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Management in Confidence

Report No CMSA 7/82

BLOOD:

RECORD KEEPING AND STOCK CONTROL

A report by

Central Management Services

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Management in Confidence

BLOOD
RECORD KEEPING AND STOCK CONTROL

Central Management Services

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INTRODUCTION

BACKGROUND

1. Over 2 million units of blood are collected each year by the Blood Transfusion Centres and these, either in the form of whole blood or blood products, find their way to patients in need via blood banks accommodated in hospital pathology departments. The blood banks often act as area banks servicing smaller hospitals (including private hospitals) for which they also carry out the necessary laboratory tests, eg cross-matching.

ORIGIN OF THE STUDY

2. Recent enquiries and investigations into the use of blood and blood products highlighted the inadequacy of records kept to control the movement of blood from collection to transfusion or disposal. As a result Health Services Division 1 (HS1) asked Central Management Services (CMS) to study the existing controls and recommend suitable procedures so that they might issue revised guidance to Health Authorities.

3. Some doubt was raised about the ability to trace a donation from collection to transfusion or disposal and for the following reasons the Department wished to rectify the situation:

3.1 Medical - a trace between donor and patient is needed to inform either party should any previously undetected illness emerge;

3.2 Accountability - blood and its components, in particular plasma protein fraction (PPF) and Factor VIII, constitute a valuable resource and an adequate stock control is required;

3.3 Level of unused whole blood (time-expired) - although blood products are produced from time-expired blood, the return rates of such blood run at an average of 13% and Ministers have expressed concern about this continuing high level.

4. An inquiry of Regional Directors about record-keeping procedures in relation to issues of blood and products from Regional Centres to hospitals was carried out prior to the request for a CMS study. The results showed that, overall, record-keeping at Centres was comprehensive and facilitated the tracing of blood donations and products to the hospitals supplied.

OBJECTIVES

5. The aims of the study therefore were to focus the investigation mainly at hospital level and to:

5.1 Look for an information system which would enable the tracing of a unit of blood from the donor to the patient to whom it is transfused;

5.2 Identify a monitoring system which would account for every unit of blood from collection to final disposal;

5.3 Determine a flexible system for maintaining stock at the various outlets which would optimise the amount of usable whole blood;

5.4 Seek a method of implementation for the new or improved systems which would minimise extra costs and if possible facilitate savings; (this would best be measured in terms of stock);

5.5 Consider in the above terms the control of the 2 main products issued from the Blood Products Laboratory (BPL) ie PPF and Factor VIII.

TERMS OF REFERENCE

6. The terms of reference were agreed as follows:

"To study existing systems for the stock control of blood at Regional Transfusion Centres, hospital blood banks and the Blood Products Laboratory; to recommend a system or systems which would enable donations to be traced readily from collection to transfusion or disposal; and to cost such systems."

These were later extended to include consideration of the stock control of PPF and Factor VIII.

RESULTS OF THE STUDY

7. To control stock and keep associated records throughout the Service, staff at Regional Centres, hospital blood banks, and at ward level each have a different yet interdependant role to play. These roles are identified and highlighted.

8. At Regional level the main requirement is to control the stock held and regulate supplies and issues, firstly, of blood from donors to hospitals; secondly, of plasma from Centres to BPL and thirdly, of blood products from BPL and the Centre to hospitals. Of equal importance, but less in magnitude, is the need to trace a unit of blood or batch of blood products in and out of the Centre. The role of the hospital blood bank is similar in the receipt and issue of goods but is complicated further by the need to control, down to individual patients, the use of blood and its products. In providing this control and a facility to trace a unit of blood or product batch a wider range of personnel is involved.

9. In the past record-keeping, particularly at hospital blood bank level, has placed most emphasis on identifying the blood used for individual patients rather than on the total stock, but stock control is becoming increasingly important and more consideration should now be given to efficient and effective ways of controlling the overall supply and issue of blood and its products.

10. Figures provided by HS1 show the cost of collecting a unit of blood as £18.00. If each hospital blood bank, through better stock control, reduced their demand for blood by an average of only 8 units per week, a saving of approximately £7,500 per annum per blood bank could be achieved and there are approximately 350 blood banks in England and Wales. There is evidence in the report to confirm that at least one hospital visited had reduced the demand for blood by better control of stock and its use; there is no reason why others cannot achieve similar results thus releasing staff time or providing savings to cover the cost of any additional clerical work required to record the relevant management information.

11. As computerised recording and stock control existed only in Regional Centres and even then only in 2 out of 5 visited, it is preferable for the purpose of this report to suggest a basis for a manual system. The principles outlined in the Appendices A, B and C provide for both stock control and for tracing individual units of blood or products by a simple system which can be adopted by any Centre or blood bank.

ACKNOWLEDGEMENTS

12. Thanks are offered to all who participated in the study, in particular those in the Region who initially provided the background to the workings of the Blood Transfusion Service and the Regional Directors who selected the study locations and arranged the timetable of visits.

INVESTIGATION

METHOD

13. In order to determine suitable systems for stock control and record-keeping it was necessary to study the current practice and problems experienced in a range of organisations including:

13.1 Regional Centres;

13.2 Hospitals which received the heaviest supply of blood;

13.3 Hospitals which appeared to return the greatest percentage of their supply;

13.4 Hospitals which appeared to return the least percentage of their supply;

13.5 A sample of non-NHS hospitals.

14. Information was collected by interviews with those in Regional Centres, hospital blood banks and wards who recorded the receipt and/or issue of blood and blood products. Check lists of the information sought are at Appendices D, E and F.

15. Five Regions were proposed and agreed to participate in the study; and in a 6th Region visits to the Centre and a number of hospitals were made to familiarise CMS with the Blood Transfusion Service prior to the commencement of fieldwork.

16. Approximately one day was spent in each of the 5 Regional Centres and a half-day was allocated for each visit to a hospital although some of these visits extended to full day sessions. In total it took 5 weeks to carry out the fieldwork, one day being spent at the BPL. More detailed investigation at BPL was being conducted by HS1 and will be reported separately.

FINDINGS

17. Findings in the report are confined to the 5 Regional Centres and associated hospital blood banks of which 16 were NHS units and 3 privately run. In addition 2 private hospitals which used the Regional Centre as a blood bank for supplies and all cross-matching are included.

REGIONAL CENTRES

Supply

18. Each Regional Transfusion Centre carried out a variety of tasks but one of their main responsibilities was supplying hospital blood banks, hospitals and clinics with a supply of fresh blood and blood products. They had established, over the years, a donor system which provided sufficient stock to supply:

18.1 Hospital outlets with blood and certain blood products;

18.2 The BPL with plasma;

18.3 Research and other establishments with their requirements for blood.

Some Centres, where the donations were plentiful, assisted other Regions who were in need. A flow chart showing the supplies and issues to and from Centres is at Appendix G.

19. At the 5 Centres visited the donations collected in 1981 ranged from 80,000 to 240,000 (details are in Appendix H) and to achieve this a delicately-balanced system had emerged. Each was concerned to maintain a regular supply as disruption had far-reaching effects on patient care eg operating lists were cancelled. The likely requirements for a future period, eg either the following month, or 12 months, were not easy to gauge and from the short time spent at the Centres it was difficult to establish whether and how each Centre forecast its needs in terms of donations required for each year. Positive steps towards mathematical forecasting by Operational Research (OR) methods were identified in Region C.

20. Flexibility in replenishing stocks from donor sessions was maintained by setting aside sessions for special bleeds and advising the donor organisers in advance how the products of a particular session were to be used.

21. Each Centre sent to the BPL regular amounts of fresh frozen plasma (FFP) and plasma from time-expired blood and in return they received on a pro-rata basis a supply of blood products, the main supplies being PPF and Factor VIII. These were stored at Centres for issue to hospitals together with other blood products manufactured at the Centre. (A list of blood products issued from Centres is at Appendix J.)

Control of stock

22. The control of stock relied very much on judgement based on past experience. Demand was difficult to forecast but steps were taken at most Centres to adjust the number of donations received according to the demand for blood and those products manufactured locally.

23. Some Centres physically counted their stock daily and operated a clerical recording system from that count; another operated a clerical system which was not verified by a physical count. Those Centres with a computerised record system were able to tally the records with the actual stock more easily as the records showing the stock held was up to date and readily available.

Blood

24. Different types of anti-coagulation agents used at donation determined the shelf life of a unit of blood. From Appendix H it can be seen that the Centres offered blood with a shelf-life ranging from 21 to 35 days. The use of those agents allowing a longer life enabled Centres to quote shorter expiry dates while having a safety margin into which the life of current stock could be extended should there be a shortage of supply. Such flexibility could present problems for computerised stock control systems if programmes had to accommodate different expiry dates.

Blood products

25. The supplies of PPF and Factor VIII from BPL fell short of meeting the nationwide demands and in 2 Regions some attempt had been made to quantify their shortfall. In one of these (Region C) the PPF supplied from BPL covered that Region's need but the Factor VIII required was far in excess of the supply and as a result the Centre bought in the balance from commercial firms. In this way the Centre was able to control the stock on a region-wide basis and hold centrally information about its total needs. In another Region each hospital using PPF and Factor VIII was asked, on a monthly basis, to advise the Centre how much of these products had been bought.

Issues

26. The systems in use for issuing blood and blood products to hospital blood banks varied among Centres and among hospitals within Regions. Of the 5 Centres visited 3 had attempted to regularise deliveries by agreeing with the hospitals a stock level to which supplies would be topped up on routine deliveries. The other 2 Centres, as far as they were able, issued stock as requested by the hospital, also on a routine basis. In both approaches a facility

existed to provide additional requirements by ad hoc deliveries, some of which were made by British Rail, taxi, the BTS transport and in cases of emergency, via a BTS blue light vehicle or by the police. Statistics on the amount and frequency of ad hoc deliveries made to each hospital could have provided useful information about which means was the most economical but such data were not in evidence in all Centres. In one Centre details to provide a profile of such deliveries were collected but no staff time had been found to analyse the records. In another, figures over a 3 month period in 1981 had been collected but the outcome of the survey was not clear.

