thus cover only one sixth of the Service's total expenditure. The Service adopted these measures because it considered that collection was the only area where it could make a direct comparison of efficiency between zones. But it found that operational differences between zones in other areas of work meant that there was no basis for cost comparison. It therefore used process indicators for its processing and testing work. We report on those indicators in Part 2. The National Blood Service uses eight further performance indicators: four about days of debt and credit and four about personnel matters.

5.10 In both years, performance failed to meet either target, mainly because the number of donations in the year was lower than was planned at the time the target was set. In 1999-2000 the lower number of donations was in part a consequence of the closer targeting described in Case Study 2.

## Reducing the cost of goods and services

5.11 The National Blood Service has made good progress in developing purchasing strategies. Two Zones - Midland and South West and Northern - appointed managers with specific responsibility for procurement of goods and services. Through them, the Service has introduced contracts for the supply of the most frequently used goods and services, such as mailing, filters, apheresis harnesses and blood test kits. In doing so, it has introduced full tendering and limited term contracts. It uses two suppliers for significant items, such as blood bags, to reduce their exposure to monopolist pricing and to reinforce safety and continuity of service. **Case Study 7** sets out action the Service has taken, and the savings claimed as a result. Work to extend the scope of effective purchasing is continuing as more classes of goods and services are subjected to the tendering process.

### 25 High level measures of efficiency

| Indicator  | Target for 1998-99 | Reported performance<br>1998-99 1999-00 |         |
|--|--------------------|---|---------|
| Donors bled per collection staff whole time equivalent | 122                | 105                                     | 94.23   |
| Collection staff costs per donor bled                  | £11.94             | £12.85                                  | £14.16* |

\*Note: The target for 1999-2000 was £12.30  
Source: National Blood Service

## Case Study 7: Purchasing

When the National Blood Service was established, major items, such as blood packs, were procured through the NHS Supplies Authority. Blood centres undertook most other purchasing.

### Action taken

In 1996, Midlands and South West Zone appointed a Zonal Purchasing and Supplies Manager. She focused initially on inviting tenders and awarding contracts for supplying goods and services that had formerly been purchased by the blood centres. The centres now undertake very little direct purchasing. The change from local to zonal purchasing led to some teething problems, but these have now been largely overcome.

In addition to setting up new contracts for supply, the Zone:

- reduced its stock holdings;
- improved its invoice processing to ensure that it can take advantage of prompt payment discounts.

Importantly, the acquisition of purchasing expertise here and in the Northern Zone enabled the Service to use its national scale to advantage. And, in some cases where goods and services had been obtained through the NHS Supplies Authority or national contracts, one of those zones, with the agreement of the other two, negotiated new national contracts.

### Savings

The Service has identified the following annual savings as having been achieved through its focus on effective purchasing:

|  |            |
|--|------------|
| Blood packs                              | £3,000,000 |
| Wafers                                   | £130,000   |
| Sample tubes                             | £67,000    |
| Disposable tips for Nucleic Acid Testing | £51,000    |

Source: National Blood Service

## Reducing national prices

5.12 The NHS Executive set up the National Commissioning Group for Blood in 1998, when they had taken the decision to move to national pricing for blood. The Group's initial role in relation to prices was to recommend the prices to be applied nationally in 1999-2000. In subsequent years, it was to review annually, by early autumn, the pricing of blood components. It was to do so by carrying out a recosting exercise taking account of the provision for inflation, new developments and strategic changes in service provision.

5.13 **Figure 26** summarises the recosting exercise for the 2000-01 national price for red cells, showing how the increase from 1999-2000 to 2000-01 was arrived at. Negotiating prices for blood components provides a mechanism for putting pressure on the National Blood Service to improve its efficiency. Negotiations over the Service's prices for 2000-2001 provided the forum for agreeing a four per cent cash releasing efficiency saving. The National Blood Service was to achieve that saving through improvements in procurement practice (see also paragraph 5.11). The saving is shown at line 2 of the "savings" section of Figure 25.

## Does the National Blood Service make use of internal and external benchmarking?

### Internal cost comparisons

5.14 The Service's three zones calculate unit costs for a common list of main activities. Although these costs are compared within zones, there was little evidence of comparisons between zones. Our review of their unit costs for a quarter during 1998-99 showed considerable variations in the unit costs calculated by the three zones for the Service's key components (**Figure 27**). For example, recovered platelets cost over 80 per cent more to produce in the Northern Zone than in the London and South East Zone. However, unit costs for the highest volume component, red cells in additive solution, are quite similar in each zone.

### 26 Movement in prices for red cells between 1999-2000 and 2000-01

|  | Per cent      | £     | £            |
|--|---------------|-------|--------------|
| <b>1999-2000 Baseline National Price</b>                       | <b>100.00</b> |       | <b>78.88</b> |
| <b>Savings</b>   |               |       |              |
| Research and Development Reduction                             | 0.6           | -0.47 |              |
| Cash releasing efficiency saving: National Procurement Savings | 4.4           | -3.50 |              |
| Waiting List Initiatives: Non-Recurring Costs                  | 2.4           | -1.90 |              |
|  |               |       | -5.87        |
| <b>Approved Developments</b>                                   |               |       |              |
| Employers Pension Costs  | 0.5           | 0.45  |              |
| Universal Leucodepletion: Full Year Effect                     | 7.2           | 5.67  |              |
| National Call Centre   | 1.2           | 0.93  |              |
| Demand Reduction for Red Cells                                 | 0.6           | 0.48  |              |
| GDP Deflator (Inflation)                                       | 2.5           | 1.96  |              |
|  |               |       | 9.49         |
| <b>2000-01 Baseline National Price</b>                         | <b>104.6</b>  |       | <b>82.50</b> |

Source: National Blood Service

**27 Zonal unit costs of main components, for the quarter ending 31 December 1998**

| Component                              | London & South East unit costs (£) | Midlands & South West unit costs (£) | Northern unit costs (£) | Ratio of highest unit cost to lowest unit cost |
|--|------------------------------------|--------------------------------------|-------------------------|--|
| Red cells in additive solution         | <b>49.76</b>                       | 42.36                                | <b>46.86</b>            | 1 to 1.17                                      |
| Platelets (recovered pooled)           | 31.75                              | <b>32.50</b>                         | <b>57.38</b>            | 1 to 1.81                                      |
| Platelets (by apheresis, Haemonetics*) | <b>210.81</b>                      | 177.72                               | <b>223.39</b>           | 1 to 1.26                                      |
| Platelets (by apheresis, Cobe*)        | <b>190.62</b>                      | 127.64                               | <b>155.21</b>           | 1 to 1.49                                      |
| Fresh Frozen Plasma                    | <b>15.58</b>                       | 10.61                                | <b>10.88</b>            | 1 to 1.47                                      |
| Key to highlights                      | Lowest                             | Middle                               | Highest                 |  |

Source: National Audit Office analysis of National Blood Service data

\* Haemonetics and Cobe are brands of apheresis machine. The National Blood Machine has a policy of not relying on the products of a single manufacturer.

5.15 There is sufficient range of unit costs to support comparisons between zones; and the National Blood Service has been working towards common definitions for costs. However, there remain some difficulties in interpreting such comparisons, largely arising from differences in overheads such as accommodation costs. For example the Northern Zone (where the estate of buildings, installations and fittings is valued at £25.5 million) generally has higher capital costs than the Midlands and South West (£10.5 million).

## Comparisons with other blood suppliers

5.16 The 1994 Bain report made international comparisons of the total blood transfusion service cost per donation. Those comparisons indicated that the National Blood Service was among the cheapest blood services in the world, but Bain & Co were unable to make accurate international comparisons of processing, distribution and overall costs. The Service has not undertaken any further international comparisons, nor has it made comparisons with other organisations involved in similar collection, testing and distribution activities.

5.17 Cost comparisons are difficult to make, and the results are not necessarily informative. Complications arise from differences in blood transfusion services' accounting structures; the nature and scope of the collection, processing and testing they undertake, including whether they leucodeplete blood components; and the mix of components and services they supply. And there are wider complications, such as differences in the cost of living.

5.18 Comparisons of practice are, however, possible; and have the potential to yield useful results. We made some comparisons and found, for example, that some blood transfusion services used incentives, such as lotteries, to attract donors; and that one made considerable use of trained volunteers.

## Do the National Blood Service's performance indicators provide an adequate basis for managing the business?

5.19 The National Blood Service uses 28 performance indicators for measuring achievement against targets (Appendix 7).

5.20 As senior managers in the Service acknowledge, the indicators have a number of weaknesses:

- The most important measure of meeting hospital demand - the ratio of orders met to orders placed - has been confounded by an element of double counting during times of shortage (paragraphs 2.5 and 2.6).
- There are no indicators for important aspects of the Service's work, such as accuracy and timeliness of non-emergency deliveries (paragraphs 2.15 and 2.16), safety (paragraph 4.2), the quality of components and services (paragraphs 4.12 and 4.15), or for responsiveness to donors or users' complaints (paragraphs 3.15 and 2.41).
- The measures of efficiency cover only the staff costs of collection of blood from donors (paragraph 5.9).
- Some of the high level indicators, although essential for operational managers, are more detailed than is required for the purposes of the NHS Executive and the National Blood Service's Board. For example, there are four indicators relating to process losses, one of which measures all process losses and wastage within the National Blood Service, while the others focus on losses at interim stages.
- There are very few client-focused indicators. Although the National Blood Service is an organisation providing a service to hospitals, its performance indicators are not, and were not intended to be, client-orientated. Our census of hospitals listed the main indicators and asked which were useful to users. Only half of the hospitals were aware of the indicators, and eighty per cent thought the demand met indicator was useful. The only other indicators that attracted strong support were delivery of emergency blood within two hours (72 per cent) and National Blood Service involvement in transfusion committees (40 per cent).



5.21 The National Blood Service acknowledges that there is scope to improve its performance measurement system. In early 1999, an internal working party proposed new performance indicators for donor services. But recommendations were overtaken by proposals for further reorganisation and the Service therefore decided to continue with existing performance indicators until the new structure was in place.