27. Details of how requests for supplies were met or how blood banks were stocked by each Centre are shown in Appendix H. At Centres A and B, which supplied on demand, the contact between Centre and hospital was made by telephone, details were documented and vans delivered the goods on the arranged days. Centres C and E offered a service whereby the delivery vans were stocked according to available supplies at the Centre and the van driver had the responsibility of meeting the hospital's needs albeit to a pre-determined level when he arrived at the hospital. At Centre D the clerks reconciled the stock in hand at the Centre with the stock held at the hospitals and if possible made up the latter to the pre-determined level. In this Region blood was in fairly short supply and the enforced need to economise may have brought about such an arrangement between the hospitals and the Centre. For some smaller hospitals, eg 2 private hospitals visited in Region A, the Centre acted as the blood bank and supplied cross-matched blood and blood products as requested for each patient.

Returns

28. The system in each Region allowed for the return of out-dated blood and products each time a routine delivery was made. The return of blood products was said to be minimal but the time-expired blood (including plasma reduced blood) received was further processed to remove the plasma which was then pooled and sent to BPL. Centres expressed fears that not all out-dated blood was returned, yet only 2 hospitals admitted disposal of blood in any other way; one, which was privately run, received its main supply of blood from a private source which did not accept returns; at the other it was said that the time-expired blood was kept for research purposes.

29. In-date blood was not usually accepted as a return for re-issue purposes at any of the Centres. The reasons against this practice included:

29.1 The record system (a computer system) could not accommodate in-date returns;

29.2 As the Centre had not controlled the handling of the blood after its removal from their fridges, they were unhappy about re-issuing it elsewhere;

29.3 Hospitals would be encouraged to return older in-date blood and request fresher blood thus probably increasing wastage rates.

30. Each of the Centres supplied blood to hospitals which in turn passed on some of the supply to other satellite hospitals and some of those, eg children's hospitals, returned their older blood to the major user to avoid excessive wastage rates. The Centres were aware of and encouraged such practice even though they were reluctant to participate in such transactions themselves.

Record keeping

31. Centres used a numerical system to identify each donation and this number, which contained between 5 and 7 digits, was used from the bedside of the donor to the issue of the blood or product to hospitals or BPL. Such long numbers, however, were said to be difficult to transcribe accurately.

32. Two Centres controlled their receipts, stock held, issues and returns (for all except PPF and Factor VIII) by computer where the entry and removal of a unit was recorded by a light pen scanning machine readable labels. The ease with which records, summaries and traces of individual units were produced was impressive and each of the other Centres visited had desires if not definite plans to have their production records computerised in the near future. Such systems were not however, without their own problems.

33. The other 3 Centres operated manual systems using a register based on the unique number. Whether the unit was issued as whole blood or split into blood products and issued in parts, registers were kept at each place to record processing, batching and issue to each hospital. All quoted the unique donation number (see Appendix K). However, the delivery notes and record of returns from each hospital did not always show unique numbers.

34. To record PPF and Factor VIII, 2 of the 5 Centres had introduced a secondary numbering system whereby each bottle was given an individual number. On this basis their stock was registered and depletions recorded as the batches or part batches were issued to hospitals. In those Centres where the records were computerised, the control of these two products which were not labelled with machine readable labels presented problems. Additional manual records had to be kept.

35. At the issue stage delivery notes accompanied the goods. There were occasional exceptions to this practice usually on the supply of an ad hoc request. At one Centre some blood products were issued on receipt of a voucher signed by a doctor at the requesting hospital.

36. Two Centres using computers issued delivery notes showing individual units by unique number and blood group; 2 others recorded only the groups and amounts issued. At the 5th Centre blank issue vouchers were held on the van which delivered the goods and these were completed by the driver when he called at the hospital and was advised of their requirements. These forms, an example of which is at Appendix L, were completed when the order was put up and they included the group, unique and batch numbers of goods issued and details of any time-expired units of blood returned. In 4 Centres the notes were issued in duplicate; a copy was signed by the hospital and returned to the Centre.

37. Statistics detailing issues and returns to each hospital and BPL were completed in all Centres on a monthly basis. Annual supply and return figures for all hospitals were also compiled and these, at some Centres, took the form of a league table which was sent to hospitals for information. None of the Centres issued the monthly figures to individual hospitals.

Planning

38. Discussions about future demands to be made of the Centres with the users ie the hospital blood banks, were irregular and in many cases non-existent unless a new hospital or a new specialty which could be a heavy user, eg cardiac surgery, was being developed. It was evident that discussion about the volume of plasma issued to BPL and the returns of PPF and Factor VIII took place as each Centre was aware of impending changes in production at BPL.

39. Each Centre visited was attempting to persuade hospital blood banks to order and manage stocks more efficiently and one common example was the drive to encourage the use of more plasma reduced blood to enable greater production of blood products. The persuasion, however, seemed to reach too limited an audience and possibly only the Medical Laboratory Scientific Officers (MLSOs) in the laboratory who ordered and returned the goods.

HOSPITAL LEVEL

40. Twenty one hospitals featured in the survey and of these 5 were privately run 2 of which did not hold a supply of blood. Eight contained haemophiliac wards or clinics. Appendix M shows the hospitals visited by type, approximate number of beds covered by their service and whether the blood banks served other hospitals. In all the hospitals the Consultant Haematologist (or Pathologist) was considered accountable and responsible for the activity in blood banks, but of the MLSOs interviewed more than half stated that responsibility for managing the stocks, supplies and issues of blood and its products was delegated or left to them.

41. Twenty one variations on stock control and record keeping were identified. Considered in broad terms each hospital was offering the same service, achieving differing degrees of success, but their systems had developed over the years and were used by many different people. Most systems had not been subjected to scrutiny prior to this study and to change them would cause widespread confusion which could not be justified provided the essential minimum controls are present.

Supply

42. In all hospitals except one, supplies of blood came only from the Regional Transfusion Centre. The exception was served by 2 sources - the major supply coming from a private source and the remainder from the Centre. Most blood products were supplied by the Centres but some hospitals had to top up PPF and Factor VIII with products bought from commercial firms. Factor IX was said to be supplied direct from the Plasma Fractionation Laboratory (PFL) at Oxford to those hospitals and clinics dealing with patients needing this special product.

43. Supplies of the commercial products came from a variety of firms and were ordered and dealt with at hospital level in several different ways. As examples:

43.1 In Region C the Centre supplied all blood products to hospital blood banks and bought in any extra Factor VIII required;

43.2 In another Region the doctors at one hospital were obliged to seek supplies of PPF through pharmacy when the weekly allocation from the Centre ran out. (In this instance no control of the ordering or distribution of the goods was exercised at the blood bank.)

43.3 At another hospital the blood bank ordered, received and distributed additional supplies of PPF and Factor VIII provided through pharmacy by commercial firms.

Typical costs of the commercial supplies of PPF and Factor VIII were as follows:

43.4 6p per unit for Factor VIII (a small bottle may contain 250 units);

43.5 £36 per bottle for PPF.

44. Details of the systems for supplying goods from Centres are tabled at Appendix H. The frequency of routine deliveries and an estimate of the ad hoc deliveries made per week are shown at Appendix N. Some hospitals considered that their proximity to the Centre influenced the frequency of ad hoc visits, those nearby received less stock on routine deliveries as their emergency needs could be met more easily and economically than those of a distant hospital. At hospital 3 the Senior Chief Medical Laboratory Scientific Officer (SCMLSO) had calculated in terms of blood supplies and wastage rates the requirements and economies of routine and ad hoc deliveries and he found it was more economical to maintain a lower stock level and receive extra deliveries of blood by train as required. Limited information about ad hoc visits was compiled at hospital level and, when asked about their costs, little interest was shown mainly because in some Regions the Centre met most of the cost and in others the charges for taxis etc fell to the hospital or District transport department, far removed from the laboratory. No pressure was placed on the blood banks to consider or even record costs. In one London hospital however a taxi bill for blood deliveries in one month was stated to be £688.

45. All products supplied from the Centre were delivered to the pathology laboratory. In most cases the blood bank received and dealt with all supplies but in 4 hospitals which used Factor VIII the coagulation section in the laboratory dealt with the issue and recording.

46. In most places the deliveries of blood were checked by group and volume on arrival. The supply was then stored in blood bank fridges usually by group and in expiry date order.

47. PPF and Factor VIII were distributed either monthly or weekly; some hospitals ordered as required and others kept stock at a certain level and had their supplies topped up or they received a delivery of a given number each month.

Control of stock

Blood

48. For those hospitals which had agreed a pre-determined stock level with the Centre, details of the blood stock level in terms of the 2 heaviest groups - O positive and A positive - are shown at Appendix N. Also from that Appendix it can be seen that, in those Regions where no pre-determined level had been set, some of the blood bank staff had themselves set a level up to which they ordered supplies. In the Region which had adopted a 35 day life span for blood, the MLSO in one hospital considered this a great benefit because it effectively increased the volume of the stock by 25%.

49. The day to day management of stock required flexible practices by the MLSOs who found it easier with experience and knowledge of how the medical staff used the supply. It was said that greatest demand for blood originated from surgical and maternity units where blood was ordered to cover emergencies but not necessarily used. In contrast, medical patient's needs were more predictable and most of the blood requested was actually used.

50. Advance knowledge of the likely requirements for theatre through pre-admission grouping, requests received in the laboratory 48 hours before the required date and summaries of requirements for special operations aided stock control. Such planning however could not cover emergencies, which could crop up at any time and for which blood bank staff had to make provision. One hospital controlled its demand on stocks by carrying out double cross-matching processes.

51. Most people accepted that the stock control and wastage rates in the use of blood were partly, if not largely, influenced by the policies of the medical staff, particularly surgeons, using the blood. It is a clinical decision whether and what to transfuse. Everyone respects this fact yet they readily agreed that there were economic considerations which could be brought to bear on the use of blood and its products without endangering the patient. Some hospitals visited had gone a long way towards setting up a dialogue with the medical staff which encouraged economical ordering of goods, supported very positively with the back up facility to provide them in cases of emergency. In the hospitals achieving success in this field the Consultant Haematologist was a key figure. He, supported by the necessary statistical information from the blood bank, had the authority to ask his medical colleagues to reconsider their clinical practice. Four major areas where the demand for blood could be controlled were identified:

51.1 An agreement with surgeons on the normal requirement for certain operations, (examples of lists drawn up at 2 hospitals are shown in Appendix P);

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51.2 A pre-admission grouping system for cold surgery patients;

51.3 A group-and-save-serum scheme whereby the laboratory held the essential sample for urgent cross-match should any blood be required;

51.4 A de-reserving policy, giving time limits for the reservation of every cross-matched unit after which it was returned to stock.