# Appendix 1

## Major forms of blood components supplied by the National Blood Service

- Red cells in additive solution, buffy coat removed
- Red cells in additive solution, leucocyte depleted
- Red cells in additive solution, leucocyte depleted, neonatal split
- Red cells for intra-uterine transfusion
- Red cells for exchange transfusion
- Red cells washed
- Whole blood
- Platelets apheresed, leucocyte depleted
- Platelets apheresed, HLA matched
- Platelets apheresed, HPA matched
- Platelets pooled, leucocyte depleted
- Platelets, leucocyte depleted, washed
- Platelets apheresed, leucocyte depleted, neonatal split
- Platelets apheresed for intra-uterine transfusion
- Leucocytes apheresed
- Fresh Frozen Plasma
- Fresh Frozen Plasma, neonatal split
- Cryoprecipitate
- Plasma, cryoprecipitate depleted

# Appendix 2

## Independent review of proposals for the transfer of bulk blood processing and testing from Liverpool to Manchester

- 1 In August 1997, the Secretary of State for Health appointed Professor John Cash to lead a review of the clinical concerns raised about proposals for the transfer of bulk processing and testing of blood from Liverpool to Manchester. In particular he was to examine whether the proposals:
  - guaranteed the safety and reliability of blood components to hospitals on Merseyside and in North Wales;
  - satisfied legitimate concerns raised by local clinicians; and
  - provided adequate support for the provision and development of high quality clinical services in those areas.
- 2 In his final report, Professor Cash:
  - summarised the background to the National Blood Service's policy of reducing the overall number of blood processing and testing centres;
  - assessed the National Blood Service's specific plans for the Merseyside and North Wales Centre against the three headings in the terms of reference, making a number of recommendations designed to enhance the Centre's continuing contribution to local health care;
  - highlighted some wider issues raised by the review.
- 3 The main recommendations specific to the planned merger were:
  - the transfer should go ahead for reasons of patient safety, but should be closely monitored, both operationally and financially, for a year before further review;
  - the National Blood Service, NHS Executive and other local stakeholders should work together to develop an action plan to improve substantially the physical state, and the medical and technical functions, of the Liverpool Blood Centre, including its future management arrangements;
  - the National Blood Service should set out and publicise the arrangements for ensuring that there is an appropriate clinical consultation service for local clinicians;
  - the National Blood Service should urgently review what further action might be needed to encourage new donor registrations and renew the confidence of people in the work of the Service locally.
- 4 The review included visits to other zones of the NBS that had completed similar mergers, and Professor Cash considered that these threw up issues of wider concern about the overall management of the Service, in particular:
  - the relationship of the service to the wider NHS had become more distant with the creation of a national service, a process reinforced by the contractual aspects of the internal market;
  - the National Blood Service's functional management structure needed urgent review and management at all levels was showing signs of overload arising from internal re-organisation, to the detriment of relationships with users and donors;
  - overall savings from the merger policy would be modest, and not without risk of damage to services. Proposals to merge operations at Bristol and Plymouth should be looked at in this light. And savings claimed need to be backed up by good relevant performance information;
  - there was scope for improving communications between the National Blood Service and the NHS Executive and tightening accountability arrangements;
  - the generally disappointing contribution to management effectiveness made by the NBA Board, and the management style of some senior management, was a cause for concern;
  - there was a need to strengthen the effectiveness of the National Blood Service Users Group;
  - following devolution, there was a case for stronger liaison, particularly with the Welsh Blood Service, but also with the Scottish Blood Service.
- 5 In September 1997, the Secretary of State for Health appointed Professor Alastair Bellingham as Transition Director in Liverpool. Professor Bellingham was asked to make recommendations for the blood service in Merseyside based on both his findings and the recommendations in the Cash Report. His report, published in February 1999, made a number of recommendations to improve services locally and concluded that:
  - there was a need for a blood centre in Liverpool;

- new and developing technologies and expertise now required at the Liverpool Blood Centre would provide an increasing workload and an adequate staff base, and offered the chance for the Centre to be in the forefront of developments in blood transfusion practice;
- the transfer of testing and bulk processing to Manchester had not been detrimental to routine blood supplies as measured by either quality or timeliness.

6 In publishing the report, the Secretary of State:

- asked the National Blood Service to ensure that Professor Bellingham's recommendations were put into effect;
- promised significant investment in structural improvement for the Liverpool Blood Centre;
- accepted that testing and bulk processing of blood should not return to Liverpool;
- concluded that the concerns raised in the Cash Report had now been addressed.

# Appendix 3

## "Better Blood Transfusion"

- 1 Health Service Circular 1998/224, issued in December 1998 by the Chief Medical Officer, set out specific action required of NHS Trusts and clinicians to improve transfusion practice. The requirements were based on recommendations of a symposium held by the UK Chief Medical Officers on Evidence-Based Blood Transfusion in London in July 1998.
- 2 The requirements were that all NHS Trusts where blood is transfused should:
  - (a) from March 1999
    - ensure that hospital transfusion committees are in place to oversee all aspects of blood transfusion; and
    - participate in the annual Serious Hazards of Transfusion enquiry.
  - (b) by March 2000
    - have agreed and disseminated local protocols for blood transfusion, based on guidelines and best national practice, and supported by in house training; and
    - have explored the feasibility of autologous blood transfusion and ensured that, where appropriate, patients are aware of this option. In particular, they should have considered the introduction of perioperative cell salvage.
- 3 In addition, the circular listed other areas of blood transfusion practice raised by the symposium that the UK Health Departments were to pursue with the national blood services, the blood user groups and the professions:
  - extending the current accreditation of haematology laboratories to include the whole transfusion service, requiring hospitals to be accredited in blood transfusion;
  - integration of the range of national systems for providing advice on blood and tissue safety;
  - systematic review of, and research into, the clinical and cost effectiveness of blood component therapy and variations in transfusion practice;
  - the possible role of an academic department of blood transfusion medicine;
  - the potential application of new technologies to improve blood transfusion;
  - the development of a website for the exchange of good practice;
  - the development of comparative audit in blood transfusion practice; and
  - the organisation of regional and national blood user groups including patient representation.

# Appendix 4

## Chronology of main events referred to in this report

|                      |   |
|----------------------|---|
| <b>March 1993</b>    | Publication of Statutory Instrument 587 of 1993 (The National Blood Authority (Establishment and Constitution) Order 1993), enabling the establishment of the National Blood Authority  |
| <b>April 1993</b>    | National Blood Authority established as a special health authority  |
| <b>July 1993</b>     | The National Blood Service commissioned Bain & Company to create the blueprint to carry the National Blood Service forward for the next 20 years  |
| <b>March 1994</b>    | Publication of Statutory Instrument 589 of 1994 (The National Blood Authority (Establishment and Constitution) Amendment Order 1994), enabling the transfer of blood centres from regional health authorities to the National Blood Authority on 1 April 1994 |
| <b>June 1994</b>     | Bain & Company reported their findings to the National Blood Service  |
| <b>November 1995</b> | The Department of Health published "Plans for the future of the National Blood Service"<br><br>The Department of Health established the National Blood Service Users Group  |
| <b>August 1997</b>   | The Secretary of State for Health appointed Professor John Cash to review proposals to transfer the processing and testing of blood from Liverpool to Manchester  |
| <b>March 1998</b>    | The Department of Health published Professor Cash's report  |
| <b>March 1998</b>    | The Secretary of State for Health appointed the current Chairman of National Blood Authority  |
| <b>July 1998</b>     | The government announced that it would extend the use of leucodepletion for all blood destined for transfusion  |
| <b>Autumn 1998</b>   | The Treasury, the Scottish Office and the Department of Health established a joint review of UK blood product manufacturing   |
| <b>October 1998</b>  | The current chief executive of the National Blood Authority took up post  |
| <b>December 1998</b> | The Department of Health issued their health service circular "Better Blood Transfusion"  |
| <b>April 1999</b>    | Implementation of national pricing and the national service level agreement   |
| <b>October 1999</b>  | Target date for leucodepletion of all blood destined for transfusion  |



# Appendix 5

## Study Methodology

- 1 The bulk of the evidence used in this report was collected in 1999 through:

- a census of blood bank heads at NHS Trusts;
- a survey of the public to determine attitudes towards blood donation;
- interviews and examination of documentation at the NHS Executive, the National Blood Service headquarters and at its zones and blood centres;
- a review of existing donor research;
- a comparison of the Service's cost-effectiveness in 1994-95 and 1998-99;
- reliance on the work of the Medicines Control Agency.

### Census of blood bank heads at NHS Trusts

- 2 We obtained information from a postal census of blood bank heads, using a questionnaire. We piloted the questionnaire with 20 blood bank heads. We sent the questionnaires for the census to blood bank heads on 29 January 1999. All of the heads of the 223 blood banks we identified responded. The number of blood banks differs from the number of hospitals transfusing blood, because a blood bank may serve more than one hospital. A blood bank head is the person in charge of the management of a hospital blood bank. That person may be either a consultant haematologist or a senior medical laboratory officer, depending on the hospital's organisational structure.
- 3 The questionnaire asked for data about supply of blood components, safety, diagnostic and other transfusion-related services, advice and expertise and the responsiveness of the National Blood Service. Within those heads the questionnaire repeated a number of the questions the Blood Service's consultants, Bain & Co, asked in 1994. And it replicated their approach to obtaining respondent's rating of the Blood Service's performance (a scale of one to 10, where one represents poor, and 10 excellent) to enable us to make direct comparisons.

### Survey of the public to determine attitudes towards blood donation

- 4 We commissioned a survey of the public, from Ipsos-RSL. Appendix 8 sets out the sampling methodology. The purpose of the survey was to identify attitudes of donors, lapsed donors and non-donors towards donation.

- 5 The questions asked were:

#### ■ To all aged 17 to 69:

- Have you ever given blood?
- How likely are you to give blood in the future?
- Is there a continuing need for blood donors?
- How would you arrange to give blood?
- Are you aware of the national (0345) number you can call?

#### ■ To all who have ever given blood:

- Where do/have you usually given blood?
- When did you last give blood?
- When did you first give blood?
- How often do/did you give blood?
- What was the main obstacle you overcame in order to give blood?

#### ■ To all who have never given blood, or have not given it recently

- What would make you more likely to give blood?
- Why have you not given blood recently?

### Interviews and examination of documentation at the NHS Executive, the National Blood Service headquarters and at its zones and blood centres

6. We interviewed a total of more than 70 key staff at the NHS Executive, at the National Blood Service headquarters at Watford; at each of the three zonal headquarters; at each of the 15 blood centres; and at the International Blood Group Reference Laboratory, Bristol.
7. We examined documentation at those sites relating to blood collection and demand, distribution, quality, safety, performance indicators, costing, research and development, accountability and responsiveness.

## Review of existing donor research

8. We reviewed the reports of all major donor research work commissioned for the Blood Service and conducted since 1989.

## Cost-effectiveness of the National Blood Service

9. We compared the Service's expenditure on its core business in 1994-95 and 1998-99. The detailed calculation is set out in Appendix 11.