52. The policy at 51.1 above operated on a basis of trust whereby the surgeons had regard to economies when ordering. For their part the blood bank agreed to meet any request, which could be a variation of the agreed cross-matching policy. Maintaining this relationship becomes especially difficult when a junior doctor, often a houseman on a 6 months' training period in a particular hospital, requests the blood or product and follows policies adopted elsewhere.

53. The pre-admission grouping system was generally used to group and screen for anti-bodies the blood of those patients due for surgery so that the blood bank could order any special requirements in advance. This also helped to identify any possible heavy demand on particular blood groups.

54. The group-and-save-serum scheme, among other benefits, allowed the doctors involved in certain areas of surgery where blood is unlikely to be needed to have cross-matched blood at short notice in an emergency rather than have it standing by. This scheme reduced the number of units to be cross-matched and therefore saved on supplies and laboratory staff time. Fast cross-matching techniques were considered essential to support such a service.

55. The de-reserving policy, found in all hospitals, formalised the understanding between the users and the suppliers about how long a cross-matched unit would be held for particular patients. Such a policy avoided cross-matched units of blood being left unused until the expiry date.

56. Such approaches to blood banking are not new. Professor Friedman, an American, offered good managerial philosophies a few years ago in his papers about maximum surgical blood order schedules. Using a similar approach one MLSO, found at location 3, had successfully reduced wastage rates by reviewing the following administrative areas:

56.1 General cross-matching policies;

56.2 Blood bank inventory levels;

56.3 Dissemination of information on blood component therapy;

56.4 The shelf-life of blood issued from the Centre and its effect on out-dating;

56.5 Issuing policies.

57. All blood banks mentioned a general practice of control whereby the older units of blood were used first except in special circumstances, eg for cardiac surgery and children's surgery where they tended to use only fresh blood. However this practice was modified further to reduce wastage. If for instance a request for blood was made for an operation in which it was fairly certain that 2 units would be used and the patient had no special blood disorder, the units to be cross-matched would be the older stock within the fridge. If however blood cover was required for an operation where the blood was unlikely to be used, fresher units would be cross-matched so that, should they be returned to stock, their remaining life span allowed possible use for another patient.

58. A further aid to stock control may emerge from the research into stock levels required at hospital blood banks being carried out in the OR department in Region C. The project is expected to quantify the likely relationship between the normal requirements of cold surgery and the cover required for emergencies.

59. Arrangements existed at all blood banks for the stocks to be checked at least daily - usually first thing in the morning with some banks checked twice per day - to identify unused cross-matched blood and time-expired blood. Unused stock, if still in-date, was returned to the stock fridge ready for further cross-matching. If stocks of certain groups were low, efforts would be made to replenish the supply from the Centre.

60. It was stated that problems of over-ordering occurred in some blood banks when other laboratory staff were on call and came in to issue blood. Depending on their experience, they were likely to deviate from the normal practice carried out by the regular blood bank staff.

Blood products

61. Control of blood products varied with the product, its shelf-life and, to a lesser extent, its perceived value. Some, eg platelets, were not stocked because of their very short life; others such as FFP, which in some places was given no expiry date, were stored for 6 months or more depending on the freezer conditions in the blood bank.

62. The day to day management of those products manufactured at the Centres and stored in blood banks, eg FFP, was found to be a simple exercise of extracting the goods from the freezer - the oldest first - to meet demand as requested.

63. Control of PPF amongst the hospitals visited was found to be haphazard. Eighteen hospitals received a supply from the Blood Transfusion Service and in 9 of these no record of receipt or issue was made. If the commercial supplies of PPF were delivered to the blood bank they were dealt with in a similar fashion. Obviously if commercial supplies were issued direct from pharmacy any form of stock control at blood bank level became meaningless.

64. Eight of the hospitals visited received a regular supply of Factor VIII and Factor IX but no common practice in dealing with them emerged. Stock control was exercised sometimes at laboratory level, at the blood bank or at ward level. The overall control tended to be carried out by medical staff and it may have been that their views about future requirements were known to their medical colleagues at the Centre or laboratory rather than in blood banks.

Issues

65. Although 21 different systems for dealing with blood and blood products were found by the study, all hospitals, when issuing blood, kept to 6 basic functions:

65.1 Using a request form to detail the service required which was completed in a patient's name, signed by a medical officer and passed with a blood sample to the laboratory;

65.2 Grouping, testing, cross-matching the sample, if appropriate, and recording the results in the laboratory;

65.3 Where cross-matching was appropriate, the labelling of cross-matched units and storing in a fridge ready for collection;

65.4 The ward or theatre instigating the collection of the units prepared;

65.5 The person allocated collecting the blood and signing for the units taken;

65.6 Laboratory staff removing from the fridge any unused units to return to stock.

If cross-matched blood was not returned to the fridge - and returns were said to be rare - it was assumed to have been transfused. In all hospital blood banks and in some theatre blood bank fridges an emergency supply of O negative blood was kept and replenished on a regular basis. A flow chart in Appendix Q shows the most common practice for issuing blood.

66. The issue of products such as FFP, Cryoprecipate (Cryo) and other specially prepared products tended to follow the systems used for blood. Systems for issuing PPF were less well defined and, in the 9 hospitals which controlled PPF, practice varied from a formal system as used for blood to a topping up system activated by the receipt of a voucher from a ward.

67. Factor VIII was issued on very different grounds in that it was governed by the medical condition of the haemophiliac and controlled by medical or nursing staff. It was issued either direct from blood banks to patients and on occasions from pharmacy to patients or, most often, from blood banks to wards or clinics which specialised in this condition where it was stored for issue to patients.

Returns

68. Returns from hospital blood banks to Centres were largely units of time-expired blood. Occasionally a blood bank separated red cells from a unit of whole blood for a particular patient and in those instances the residual plasma was returned to the Centre still in-date. In 2 Regions there were facilities for returning in-date blood, eg a large cardiac unit had its blood exchanged on routine delivery and the older in-date blood went back to the Centre, but these practices were rare and covered by special arrangements.

Record keeping

Blood

69. None of the hospital blood banks had a formal "request for supply form" and only one hospital had designed and was using a stock-taking form (reproduced at Appendix R). Requests for goods were made by telephone, and in most hospitals a copy of the delivery note remained at the hospital. (See also Appendix S).

70. The guidance issued by the Department in 1964 and 1975 suggested that hospital blood banks keep a register to record the issue and fate of units of blood and appropriate books have been made available from Centres. They record patient detail, some detail of the cross-matched unit including the unique number, and the signature of those collecting the unit of blood. Examples of information collected in the standard and other registers are at Appendix T. Sixteen of the hospitals visited used some form of register; one seen had been specially designed for that hospital and was said to have cost approximately £200 and to last approximately 6 weeks. In the other 5 hospitals either the request form had been successfully adapted to cover the issue details and signatures required or, as in 2 hospitals, a voucher/card system for obtaining the signature of those collecting the units had been introduced to run alongside the request form. Such variations were said to reduce the amount of clerical work required.

71. The majority of blood banks first registered their supply of blood at the cross-matching stage when the unique number was recorded against the patient's name. Most MLSOs stated that control of blood by a register of units received on arrival in the bank and using the unique number and recording the fate of each, would be too onerous and time-consuming to operate with current staffing levels. To trace individual units it was considered less time-consuming overall to go through the records held mainly for other purposes, when a request arose, than to constantly record the destination of every unit from arrival to disposal. In practice requests from the Centre to trace a unit of blood occurred once or twice per year on average.

72. Only 4 hospitals (including 2 private) used a register to record, by unique number, each unit of blood as it arrived and its fate. One Centre (Centre B) in an attempt to obtain information about the fate of each unit had issued a loose leaf register as part of the delivery note but hospital staff failed to complete and return them. The experiment fell into disrepute mainly because it took too much time to

trace the disposal of all units listed on each delivery sheet. One sheet could not be completed until each unit listed had been transfused or returned to the Centre and the recording was then historical - possibly 3 weeks after the delivery - by which time 7 or 8 other sheets had piled up and had to be scanned. In addition the keeping of such records was seen to be mainly for the benefit of the Centres rather than the blood bank.

73. During the study 20 different request forms were found in use. Each had a different layout; some were multi-part - up to 4; another a single card, and most requested similar information. Appendix V shows the detail recorded which fell mainly into 4 categories:

73.1 Patient identification;

73.2 Patient history;

73.3 The request and the person making it;

73.4 Laboratory information.

All recorded the unique number of each unit of blood cross-matched for that request. At least one copy of the request form, usually the back copy which contained more laboratory information about the cross-matching process, was kept in the laboratory and filed alphabetically by year. Where no registers existed other methods were used to file the information needed to trace, eg 2 lab copies were kept, one filed alphabetically and the other chronologically thus facilitating a trace during a given period, eg the life span of the units of blood.

74. Underlying the recording systems at all blood banks was the assumption that a unit of blood had been transfused if it had been cross-matched for a patient and, either in a register or on a request form or card, someone (in an official capacity) had signed for that unit of blood. What happened after the blood had left the fridge was considered to be out of the control of the blood bank staff and therefore someone else's responsibility to use or return.

75. In addition all laboratories had some record of the laboratory work carried out ie records were kept of the cross-matching results. In many hospitals each request was allocated a lab number and the record showed the patient's name as well as the unique number of the units cross-matched. This record, as well as being part of a system for controlling work in a laboratory, had the added facility of acting as a back-up source of information for tracing the fate of a unit of blood. Additional clerical work, although not specifically record-keeping, included the labelling of bags with the patient's detail. Again several different types of cross-matching labels were in use and hospitals used different methods such as sticking the label on the front or the back of the bag; some found colour-coded compatibility labels a security against labelling incorrectly and so causing transfusion accidents. One common problem in the labelling procedure concerned the legibility of the MLSOs' writing. To overcome this one hospital used a type of label resembling a luggage label with the patient's banda label attached; another resorted to having labels typed.

76. The bags themselves, already labelled with the unique number and contents at the Centre, carried sufficient information for record-keeping for stock control and tracing purposes. In several hospitals these bags, once the contents had been transfused, were returned to the laboratory mainly for retention pending the onset of possible transfusion reaction and then they were disposed of. In one blood bank the returned empty bag was used to check the record of the disposal of each unit. In most places the MLSOs considered the empty bags to be too messy to feature in a recording system and, in the event of computers using light pens being installed at blood bank level, there was doubt whether the light pens would register bar code information which may be spotted or covered with blood should a spillage occur.

Blood returns

77. It was established that little information was kept at hospital level about returns to Centres (see Appendix W) and few records were found which recorded the disposal of unusable units or units which had been passed elsewhere for testing or research purposes.