## Reliance on the work of the Medicines Control Agency

10. The Agency's role is to safeguard public health by ensuring that all medicines on the UK market meet appropriate standards of safety, quality and efficacy. It achieves this through a system of licensing, inspection, enforcement and post-marketing surveillance. The National Blood Service's activities have to comply with the Medicines Act 1968. The Agency's purpose in inspecting National Blood Service sites is to ensure that blood centres are operating in compliance with that Act and with the principles of good manufacturing practice. It inspects and licenses the National Blood Service's collection, processing, testing and storage activities. All of the Blood Service's blood centres are approved for including in the National Blood Service's manufacturer's "specials" licence.
11. We examined the Agency's 1998 reports on blood centres, as held by the Blood Service; and discussed with the Agency our interpretation of those reports and the methodology they used.
12. We used other evidence to establish how the Blood Service ensured that it was operating safely, and to find the number of deaths related to unsafe blood. But we relied on the work of the Medicines Control Agency for assurance that the safety procedures were sufficient and were operated properly.

# Appendix 6

## Expert advice

We are grateful to the following people, who advised us either on the study as a whole or on specific aspects.

|                               |   |
|-------------------------------|---|
| Dr Paula Bolton-Maggs         | Chairman of the Paediatric Haematology Forum, Royal College of Paediatrics and Child Health                         |
| Professor John Cash           | President of the British Blood Transfusion Society  |
| Dr Hannah Cohen               | Chairman of Serious Hazards of Transfusion working party, and Consultant Haematologist at University College London |
| Mr Michael Farley             | Woodstock Marketing (nominated by the Chartered Institute of Marketing Consultancy Services)                        |
| Professor Ian Gilmour         | Registrar, Royal College of Physicians of London  |
| Professor Edward Gordon Smith | Chairman of the National Transfusion User Group (and formerly Chairman of the National Blood Service Users Group)   |
| Dr L A Kay                    | Consultant Haematologist, HCA/Hospitals Central London (private sector)   |
| Dr Paul Kelsey                | Chairman of the Blood Transfusion Task Force of the British Committee for Standards in Haematology                  |
| Professor J S Lilleyman       | President, The Royal College of Pathologists  |
| Professor J S P Lumley        | Professor of Surgery, Vascular Unit, St Bartholomew's Hospital (nominated by the Royal College of Surgeons)         |
| Dr Isobel Walker              | British Society for Haematology   |

# Appendix 7

## Performance indicators used by the National Blood Service

### Performance indicators relating to Part 2 of this report

| Indicator   | 1998-99<br>Target | 1998-99<br>Reported<br>performance | 1999-2000<br>Reported<br>performance |
|---|-------------------|------------------------------------|--------------------------------------|
| <b>The Service's success in meeting hospital demand</b>   |                   |                                    |                                      |
| Meet hospital demand  | 99.51%            | 93.78%                             | 99.76%                               |
| Emergency deliveries within two hours   | 100%              | 99.82%                             | 99.81%                               |
| <b>Wastage/loss of blood between bleeding donors and issuing blood components to hospitals</b>      |                   |                                    |                                      |
| Percentage of red cells outdated at centres   | 0.76%             | 0.36%                              | 0.56%                                |
| Percentage of completed donations to donors bled  | 98.02%            | 98%                                | 98.16%                               |
| Percentage of units banked to donors bled   | 94.94%            | 93.74%                             | 95.03%                               |
| Percentage of clinical issues to donors bled  | 94.34%            | 92.32%                             | 93.25%                               |
| <b>Promotion of optimal use of blood in hospitals</b>   |                   |                                    |                                      |
| Percentage of NHS hospitals with a hospital Transfusion Committee                                   | 64%               | 81%                                | 90.98%                               |
| Percentage of hospital transfusion committees with National Blood Service consultant representation | 92%               | 93%                                | 93.97%                               |
| Attendance at hospital transfusion committees   | 160               | 371                                | 470                                  |
| Number of audits undertaken at NHS hospitals  | 96                | 67                                 | 56                                   |
| Number of NHS hospitals involved with at least one audit  | 160               | 210                                | 239                                  |
| Teaching activities - hours   | No target         | 958                                | 902                                  |

### Performance indicators relating to Part 3 of this report

| Indicator   | 1998-99<br>Target | 1998-99<br>Reported<br>performance | 1999-2000<br>Reported<br>performance |
|---|-------------------|------------------------------------|--------------------------------------|
| <b>Collection</b>   |                   |                                    |                                      |
| Percentage of donors bled to target   | 100%              | 96.29%                             | 97.06%                               |
| New donors enrolled   | 318,750           | 408,043                            | 442,550                              |
| New donors attending (bled)   | 285,000           | 279,409                            | 268,739                              |
| Lapsed donors   | 297,189           | 218,116                            | 196,863                              |
| <b>Donor care</b>   |                   |                                    |                                      |
| Percentage of donors waiting longer than 30 minutes before registration and screening | 7.3%              | 6%                                 | 9.14%                                |
| Percentage of donors taking more than 40 minutes to reach bleed bed                   | 9.8%              | 8.7%                               | 10.29%                               |
| Percentage of donors satisfied (measured through satisfaction survey)                 | 90%               | 93.5%                              | 99.68%                               |