78. Other than in Region C, where the van driver completed return vouchers, 12 hospitals made no record of unique numbers and 9 did not record the volume of units returned to the Centre at the time of despatch. Blood bank staff considered a record unnecessary mainly because the goods being returned were recorded at the Centre. As no check between hospital and Centre was made blood could have been mislaid or diverted between the 2 places. The lack of such a record at hospital level also complicated the tracing of individual units.

Blood products

79. The recording of blood products was initiated usually at the issue stage when batch numbers were recorded against patient names in registers or on request forms. PPF most often proved to be the exception. (Appendix X gives details).

80. Requests from wards for most products were made on the same forms used for blood. Factor VIII was dealt with differently according to the hospital system (see para 67) whereby issue was recorded on a treatment sheet or register. In several hospitals PPF was made freely available for those requiring the product to help themselves; only 9 hospitals held a record of issues and the common practice involved the collector signing a register or notebook, not all of which recorded batch numbers.

81. Those blood bank staff dealing with PPF where few or no records were kept believed that:

81.1 It was no longer a potentially dangerous intravenous (IV) product;

81.2 It was provided free on a regular basis and therefore could be supplied to likely users eg theatre, haematology wards etc in bulk as required;

81.3 As the batch number on the bottle was the same as that on possibly hundreds of other bottles the relevance of quoting that number on issues was meaningless;

81.4 If anything was to go awry at transfusion it would happen quickly at which stage the transfusion could be halted, the bottle would still be available in the ward and the appropriate batch number could be noted as necessary;

81.5 If a batch needed to be recalled the Centre would quote the batch number and those still held in the various store cupboards could be checked and extracted from circulation. Those transfused were lost and assumed to have caused no reaction.

Statistics

82. As a means of monitoring the work load most blood banks operated some form of counting the cross-matches performed. In many hospitals this was the only attempt to quantify the service offered. Thirteen of the 21 hospitals visited kept no statistics of receipts, issues to wards or theatre and returns of blood and blood products to the Centre. At the other end of the spectrum 4 hospitals collected monthly statistics covering receipt, transfusion and return figures as well as indicators of performance gauged by the cross-match to transfusion ratio. These calculations, only possible when summaries were made, were found in those blood banks where the MLSOs had a particular interest in management information and performance indicators and pride in how well their blood bank performed.

83. Some of the other hospitals may not have kept statistics regularly but periodically they logged requests, number of units issued and used for a period of 3 or 6 months to provide evidence for discussion if they considered that a particular firm of consultants or a doctor was making uneconomical demands on the services offered. All information required to complete such statistics was included on the laboratory copies of the request forms and/or the register.

84. Statistics kept for blood products were found only in isolated locations. As in the dealings with blood, they existed in those hospitals where the MLSOs were more inclined towards accountable management or the Centre sought the information.

85. No computerised record-keeping was found at blood bank level. Many MLSOs were keen to experiment and most thought that it would be the answer to the problems of record-keeping and stock control at that level. In Region B a research project was well under way with the aim of setting up in the blood bank at hospital 10 a micro-computer system for which the costs of hardware and software were expected to amount to less than £10,000. Details of the approach and records to be kept in this system are shown at Appendix Y. It is expected to be operational by the end of 1982. Another proposed micro-computer system was identified at hospital 21.

The recording of unique numbers and batch numbers in patients' notes

86. At the end of the chain in blood transfusion the patient receives the blood and/or a component and in case there should be any transfusion reaction, or at a later stage if some defect is found in the items transfused, the recording of the issue of individual units or a batch product to recipients has great importance.

87. In 19 of the 21 hospitals visited the unique numbers of transfused units of blood were recorded in patients' notes and were found either on the top copy of the request form, on which a signature or a tick indicated that a particular unit had been transfused, or on the intravenous treatment charts or the fluid balance charts. In one hospital a special stamp had been designed to imprint on the medical notes a series of boxes in which the numbers of transfused units could be entered. Records of the individual units of blood being transfused in those hospitals were therefore available in the patients' notes for the period those notes were kept.

88. In most hospitals the nurses stated that during their training they had been instructed about the importance of the handling of blood and blood products and nursing procedures seen at several hospitals were quite specific in instructing the nurses to record unique and batch numbers at transfusion. In theatre cases it was often the anaesthetists who transfused the blood and they were responsible for recording the issue and the unique numbers of the appropriate units.

89. Other products, FFP, Cryo etc were usually transfused in theatre or on the post operative wards where the same procedures as those for blood were normally followed.

90. Factor VIII, dealt with in the specialist areas, was recorded by batch number in patients' documents. PPF however did not receive the same attention. In 11 hospitals batch numbers for PPF were recorded in the notes, usually on the intravenous or treatment charts. In the others a record of batch numbers was not considered necessary and this product was recorded in a similar fashion to saline and other non-dangerous IV fluids.

Planning

91. Within the Department, Centres and some hospitals, the ratio of returns of time-expired blood to blood supplies was seen to be indicative of how well a blood bank managed the stock. Most of the study locations were chosen for their heavy or light return rates and as the study progressed it became clear that return figures were not necessarily an indication of good or bad management at the blood bank. Those with high return rates sent back more units for a variety of reasons eg some geographically distant hospitals held more stock in case of emergencies, in others the medical staff preferred to have more blood standing by or, as in larger hospitals with heavier demand for blood, they received additional older supplies from smaller nearby hospitals in an attempt to curb excess wastage at the latter. Such practices resulted in a high level of stock, above the level of demand.

92. On the other hand it was said by some laboratory staff that while a low return rate could be indicative of good blood bank management, such figures could also hide the disposal of unused units by unorthodox methods given that there was an overall reconciliation of supplies.

93. In response to questions asked at hospital level about high return rates, by far the most common answer placed responsibility on the medical staff who ordered and used the blood. The general opinion was that, at worst, surgeons over-ordered blood for patients for a variety of operations and blood bank staff doubted whether they should, or could, persuade them to do otherwise. In some hospitals the Consultant Haematologists were said to be reluctant to discuss usage and possible economies with the users and as a result the normal supply to the hospitals, which was often based on amounts used in previous years, was left at a high level, cross-matching activity was also at a high level and because so much blood was circulating from store to cross-match, a lot of it went out of date. At best, blood bank staff had entered into a dialogue with those using the blood and policies which embraced economies in the ordering and cross-matching of blood had been agreed.

94. Where such policies had developed they had not done so overnight. Blood bank staff had usually collected statistics on use by firms of consultants, wards or individual doctors and had prepared the evidence for the Consultant Haematologist who then was well prepared to meet and discuss the problems with his medical colleagues. From there on the liaison had developed slowly. On occasions the blood bank MLSOs had approached the medical staff but more often they did so after the haematologist had made the first contact. To evaluate or maintain performance a repeat of the statistics collection provided further evidence.

Blood banks and Centres

95. Regular contact was maintained between the person in the hospital blood bank controlling the level of stock and the person on the end of a telephone at the Centre who dealt with issues to hospitals. If problems arose the medical staff at the Centre entered the discussion but the involvement of the haematologist at some hospitals was not so obvious. The relationship between hospitals and Centres appeared to have flourished mainly at operational level and combined complete trust with dubious methods of inflating levels of stock.

96. This trust manifested itself in the responsibilities placed on a variety of individuals in the transfusion service, in particular on van drivers who transported goods from Centre to hospital and back, sometimes without the hospital checking even the volume of deliveries or their returns. Because the service was at the outset based on voluntary donations it was considered mainly in terms of patients' needs, and even though there were shortages of stocks from time to time, systems were not sensitive to security of stock and the need to keep a check on transactions.

97. The different picture encountered in several hospitals was one of exaggerating shortages of stock held to ensure a replenishment supply at a more comfortable stock level at the bank. When this occurred the Centre was usually aware that the hospital was using tactics and the staff at the hospital knew that the Centre staff were aware that they were playing games. In other places an honest approach secured an equally acceptable level of supplies.

98. Discussions had taken place in the past between the Centres and the hospitals in Regions C, D and E to agree stock levels. Many of the MLSOs were unaware of when and how the stock levels had been set, whether they were open for review and whether anyone looked at them on a regular basis. In practical terms the relevance was not too important because if a hospital was short of blood or blood products they rang through to the Centre for an emergency or an ad hoc delivery.

CONCLUSIONS AND RECOMMENDATIONS

REGIONAL CENTRES

99. The methods adopted at each Centre for supplying hospitals with blood and components varied. As a result systems at hospital blood banks showed a wider variation; they were based on the Centre's systems and had developed from that base.

100. The different procedures and processes found amongst hospitals within the same Region showed that the Centres had little influence over methods of blood banking, issues and supplies. Although the hierarchy in both are not related and no accountability is strictly placed on the Centres for the management of supplies in hospital blood banks, the blood bank staff in each hospital could benefit from an exchange of ideas through a central body. Should computerised record-keeping develop in hospital blood banks the need for co-ordination by Centres and for information to be exchanged becomes acute.

101. It is recommended that Centres consider as part of their role a formal process to enable the exchange of ideas and good practice at operational level for hospitals to whom they supply substantial quantities of blood and blood products.

Stock control: Blood

102. The supply and issue of goods at Regional level was seen to be delicately balanced. Any interruption in the flow had far-reaching effects and as the major supplier was the public, the handling of the service needed to be particularly sensitive.

103. Discussion between suppliers and users of blood and products at the higher managerial levels at both Centres and hospitals was found to be too sporadic to foster good planning and an understanding of each others needs. The results of the OR assignment in Region C could provide a useful infra-structure for such dialogue.

104. It is recommended that discussion on a formal basis - say annual or 6 monthly - between the medical staff or Director at the Centre and the hospital based haematologist in charge of the blood bank is considered with a view to sharing problems and good practice experienced in blood banking.

105. Clerical records without a matching physical count of stock are unreliable and, even if more clerical time is needed to carry out the stock-taking process, the tally of records with stock is seen to be essential particularly when the stock has a commercial value.

106. It is recommended that stock-taking on a regular basis, at least weekly, to enable the tally of goods held with the records at the Centres, is carried out.

107. The need to have flexibility in the approach to supplying blood was demonstrated in each Region, not least when requests arose for blood to cover emergencies. Although 4 out of 5 Regions offered a different approach, each had settled into a system of routine and ad hoc deliveries which was seen to work. The missing element in their systems concerned the evaluation of how well they worked. The obvious monitoring approach would be to quantify the number, frequency and costs involved in ad hoc deliveries.