## Performance indicators relating to Part 5 of this report

| Indicator  | 1998-99<br>Target | 1998-99<br>Reported<br>performance | 1999-2000<br>Reported<br>performance |
|--|-------------------|------------------------------------|--------------------------------------|
| <b>Efficiency</b>                                      |                   |                                    |                                      |
| Donors bled per collection staff whole time equivalent | 122               | 105                                | 94.23                                |
| Collection staff costs per donor bled                  | £11.94            | £12.85                             | £14.16                               |
| Other  |                   |                                    |                                      |
| Average days of debt - external                        | 35                | 34                                 | 20                                   |
| Average days of debt - internal                        | 31                | 20                                 | 105                                  |
| Average days of credit - external                      | 30                | 19                                 | 29                                   |
| Average days of credit - internal                      | 29                | 30                                 | 105                                  |
| Average staff headcount                                | 5,235             | 5,381                              | 5,311                                |
| Staff turnover   | 13%               | 13%                                | 15%                                  |
| Average whole time equivalents                         | 4,552             | 4,581                              | 5,072                                |
| Total whole time equivalent                            | 4,646             | 4,679                              | 5,166                                |

Source: National Blood Service

# Appendix 8

## Public attitudes survey methodology

### Public attitudes survey methodology

The survey was undertaken by Ipsos-RSL as part of their national CAPIBUS sample.

#### Interview method

Interviews were conducted during the period 23 to 27 July 1999. The CAPIBUS sample used 170 interviewers and 80 supervisors covering 180 points. All interviews were conducted face-to-face in respondents' homes, using computer assisted personal interviewing machines. Ten per cent of all interviews conducted were subjected to telephone back-checks as a means of quality assurance.

#### Sample size

1576 adults aged 17 to 69 in England and North Wales (the area covered by the National Blood Service).

### Sampling method

CAPIBUS used a two stage stratified random location design. The primary sampling units are local authorities, and the secondary sampling units are enumeration districts. The sampling frame itself is the postal address file, a frequently updated record of all addresses in Great Britain recognised by the Royal Mail.

**Selection of primary sampling units:** the country is divided into 58 area groupings by stratifying local authority areas by government standard regions and ISBA areas. ISBA areas are defined by a group of advertising organisations to loosely reflect television regions, providing demarcated area units that are not defined by government administrative needs. A total of 180 local authority areas are randomly selected from the stratified grouping, with a probability of selection proportional to size. They provide a fully dispersed sample of the whole of Britain, in this case limited to those in England and North Wales.

**Selection of secondary sampling units:** at the second stage of sampling, one enumeration district - each consisting of 60 to 100 addresses - was selected from each local authority area. The process is random but uses ACORN segmentation system to control the sample. The ACORN system classifies enumeration districts into one of 54 differentiated types. In turn, types can be combined into 17 groups and six categories. ACORN types are labelled by detailed descriptors (for example, Type 13:40 = Council Areas, Older People, Health Problems) and based on multivariate analysis of data from the last census.

To ensure a representative sample, enumeration districts are randomly selected such that the sample profile of ACORN groups within each standard region matches the population profile of the region. This produces a national sample that is balanced in terms of ACORN category/group at a regional level and ACORN type at national level.

Each enumeration district is defined by the list of addresses contained within it. Interviewers are given a randomly selected start address within the district. Interlocking quota controls are set for age, sex and working status, based on the ACORN classification. Thus, quota controls are specifically tailored to each sampling point.



# Appendix 9

## Ways in which the Blood Service obtains independent quality assurance

| Area of business | Key processes   | Independent quality assurance provided by:   | Main Findings in 1999  | Remedial action taken by National Blood Service <sup>1</sup>   |
|------------------|---|--|--|--|
| Collection       | Donor screening for eligibility                               | National Blood Service medical staff are responsible for overseeing the application of the Medical Assessment of Donors guidelines. The National Blood Service's Director of Medical Services proposes to develop a system of clinical audit that will provide improved assurance on the operation of the Medical Assessment of Donors guidelines. Medicines Control Agency tests whether session documentation is properly handled.   | Donor ID cards were found to have the correct eye readable information, but incorrect bar codes. | The Blood Service notified its staff to ensure that they correctly identified donors. Subsequently the supplier was able to identify and correct the problem. This corrective action was subject to National Blood Service supplier audit to confirm its effectiveness. No patients were put at risk as a result of this incident. |
|                  | Bleeding of donors and transport of blood to centres          | The Medicines Control Agency carries out inspections to confirm that these processes meet acceptable standards of Good Manufacturing Practice  | Instances occurred where blood bags had too little, or too much, anticoagulant.                  | On each occasion, the Blood Service notified its staff and the manufacturers, who in turn checked bags in stock. And the manufacturers took corrective action to prevent a recurrence of the problem. No patients were identified as being harmed by these incidents.  |
|                  | General handling of donors (customer care)                    | None. National Blood Service complaints procedures and quality assurance questionnaires provide internal assurance   | No incidents requiring national remedial action  |  |
| Processing       | Manufacturing procedures                                      | The Medicines Control Agency carries out inspections to confirm that these processes meet acceptable standards of Good Manufacturing Practice  | No incidents requiring national remedial action  |  |
| Testing          | Blood grouping, extended phenotyping, screening for infection | Use of the National Institute for Biological Standards and Control's defined reference materials and expertise at analysing test data allows the National Blood Service to monitor the performance of laboratory testing equipment, personnel and overall accuracy of virology screening   | A problem with software led to incorrect recording of the results of virology tests.             | All blood centres were notified on the day the problem was found. The firm that maintains the system investigated and corrected the problem.   |
|                  |   | The National Blood Service participates in National External Quality Assurance Schemes that test the competence of laboratory testing equipment, personnel and accuracy of blood grouping, screening and phenotyping.<br><br>The Medicines Control Agency takes account of the use of the National Institute for Biological Standards and Control's reference materials and NIBSC's data analysis in the Agency's assessment of testing with respect to conformance with Good Manufacturing Practice |  |  |

| Area of business            | Key processes  | Independent quality assurance provided by:   | Main Findings in 1999   | Remedial action taken by National Blood Service <sup>1</sup>   |
|-----------------------------|--|--|---|--|
| Distribution                | Storage of components at the blood centre  | Medicines Control Agency check, for example the system for ensuring that components are stored at correct temperature  | No incidents requiring national remedial action.  |  |
|                             | Filling of hospital orders   | None   | Following the removal of Non-Nucleic Acid tested plasma from issue stock, it was found that in specific circumstances it was possible for non-NAT plasma to be released for issue if a particular software routine was not run regularly. | Centres were notified of the circumstances in which this problem might occur. It was confirmed that no non-NAT plasma had been unintentionally issued as a result of this problem. |
|                             | Transport of components to hospitals   | Medicines Control Agency checks the system for ensuring that components are properly stored in transit<br><br>Assurance of the timeliness of transport is taken from (the absence, or low levels of) hospital complaints   | No incidents requiring national remedial action.  |  |
| Diagnostic services         | Testing for blood diseases and disorders, e.g., haemolytic disease of the unborn | The National External Quality Assurance Scheme exercises test the competence of laboratory testing equipment, personnel and overall accuracy<br><br>Some diagnostic work is carried out in laboratories that are subject to good manufacturing practice requirements and inspection by the Medicines Control Agency<br><br>Laboratory procedures are subject to Clinical Pathology Accreditation | A small number of software problems with the potential to produce incorrect results were identified.  | In each case, blood centres were notified as to how to handle the problems; and the underlying problems were corrected.  |
| Transfusion Medicine Advice | Advising hospitals how best to make use of blood components for example          | The quality of the National Blood Service's medical staff is ensured by their membership of the Royal College of Pathologists, which requires that they undertake Continuing Medical Education   | No incidents requiring national remedial action.  |  |

- Notes
- Once a problem has been identified to the National Quality Assurance Manager, the National Blood Service carries out the investigation, and any corrective action, following a written procedure.  
The key elements are:
    - Prompt evaluation of the seriousness of the incident. This is done by working with the manufacturer to identify the potential cause and to confirm there is a problem. If it is impossible to contact the manufacturer then corrective action would be taken based on the evidence available.
    - If corrective action is required a corrective action request is sent to quality managers in England and copied to sister organisations, the manufacturer and other interested parties.
    - Quality managers are asked to confirm receipt of the notice and then confirm the corrective action is complete. Both events occur within a time scale decided on a case by case basis. Checks are made to confirm these are received and that action is confirmed as complete.
  - The National Blood Service Director of Medical Services proposes to develop a system of clinical audit that will provide improved assurance on the operations of the Medical Assessment of Donor guidelines.

# Appendix 10

## The main components of the National Blood Service's Expenditure, 1998-99

**Figure 28** sets out the main components of the Service's expenditure in 1998-99. It excludes expenditure on the Bio Products Laboratory.

**28** Components of National Blood Service Expenditure, 1998-99

| Component                | Expenditure<br>1998-99<br>£ million |
|--------------------------|-------------------------------------|
| Salaries and Wages       | 81.5                                |
| Consumable Supplies      | 51.5                                |
| Capital Charges          | 14.0                                |
| Staff non-pay costs      | 6.1                                 |
| External Contractors     | 4.5                                 |
| Maintenance of Buildings | 4.0                                 |
| Rent & Rates             | 4.0                                 |
| Transport                | 3.5                                 |
| Clinical Negligence      | 1.9                                 |
| Telecommunications       | 1.7                                 |
| Postage                  | 1.7                                 |
| Reorganisation costs     | 1.5                                 |
| Utilities                | 1.4                                 |
| Equipment purchases      | 1.3                                 |
| Printing - donor call up | 1.1                                 |
| Advertising              | 1.0                                 |
| Hire of halls            | 1.0                                 |
| IT                       | 0.6                                 |
| Other <sup>1</sup>       | 1.7                                 |
| <b>TOTAL</b>             | <b>184.0</b>                        |

Note 1. The 'other' figure of £1.7 million includes:

- Administrative and office expenses
- Catering and donor provisions
- Donor awards and ceremonies
- Legal fees
- Professional fees
- Losses and compensation
- Cleaning and waste disposal