108. It is recommended that an investigation is made into ad hoc requests and deliveries and their frequency and costs.

Record keeping: Blood

109. Recording at Centres where the fractionation of red cells and plasma produces several products was found to be comprehensive, complicated and possibly prone to transcription errors because of the length of the identifying numbers and the numerous records in which their entry was required. The computer systems seen, although not without their own problems, offered much in terms of accurate records, easy tracing and regular statistics. Savings in staff time were not obvious but more immediate management information and easier compilation of them appeared to be benefits worth pursuing.

110. No recommendation is appropriate as each Centre had plans to move towards the computerisation of their records systems. It would be helpful however if each Region worked towards a common system which used similar equipment.

111. Delivery notes issued from Centres were found to be key instruments in the stock control and record-keeping of blood. At the Centres the returned notes were used to keep track of how much blood and which units had been received by which hospital.

112. It is recommended that with each delivery of blood Centres issue duplicate delivery notes which record the volume, group and individual unit numbers sent to each hospital. (Where a copy should be retained.)

113. Returns of blood received at Centres were recorded either by unit number and/or in volume per group. To aid the dialogue between hospitals and Centres in the event of tracing a particular unit, it would be helpful if all Centres could record, against records held for each hospital returning the blood, the unique numbers of the units received. (This would also serve as a security check if compared with records of returns kept at blood banks.)

114. It is recommended that Centres record returns by unique number as well as volume per group for individual hospitals.

115. The annual statistics produced by some Centres showing a list of supplies and returns for each hospital may provide an efficiency indicator at Centres but were found not to fulfil any useful purpose at hospital level. Some of those with high return figures ridiculed the system and tended to ignore the figures presented. More would be gained by both parties if figures were reproduced for each hospital separately and on a more frequent basis, say 3 monthly, and used to structure discussion between a Centre and its blood banks on requirements and use in the future.

116. It is recommended that the annual league tables are no longer published and that more frequent returns, say, quarterly, are compiled for individual hospitals and used as a basis for discussion on future needs and usage.

Stock control: Blood products

117. Blood products from BPL did not meet nation-wide needs and their present labelling hindered efficient stock control. If some way could be found to identify each bottle of PPF and Factor VIII with bar code labels, stock control at Centres would be easier. (An individual number on a bottle could encourage stock control in blood banks and the recording of goods transfused in patients' records.)

118. It is recommended that BPL considers numbering and labelling individual bottles to facilitate the system for recording goods transfused and better stock control.

119. Region C's approach to buying in and controlling the whole Region's supplies of Factor VIII was attractive. It was difficult to establish whether other Regions had considered such an approach. At present the hospitals in those Regions were buying individually according to their needs, each possibly haggling for a better price and each duplicating the time spent on discussion and associated clerical work.

120. It is recommended that further enquiries should be made into the merits of more regional control of the ordering and supply of blood products from the commercial sector.

Record keeping: Blood products

121. For the issue of blood products the delivery systems followed a similar pattern to that used for blood. The recording of the issues and, if appropriate, returns of goods by batch number for each hospital would facilitate stock control and the tracing of goods if required.

122. It is recommended that a delivery system and statistical recording of issues and returns of blood products follows a similar system to that employed for blood.

HOSPITAL LEVEL

123. In most places stocking the blood bank appeared to be governed more by experience than quantified managerial information. Although it is recognised that demand for blood and its products is very difficult to predict, information about past and future use was more readily accessible at this level. In some places a management information system combined with flexible ordering arrangements by those using blood and blood products had reduced the requirements at hospital blood bank level.

124. In Region C the OR assignment which has been extended to cover a mathematical approach to forecasting the needs of a hospital blood bank should, when complete, provide some further evidence for a discussion forum.

125. More detailed information about the normal running of the blood bank should be available for those on-call to refer to when necessary. Operational procedures may have to be written but in some cases it may be sufficient to have available the daily stock figures which on perusal would furnish the MLSO with some knowledge of normal stock levels from which he can judge the necessity for replenishing stocks.

126. It is recommended that information about normal working practice and stock levels is made available for reference by on-call staff.

127. The haematologists in charge of the blood banks were considered to be responsible for the services offered. Some were actively concerned with good management practice, most were not. They are best placed to influence usage of blood and blood products and should be encouraged to pay more attention to the economical management of the stock.

128. It is recommended that haematologists are reminded of their full responsibilities in the management of blood.

Stock control: Blood

129. It is accepted that the stock control and wastage rates for blood are largely influenced by the policies adopted by the medical staff, particularly surgeons, using the blood. If efficiency is to be improved each bank must reconsider, with the users, its cross-matching policies and stock inventory levels.

130. MLSOs consider themselves to be less influential than another doctor in dealings with medical staff. The haematologist in charge of the bank therefore must feature in discussion about economies if it is to bear fruit.

131. It is recommended that haematologists in charge of blood banks are asked to ensure that they discuss with their medical colleagues economies in blood usage. (Blood products - although not found to be such a problem - should be considered too.)

Record keeping: Blood

132. Guidance from the Department (notes on Transfusion 1975 - HM(64)5) suggested that hospital blood banks keep a register showing the use of all blood and blood products, the main purpose of which appears to have been to facilitate a trace of donations. No specific mention is made about stock control. Some hospital systems record enough information to trace a donation on the request form, thus obviating the need for a separate register if the request forms are filed systematically. Requests to trace are infrequent and it is illogical to spend an inordinate amount of time on duplicate recording for that purpose alone.

133. Although one hospital was observed to maintain a running stock control recording system the majority recorded less frequently whilst some did not record at all. As each blood bank reviewed their stock at least once per day it would appear most convenient to incorporate a recording system in that physical check. The basis of a suitable recording form is shown at Appendix B. This coupled with detail on delivery notes, the unconfirmed usage numbers - which could be obtained from subtracting one day's stock figures from the next - and a record of returns to the Centre, would provide, an albeit basic, stock control recording system. Details confirming figures for blood or blood products used could be obtained on a less frequent basis - say weekly or monthly - by counting the number of units signed for either in a register, if one is held, or on the filed back copies of the request form. Information about use by ward, firm of consultants or individual doctors could be extracted from the same source.

134. It is recommended that to facilitate the tracing of units of blood, a chronological file of details showing patients' name, unique number of the units cross-matched and a signature for the removal of a unit from the blood bank should be kept. The decision whether this takes the form of a register or a file of back copies of request forms should be left for the hospital blood bank to decide in light of their well established practice and evaluation of it.

135. The recording of returns of time-expired blood to Centres (except in Region C) and the issue of blood to other establishments for purposes other than transfusion to a patient was virtually non existent amongst locations visited. Without such records blood banks cannot account for their stock supplied and would no doubt find it difficult to trace a unit of blood if it was not transfused and had not been recorded at the Centre as a return. A suggested form for recording returns and disposals is at Appendix C.

136. It is recommended that stock control recording systems should be based on a daily inventory record supported by delivery notes and a record of returns and disposals.

Stock control: Blood products

137. Stock control of blood products and accounting for the costs of those supplied commercially would be facilitated if the distribution was centred on one place in the hospital organisation. Blood banks provide the most obvious central distribution point.

138. It is recommended that all blood products including those supplied by commercial firms be channelled through blood banks for distribution to wards and theatres for patient use.

139. In the control of PPF those working at blood bank and ward levels are uncertain about the dangers inherent in transfusing PPF and require some direction about what should be recorded for the safety of the patient. At the same time some reminder about the value of PPF would help blood bank staff to decide whether they should spend additional time clerically recording its issue.

140. It is recommended that the Department or the BPL issue information and guidance about the need to control stocks of PPF and, if appropriate, record issues of each bottle.

Record keeping: Blood products

141. The issue of most blood products to patients, with the exception of PPF, was comprehensively recorded, most often through a register or by use of the request forms.

142. Statistics covering the use of blood products, both those manufactured at Centres and those supplied by BPL, were incomplete or in some blood banks non existent. Particularly for those which may have to be replenished by commercial supplies, information about patterns of issue is essential for budgeting purposes.

143. It is recommended that statistics are kept in the blood banks for blood products on a similar basis to those for blood. Figures for those products which, in the event of depletions of stock, are replaced by commercial products should be kept separately to allow cost identification.

Records at ward level

144. With the exceptions of only 2 hospitals, unique numbers for units of blood transfused were recorded in patient notes. Similarly batch numbers were recorded for all blood products transfused except PPF. Doubts about whether PPF should be recorded had percolated to ward level in many hospitals. Clarification about transfusing PPF is essential and, when advised hospitals will need to introduce either confirmatory or revised procedures to be followed at ward level.

145. It is recommended that the need for a record in patient's notes of the batch numbers of PPF transfused should be clarified and guidance issued to those concerned at ward level.

146. The number of different request forms identified during the study almost equalled the number of locations visited and suggested that each hospital or Health Authority had probably paid separately for their design and print. Standardisation of forms in theory is the ultimate goal in this situation but it is recognised that each organisation prefers its own system; they could not change their systems quickly and money may not be available to pay for new forms. However, they could bear in mind that if they were to change their systems and require new forms, someone else in the business will have designed a form, already in print, which would meet their needs. Regional Centres could provide a reference point on such aspects (see para 100).

147. It is recommended that if hospitals are reviewing their request and recording systems for blood and blood products, reference should be made to Centres for information about suitable systems and designs of the required paper-work within or outside the Region. Regional O & M units could provide expert help.

LIST OF RECOMMENDATIONS

148. It is recommended that Centres consider as part of their role a formal process to enable the exchange of ideas and good practice at operational level for hospitals to whom they supply substantial quantities of blood and blood products.

149. It is recommended that discussion on a formal basis - say annual or 6 monthly - between the medical staff or Director at the Centre and the hospital based haematologist in charge of the blood bank is considered with a view to sharing problems and good practice experienced in blood banking.

150. It is recommended that stock-taking on a regular basis, at least weekly, to enable the tally of goods held with the records at the Centres, is carried out.

151. It is recommended that an investigation is made into ad hoc requests and deliveries and their frequency and costs.

152. It is recommended that with each delivery of blood Centres issue duplicate delivery notes which record the volume, group and individual unit numbers sent to each hospital. (Where a copy should be retained.)

153. It is recommended that Centres record returns by unique number as well as volume per group for individual hospitals.

154. It is recommended that the annual league tables are no longer published and that more frequent returns, say, quarterly, are compiled for individual hospitals and used as a basis for discussion on future needs and usage.

155. It is recommended that BPL considers numbering and labelling individual bottles to facilitate the system for recording goods transfused and better stock control.

156. It is recommended that further enquiries should be made into the merits of more regional control of the ordering and supply of blood products from the commercial sector.

157. It is recommended that a delivery system and statistical recording of issues and returns of blood products follows a similar system to that employed for blood.

158. It is recommended that information about normal working practice and stock levels is made available for reference by on-call staff.

159. It is recommended that haematologists are reminded of their full responsibilities in the management of blood.

160. It is recommended that haematologists in charge of blood banks are asked to ensure that they discuss with their medical colleagues economies in blood usage. (Blood products - although not found to be such a problem - should be considered too.)

161. It is recommended that to facilitate the tracing of units of blood, a chronological file of details showing patients' name, unique number of the units cross-matched and a signature for the removal of a unit from the blood bank should be kept. The decision whether this takes the form of a register or a file of back copies of request forms should be left for the hospital blood bank to decide in light of their well established practice and the evaluation of it.

162. It is recommended that stock control recording systems should be based on a daily inventory record supported by delivery notes and a record of returns and disposals.

163. It is recommended that all blood products including those supplied by commercial firms be channelled through blood banks for distribution to wards and theatres for patient use.

164. It is recommended that the Department or the BPL issue information and guidance about the need to control stocks of PPF and, if appropriate, record issues of each bottle.

165. It is recommended that statistics are kept in the blood banks for blood products on a similar basis to those for blood. Figures for those products which, in the event of depletions of stock, are replaced by commercial products should be kept separately to allow cost identification.

166. It is recommended that the need for a record in patient's notes of the batch numbers of PPF transfused should be clarified and guidance issued to those concerned at ward level.

167. It is recommended that if hospitals are reviewing their request and recording systems for blood and blood products, reference should be made to Centres for information about suitable systems and designs of the required paper-work within or outside the Region. Regional O & M units could provide expert help.

APPENDIX A
(See paras 11, 110 & 133)

PRINCIPLES FOR STOCK CONTROL AND ASSOCIATED RECORD KEEPING

1. The conclusions drawn in the report suggest that there are 3 main aspects to be considered in stock control and associated recording systems in blood transfusion. These are:

1.1 the control of goods received and issued at Centres, hospital blood banks and wards

1.2 the usage of the goods

1.3 the facility to trace a unit of blood or batches of products.

Requirements for records at Centres

2. At Regional level the main requirement is one of stock control. Of equal importance, but less in magnitude is the need to trace a unit of blood or batch of blood product in and out of the Centre. Systems in broad terms should record at least information listed below. Methods of meeting the requirements are also shown.

INFORMATION REQUIRED	INFORMATION MET BY
for stock control	
3. requirements of each blood bank (plus non blood bank hospitals)	- discussion between Centre and hospitals at both higher managerial level and operational level for the future long term and day to day requirements
4. what and how much has been issued to each hospital and BPL	- record of issues to hospitals and BPL showing volume, group, unique and batch numbers
5. what and how much has been supplied by donors, BPL and returned from BPL and each hospital	- record of receipts and returns from each organisation showing volume, group, unique and batch numbers
6. what stock is held at the Centre	- physical count of stocks (tallied with records)
7. how much plasma to issue to BPL to secure return of supplies needed	- discussion between Centre and BPL
8. data which records the number of ad hoc deliveries made to each outlet	- record of ad hoc deliveries including what was delivered for each hospital
for tracing	
9. which units have been fractionated for products	- record of units fractionated by unique number
10. which units and batches have been sent to which hospital or BPL	- recorded at 4. above
11. which units and batches have been returned to the Centre from hospitals or BPL	- recorded at 5. above

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Requirements for records at hospital blood banks

12. In hospital blood banks the recording requirements cover all three aspects noted in paragraph 1 above. Systems at this level should record at least the information detailed below. Ways of doing so are also included.

INFORMATION REQUIRED	INFORMATION MET BY
for stock control	
13. requirements of surgeons and medical staff and amounts to be held in reserve	- discussion with users, historical data, experience and any formulae emerging from the OR project
14. how much has been supplied	- delivery notes and/or daily inventory sheet (see Appendix B)
15. how much has left the bank	- daily inventory sheet
16. how much has been returned to the Centre or disposed of in another way	- record of returns and disposal (see Appendix C)
17. how much stock remains	- daily inventory sheet
for usage	
18. who has ordered what for what purpose	- request forms
19. how much of what has been used for what purpose	- record of goods leaving the bank if it is different from the request form
for tracing	
20. which units or batches were received	- delivery note
21. which units or batches were taken for transfusion to which patient	- 2 copies of request form, one filed in patient's notes and the other in laboratory (chronologically) (spot checks on issues and request forms held in patient's notes would verify the system)
22. which units or batches were returned or disposed of	- record of returns and disposal

23. Following these lists through, all needs at hospital blood banks could be met by the use of 4 data collection forms

23.1 delivery note from Centres

23.2 daily inventory sheet

23.3 record of returns or disposal, and

23.4 the request form (at least two parts).

At ward level the essential record is the top copy of the request form filed in patient's notes showing which unit or product has been transfused

APPENDIX B
(See paras 11 & 133)

BLOOD BANK DAILY STOCK INVENTORY

DATE

	Blood group	expired	to expire by next delivery	stock in hand	stock X matched	total stock	stock requested	stock received	additional requests	additional receipts	total stock
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11) (6+8+10)
WB Rh pos	O										
	A										
	B										
	AB										
WB Rh neg	O										
	A										
	B										
	AB										
PC Rh pos	O										
	A										
	B										
	AB										
PC Rh neg	O										
	A										
	B										
	AB										
BLOOD PRODUCTS	FFP Cryo Platelets PPF Factor VIII										

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1. By comparing total stock (col 11) on day 1 with total stock (col 6) at day 2, unconfirmed figures for amounts used emerge.

2. Figures quoted in col 2 if totted for month should equal returns/disposal figures recorded elsewhere.

3. Cols 9 and 10 should control ordering from Centres.

APPENDIX C
(See paras 11 & 135)

RECORD OF RETURNS AND DISPOSAL

RETURNS								DISPOSALS								
date (1)	unique number (2)	O (3)	A (4)	B (5)	AB (6)	pos (7)	neg (8)	date (9)	unique number (10)	O (11)	A (12)	B (13)	AB (14)	pos (15)	neg (16)	issued to (17)

APPENDIX D
(See para 14)

CHECK LIST - REGIONAL TRANSFUSION CENTRE

INTERVIEWEE: DATE:

REGION:

1. Who is accountable for the receipt and supply of blood and blood products?

2. How much blood is donated per annum?

3. What is processed locally in the form of blood products (PPF & Factor VIII)?

4. What system is used to identify each unit of blood?

5. How many blood banks or other outlets are served?

- what quantities of which goods are sent to each on a regular basis?
- how frequently do they make ad hoc requests?
- what control documentation is used for each?
- how much and what was issued to each in May 1982?

6. How much outdated blood is returned from each outlet?

- how frequently is it returned?
- what control documentation exists for each outlet?

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7. What happens to returned units of blood?

- fresh whole blood?
- out dated blood?
- packed cells and plasma?
- what control documentation exists?

8. Is fresh frozen plasma and plasma from time expired blood sent to BPL?

- how much is normally sent?
- how is it sent?
- what paper work is involved?
- what is received in return from BPL?

9. What statistics are kept?

10. What does the service cost?

11. Any other points?

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APPENDIX E
(See para 14)

CHECK LIST - HOSPITAL BLOOD BANKS OR OTHER OUTLETS

INTERVIEWEE: DATE:

HOSPITAL: TYPE: NO OF BEDS:

A. Relationship with supplier

1. Who is accountable for blood and blood products received from or returned to the regional centre (or other source)?

2. Which blood products are supplied (note in particular Factor VIII & PPF)?

3. Where do supplies come from?

- who estimates need?
- how often do they come?
- what is regular supply?
- what paper work emerges - from the request to the receipt of supply?
- how often are ad hoc requests made?
- are delivery notes requested with supply?

4. Which products are returned to the supplier?

- why, when and how?
- what paper work emerges?

5. What was supplied and subsequently either transfused or returned in the cal month May 1982?

6. How is the stock controlled?

B. Relationship within hospital or with other hospitals to which you supply blood

7. Are there private hospitals receiving supplies from this bank?

- how many?

- which?

8. How do requests for blood arise?

9. Who estimates need?

10. What paper work emerges?

11. Who cross matches blood?

- where does it go to?

- what paper work goes with it?

12. How do you know how much blood (or blood products) is used?

- where does unused matched blood go to?

- what paper work is involved?

13. If blood is cross matched again what paper work emerges?

14. When blood is time expired who extracts it from circulation?

- what paper work emerges?

15. What happens to empty blood bag?

16. What statistics are kept?

17. Any points of interest?

APPENDIX F
(See para 14)

CHECK LIST - HOSPITAL BLOOD BANK - THEATRE AND WARD LEVEL

INTERVIEWEE: DATE:

HOSPITAL WARD: TYPE: NO OF BEDS

1. Who is accountable for determining amount and type of blood/blood product required?

2. Who is accountable for transferring blood/blood products to the patient?

3. Who collects blood/blood products from lab or wherever?

4. What paper work is involved?

5. What happens when the blood/blood product arrives in theatre/wards?

6. What paper work emerges?

7. Are unique numbers recorded in patients notes?

8. What happens to unused blood/ blood products?

9. What paper work is completed?

10. What happens to empty containers?

11. Any other points?

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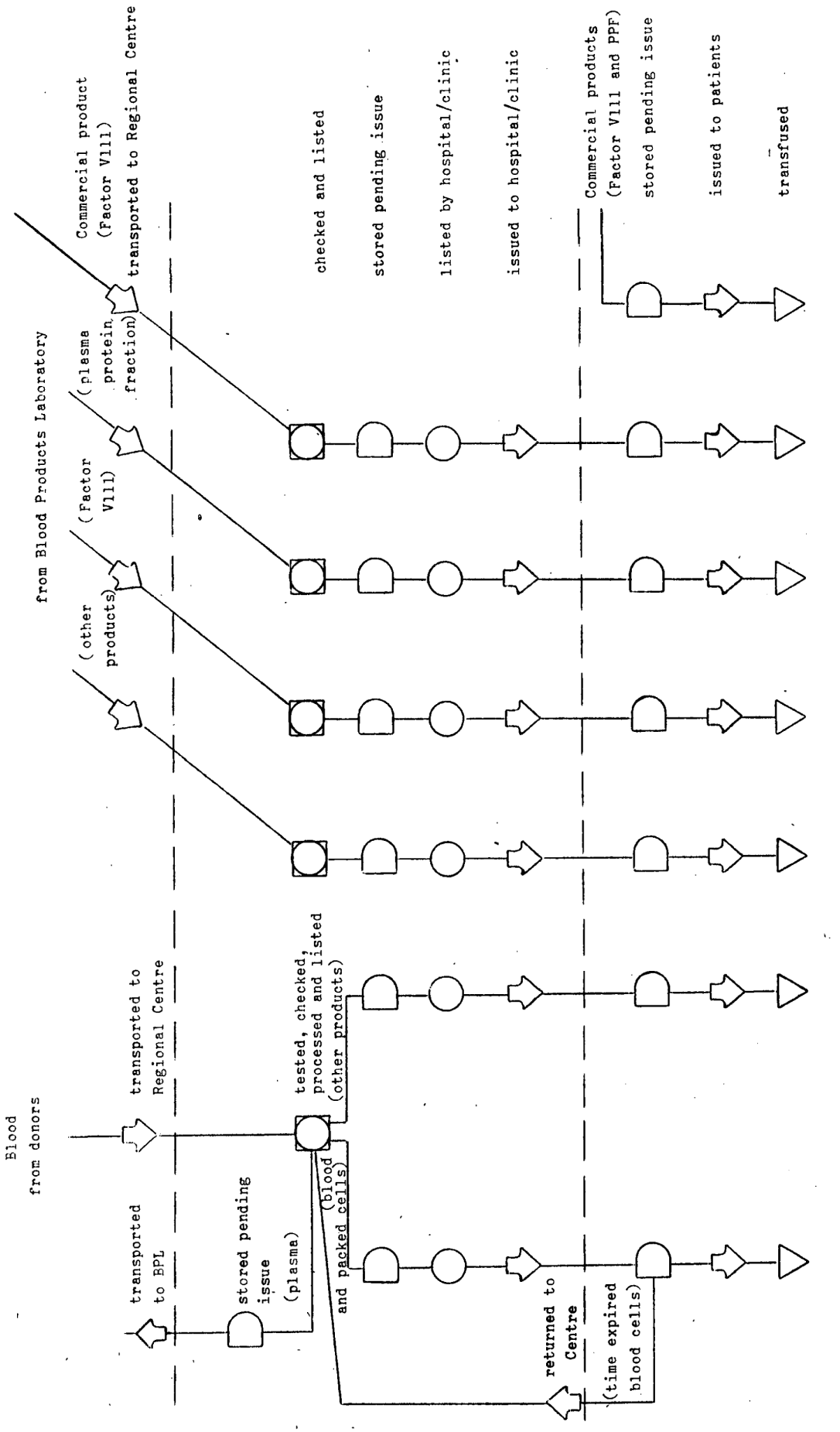
APPENDIX G
(see para 18)

SUPPLIES AND ISSUES OF BLOOD AND BLOOD PRODUCTS



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APPENDIX H
(See para 19)

REGIONAL TRANSFUSION CENTRES: NUMBER OF DONATIONS COLLECTED AND THE SYSTEMS FOR ISSUES FROM THE CENTRE

REGION	DONATIONS IN 1981	NUMBER OF BLOOD BANKS SUPPLIED	BLOOD SHELF LIFE	AGREED PRE-DETERMINED STOCK LEVEL	APPROACH TO SUPPLYING BLOOD AND BLOOD PRODUCTS TO HOSPITAL BLOOD BANKS
A	180,000	16	28 days	No	Blood bank telephones Centre (or vice versa) prior to delivery and places order. Vans deliver on set days and fulfil the orders. Delivery note accompanies the delivery. Manual system records all goods issued.
B	200,574	37	28 days	No	Centre telephones blood bank the morning or afternoon preceding routine delivery and takes the order. Provided stocks are available the vans deliver order. 2 delivery notes accompany the delivery. All products except PPF and Factor VIII are controlled on computer system.
C	80,000	14	28 days	✓	Prior to routine delivery, van is filled with blood according to state of stock at Centre and van driver is instructed to issue blood required to bring blood banks up to the predetermined level. Two issue vouchers accompany delivery and van driver completes these at each blood bank. Manual system records all goods issued.
D	240,000	66	35 days	✓	Prior to scheduled delivery blood bank telephones Centre and gives stock level. Clerks at Centre calculate balance required to replenish stock to predetermined level and, providing Centre holds sufficient stock, they advise Centre blood bank to prepare the delivery. Manual system records all goods issued.
E	156,000	23	21 days	✓	Delivery van takes agreed level of stock to each blood bank on set days. Delivery note in duplicate accompanies the stock. Blood bank takes what it needs and delivery notes are amended. Blood products PPF, CRYO, FFP, Factor VIII issued weekly on a voucher system which tops up stock. All except PPF and Factor VIII are computerised.

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APPENDIX J
(See para 21)

BLOOD PRODUCTS ISSUED FROM CENTRES

Products manufactured at Centres

Whole blood

Plasma reduced blood

Concentrated red cells

Frozen cells

White cells

Platelet rich plasma

Platelet rich concentrate

Buffy coat

Cryo-precipitate

Fresh frozen plasma

Washed concentrated red cells

Leucocyte poor cells

Products manufactured elsewhere but issued from Centres

Plasma protein fraction

Albumin

Factor VIII

Hyperimmune globulins

Anti-D Immunoglobulin

(NB. Factor IX is issued direct from BPL at Oxford)

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REGION	UNIQUE NUMBERS RECORDED BY HOSPITAL ON ISSUE OF BLOOD		BATCH NUMBERS RECORDED BY HOSPITAL ON ISSUE OF PRODUCTS		UNIQUE NUMBERS FOR RETURNS RECORDED		INDIVIDUAL BOTTLE NUMBERS ALLOCATED TO	
	AT CENTRE	ON DEL. NOTE	AT CENTRE	ON DEL. NOTE	AT CENTRE	ON DEL. NOTE	PPF	FACTOR VIII
A	✓	No	✓	No	No	No	✓	✓
B	✓	✓	✓	✓	✓*	No	No	No
C	✓	✓	✓	✓	No	✓	✓	✓
D	✓	No	✓	No	✓ ≠	No	No	No
E	✓	✓	✓	✓	✓*	No	No	No

* Bags light penned into computer system.

≠ Accuracy doubtful

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APPENDIX M
(See para 40)

TYPE OF HOSPITALS VISITED, ACCOUNTABILITY AND NUMBER OF BEDS COVERED BY EACH BLOOD BANK

REGION	HOSP-ITAL	TYPE	APPROXIMATE NUMBER OF BEDS COVERED	HAEMATOLOGIST (OR PATHOLOGIST) ACCOUNTABLE	ONE OR MORE HOSPITALS SUPPLIED	PRIVATE HOSPITALS SUPPLIED
A	1	Acute	2,000	✓*	✓	-
	2	Acute	420	✓*	✓	-
	3	Acute	600	✓*	✓	✓
	4	Private			Not a blood bank	
	5	Private			Not a blood bank	
B	6	Mainly Acute	1,915	✓*	✓	-
	7	Mainly Acute	400	✓*	-	-
	8	Acute	1,800	✓*	✓	-
	9	Private (Gen surgery)	70+	✓*	✓	✓
	10	Acute	1,500	✓	✓	-
C	11	Acute	500	✓*	-	-
	12	Acute	800	✓*	✓	✓
	13	Mainly Acute	380	✓	-	-
	14	Acute	880	✓	✓	✓
D	15	Acute	1,250	✓	✓	-
	16	Cancer	165	✓*	-	-
	17	Private (Gen surgery)	300	✓	✓	✓
	18	Private (Gen surgery & cardiac)	80+	✓*	✓	✓
E	19	Acute	750	✓	✓	✓
	20	Mainly Acute	500	✓	-	-
	21	Acute	1,100	✓*	✓	✓

*Responsibility delegated to senior blood bank staff.

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APPENDIX L
(See para 36)

EXAMPLE OF ISSUE AND RETURN VOUCHER

REGIONAL TRANSFUSION CENTRE

ISSUE AND RETURN VOUCHER

SERIAL № 92247

Issued to ..... Source of Message ..... Date .....

Special Instructions ..... Packed by .....

	WHOLE BLOOD								CONCENTRATED RED CELLS								BLOOD PRODUCTS																		SUNDRIES			ANTISERA AND CONTROLS										OTHER ITEMS					
	Rh. Positive				Rh. Negative				Rh. Positive				Rh. Negative																																									
	Group O	Group A	Group B	Group AB	Group O	Group A	Group B	Group AB	Group O	Group A	Group B	Group AB	Group O	Group A	Group B	Group AB	Platelet Rich Blood	Platelet Rich Plasma	Platelet Rich Conc.	Fresh Frozen Plasma	Cryo	Washed Conc. Red Cells	Leucocyte Poor	PlasmaProtein Fraction	Dried Albumin	Dried Fibrinogen	Dried Plasma	Distilled Water	Factor VIII Concentrate	Anti-D Immunoglobulin	Returned Plasma	Taking Sets	Anti-A	Anti-B	Anti-A B	Albumin Anti-D	AHG Control	AHG Serum	Rapid Anti-D	Low's Papain	AB Serum	ABO Cells						
ISSUE																																																
RETURN																																																
Serial nos. of Units Issued																																																
Serial nos. of Units Returned																																																
Items required on next delivery																																																

Despatched per Road/Rail at ..... a.m. / p.m.

Date ..... Via .....

Driver .....

Received at ..... a.m. / p.m.

Date .....

Signature .....

RTC 10 A

Revised 1975

This form will accompany the consignment and should be SIGNED IMMEDIATELY on receipt of the goods. It must be handed to the driver, or when delivery is effected by rail, returned to the above address.