Source: National Blood Service

# Appendix 11

## Methodology used to compare the National Blood Service's expenditures for 1995-96 and 1998-99

|   | 1998-99<br>prices<br>£ million | 1995-96<br>prices<br>(Note 1)<br>£ million | Note     |
|---|--------------------------------|--|----------|
| <b>1995-96 Expenditure</b>  |                                | <b>153.700</b>                             | <b>2</b> |
| <b>1998-99 Expenditure</b>  | <b>184.000</b>                 | <b>169.142</b>                             | <b>2</b> |
| <b>Adjustments to make 1998-99 expenditure properly comparable with that for 1995-96 (new or increased activities). Deduct:</b> |                                |  |          |
| Leucodepletion  | 9.700                          | 8.917                                      | 3        |
| Waiting list initiative/Donor 2000  | 4.157                          | 3.821                                      | 3        |
| Nucleic acid testing  | 1.657                          | 1.523                                      | 3        |
| Tissue and bone banking   | 1.767                          | 1.624                                      | 3        |
| Cord blood banking  | 0.721                          | 0.663                                      | 3        |
| Marginal cost of additional volume of Blood and Components  | 2.459                          | 2.260                                      | 4        |
| Marginal cost of additional volume of Specialist services and other   |                                | 0.097                                      | 4        |
| Additional (locality based) teams to deal with additional workload  | 2.000                          | 1.839                                      | 4        |
| Implementation of Medical Assessment of Donors guidelines   | 1.372                          | 1.261                                      | 4        |
| Clinical negligence provision   | 1.900                          | 1.747                                      | 5        |
| <b>Total adjustments</b>  |                                | <b>23.752</b>                              |          |
| <b>Adjusted 1998-99 expenditure (to compare like with like)</b>   |                                | <b>145.390</b>                             |          |
| <b>NBS Efficiency savings 1995-96 to 1998-99<br/>(1995-96 expenditure minus adjusted 1998-99 expenditure)</b>                   |                                | <b>8.310</b>                               |          |

Notes: 1. We have used the GDP deflator - in this case 91.925 per cent - to convert 1998-99 expenditure to 1995-96 prices.

2. The National Blood Service calculated the expenditure figures for both 1995-96 and 1998-99 by deducting the cost of the Bio Products Laboratory and the International Blood Group Reference Laboratory from the total National Blood Service expenditure. Because the Service does not provide segmental reporting, we are relying on its management assurance that the Bio Products Laboratory and International Blood Group Reference Laboratory elements are as stated.

3. These items represent new activities that were not undertaken in 1995-96.

4. These items represent increases in activity in 1998-99 compared with 1995-96.

5. This item represents an expenditure for which there was no equivalent in 1995-96.

# Glossary

## Advisory Committee on the Microbiological Safety of blood and tissues for Transplantation

A departmental committee chaired by the Deputy Chief Medical Officer that advises the health departments of the UK on measures to ensure the microbiological safety of blood and tissues for transplantation.

## Apheresis

A donor is connected to a machine that removes the desired component (plasma, platelets, red cells, or combinations of these) from the blood and returns the remainder of the blood to the donor. It can be performed more frequently than whole blood collection.

## Blood bank

A blood bank is the part of the hospital where blood delivered by the National Blood Service is held in appropriate conditions pending use within that hospital.

## Blood bank head

For the purpose of this study, a blood bank head is the person in charge of the management of a hospital blood bank. This person may be either a consultant haematologist or a senior medical laboratory officer, depending on the hospital's organisational structure.

## Cryoprecipitate

A concentrated fraction of plasma containing the major portion of Factor VIII and some other factors.

## Cytomegalo Virus (CMV)

A virus that is prevalent in the population. Once they are infected, people are carriers for life. The incidence of carriers increases with age. The infection in healthy people is usually subclinical - they are not apparently ill. The virus is transmitted by transfusion of blood components and can be lethal if the recipient is immuno-suppressed. New and untested donors are tested for the presence of the virus to provide a stock of Cytomegalo Virus negative blood components for transfusion to patients at risk of infection. The virus is carried in white cells and leucodepletion may reduce the risk of transmission of the virus.

## Hospital transfusion committees

Some hospitals have long-established hospital transfusion committees. But the 1998 health service circular "Better Blood Transfusion" stated that every hospital where blood is transfused should have one. It stated that such committees should promote best practice; have a key role in clinical practice, clinical audit and feedback and in education and training relating to blood transfusion matters; and communicate with blood user groups and patient representatives.

## National Blood Stocks Project

The aim of this project, in which the National Blood Service is working alongside 22 hospitals, is to enable blood stocks to be managed with hospitals in an increasingly collaborative way. The project started in January 1998 and the Blood Service expects it to become a part of its mainstream activity in 2000-01.

## Nucleic acid testing

Testing for viral contamination by assessing whether viral DNA is present, rather than testing for the presence of anti-bodies (which has been standard hitherto). This advanced form of testing eliminates the "window period", that is, the risk of false negative results caused by antibodies not having had the time to develop in response to a viral infection.

## Paediatric components

Components suitable for new-born babies and those under one year old. They require particular testing and are in smaller volumes than "normal" components.

## Phenotyping

A process that tests red blood cells or platelets of donors for the absence of antigens to blood group anti-bodies other than anti-A or anti-B. This allows blood to be selected that will be compatible with the recipient.

## Plasma

The fluid in which blood cells are suspended. It acts as a carrier for the blood cells and contains factors such as immunoglobulin (anti-bodies), albumin and clotting factors.

**Platelets**

Blood cells that are important in the blood clotting process. They are needed where bone-marrow suppression has occurred as a result of anti-cancer treatment (for example, treatment against leukaemia) and in cases of massive transfusion to control bleeding due to surgery or trauma.

**Red cells**

Red cells carry oxygen and make up nearly half the blood volume. Most transfusions are of red cells only.

**Stem cell harvesting**

Stem cells continually grow and develop to produce red and white blood cells and platelets. They are used for example to treat leukaemia where, following treatment to destroy the recipient's bone marrow, the transfused stem cells establish themselves and replenish the red and white cells and platelets. They can be collected from peripheral blood, bone marrow and cord blood.



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