APPENDIX N
(See para 44)

HOSPITAL BLOOD BANK STOCK LEVELS (O AND A POSITIVE) AND DELIVERIES

REGION	HOSPITAL	PRE-DETERMINED LEVEL SET BY	O pos	A pos	ROUTINE DELIVERIES PER WEEK	AD HOC DELIVERIES PER WEEK (Estimated)
A	1	MLSO	60	60	daily	4 x per day
	2	MLSO	30	30	2	1
	3	MLSO	40	40	3	3
	4(P)	None	-	-	-	-
	5(P)	None	-	-	-	-
B	6	MLSO	30	30	2	3
	7	MLSO	30	30	2	infrequent
	8	MLSO	30	30	daily	daily
	9(P)	None	-	-	-	daily as required
	10	MLSO	50	50	2	2 x per month
C	11	Centre with hospital	30	30	2	once per month
	12	Centre with hospital	48	48	daily	2
	13	Centre with hospital	18	18	2	daily
	14	*Centre with hospital	60	60	4	infrequent platelets on demand
D	15	*Centre	45	45	3	twice daily
	16	Centre	20	20	2	daily
	17(P)	Centre	10	10	3	twice per month
	18(P)	Centre	2	2	2	rarely
E	19	Centre	48	48	2	N/A
	20	Centre with hospital	20	20	2	fortnightly
	21	Centre with hospital	47	47	2	daily

*Not strictly adhered to N/A = Not available Excluding special X matches

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APPENDIX P1
(See para 51)

EXAMPLE OF HOSPITAL
BLOOD ORDERING POLICIES

INTRUCTIONS

1. Send 5-10cc clotted blood, labelled with the Patient's name, forename, ward, hospital number date.

2. PACKED CELL, LEUCOCYTE FREE and other special transfusions. For requests which may involve special delivery of blood from the Regional Transfusion Centre, please give 48-72 hours clear notice where possible.

3. In the event of a transfusion reaction, return UNWASHED blood bottles to the Transfusion Laboratory, together with a fresh specimen of the patient's blood and urine, and a completed 'TRANSFUSION REACTION' form. IMMEDIATE verbal notification should also be made.

4. MINIMUM REQUIREMENTS FOR OPERATIONS. (Compiled after consultations with anaesthetists and surgeons.)

OPERATION	MINIMUM AMOUNT OF BLOOD (IN PINTS)	
A. ROUTINE	(previous policy)	
General Surgery (including GU)		
Partial gastrectomy (of any kind)	(3)	2
Vagotomy and pyloroplasty	(2)	0
Cholecystectomy	(2)	0
Cholecystectomy with exploration of common bile duct	(3)	2
Colectomy	(3)	2
Hemicolectomy	(3)	3
Abdomino-perineal excision of rectum	(8)	3
Splenectomy (non emergency)	(2)	2
Thyroidectomy	(2)	0 or 2
Block dissection of glands of neck	(3)	variable
Radical mastectomy	(3)	0
Local mastectomy	(1 or 2)	0
Nephrectomy	(2)	2
Prostatectomy - 1 Freyers, Millins etc	(4)	2
Prostatectomy - 2 Punch	(6)	2
Orthopaedic		
Austin Moore Arthroplasty	(2)	
McKee-Farrer Arthroplasty	(3)	
Laminectomy	(3)	2
SP pin	(2)	2
SP pin and plate	(2)	2
Open operations on fractured femurs	(3)	2
Open operations on fractured tibia	(2)	0
Major operations on shoulder and pelvis	(4)	variable
Gynaecological		
Total hysterectomy or hysterotomy	(2)	2
Pelvic floor repair	(2)	0
Vaginal hysterectomy	(2)	2
Vaginal hysterectomy with repair	(4)	2
Vaginal termination	(2)	0
Vulvectomy (simple)	(2 or 3)	2
Ovarian cyst or D and C	(0) (Group and retain)	0
Caesarian section	(2)	2

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B. EMERGENCY

Partial gastrectomy	(4) This is the variabl
Ectopic gestation	(2) absolute MINIMUM
Laporotomy for haemorrhage following accident	(6)
Fractured pelvis with ruptured urethra	(6)

NOTES:

1. In all routine operations when the haemoglobin is below 11 G and the operation cannot be postponed, at least 2 pints of blood should be available.

2. Request and specimen should be sent to the Transfusion Laboratory at least 24 hours before the operation. (Noon Friday for Monday morning operations.)

3. Details of the compatibility label MUST be checked by a doctor, SRN or SEN before the blood is transfused to the patient.

4. Blood not used within 24 hours of the time for which it was requested will be withdrawn unless the Transfusion Laboratory is requested to the contrary.

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APPENDIX B2
(See para 51)

EXAMPLE OF
BLOOD ORDERING POLICY

	No of Units
Accident Unit	As requested
Arterial Surgery	As requested
Large Bowel Surgery	3
Gastrectomy	2
Liver-Excision of Abscess	3
Liver Biopsy	2
Splenectomy	2
Bladder- TUR	2
Prostate RPP	2
Compound Fractures	3
Hip Replacement	4
Hip Arthrodesis	4
Laminectomy	2
Spinal Fusion	2
Caesarian Section	2
Manual Removal of Placenta	2

GROUP

Mastectomy
Cholecystectomy
Wound Debridement
Hysterectomy
Salpingo-Oophorectomy
Thyroidectomy
Below Knee Amputation
Vagotomy and Pyloroplasty
Prostate - TURP

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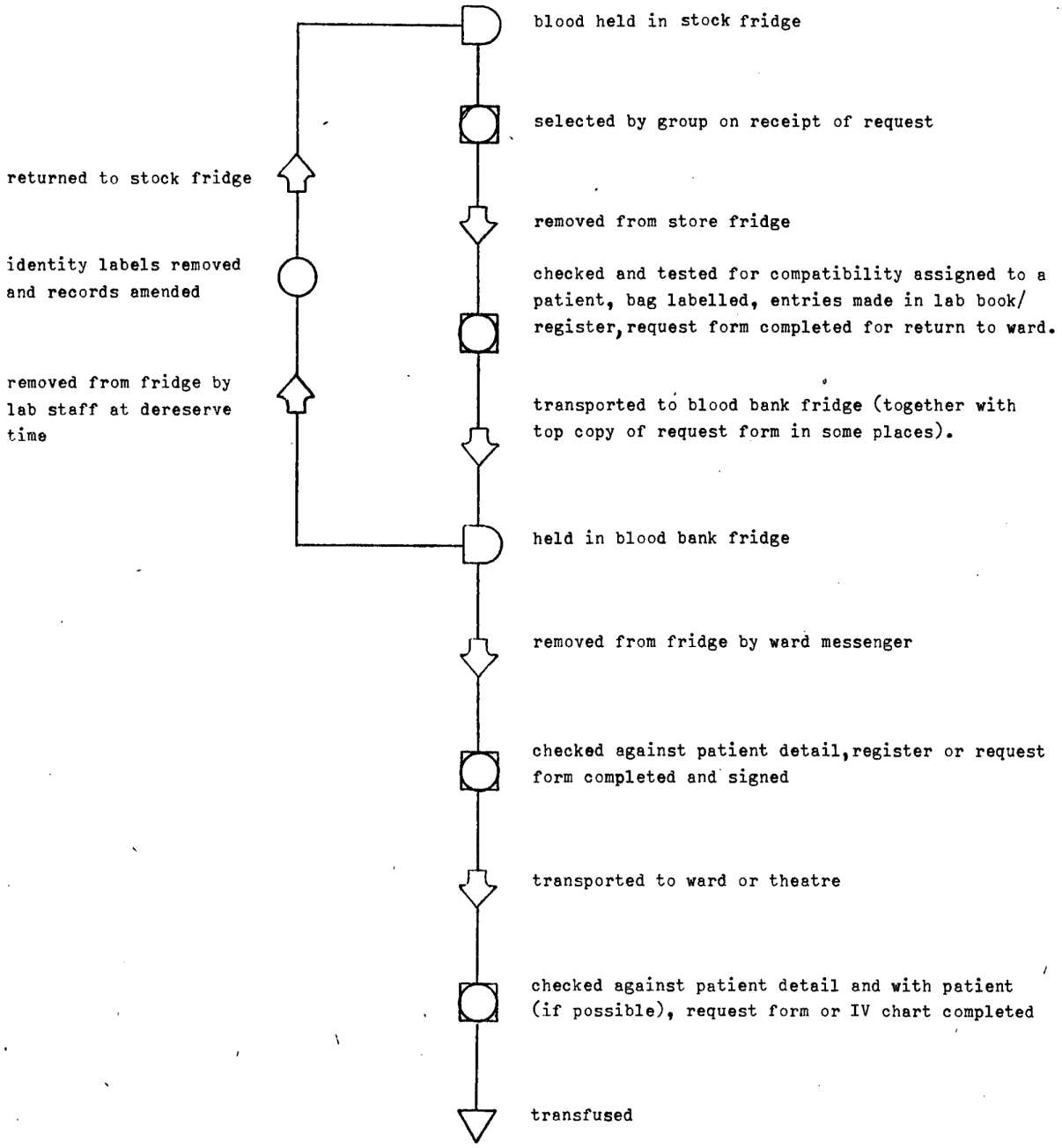
APPENDIX Q
(See para 65)

MOVEMENT OF BLOOD FROM BLOOD BANK TO PATIENT FOR TRANSFUSION - FLOWCHART



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APPENDIX R
(See para 69)

EXAMPLE OF

BLOOD BANK DAILY STOCK INVENTORY

DATE _____ (To be completed after returns)

BLOOD GROUP	UNITS EXP'G IN 48 Hrs	UNITS EXP'G IN 3 - 6 DAYS	UNITS EXP'G AFTER 6 DAYS	UNITS EXP'D TODAY	CURRENT STOCK	STOCK ORDER	OD - CONFIRM
O Rh Pos Whole							
P/C							
O Rh Neg Whole							
P/C							
A Rh Pos Whole							
P/C							
A Rh Neg Whole							
P/C							
B Rh Pos Whole							
P/C							
B Rh Neg Whole							
P/C							
AB Rh Pos Whole							
P/C							
AB Rh Neg Whole							
P/C							

HP-RF			
FIBRINOGEN			
ALBUMIN			
FACTOR VIII	Cryo'		
	Lyoph'		
GAMMAGLOBULIN	100ug		
	50ug		

Signed _____

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APPENDIX S
(See para 69)

DELIVERY OF GOODS TO HOSPITALS: RECORDS KEPT

REGION	HOSPITAL	PAPER WORK PRIOR TO PLACING ORDER	DELIVERY NOTE SIGNED AT HOSPITAL	DELIVERY NOTE RETAINED	UNIQUE OR BATCH NUMBERS QUOTED	REGISTERED BY UNIQUE OR BATCH NUMBER ON ARRIVAL		
						BLOOD	PPF	FACTOR VIII
A	1	none formal	✓	no	no	no	no	✓
	2	blood bank daily stock inventory	✓	no	no	no	no	-
	3	none formal	✓	no	no	✓	no	E
	4(P)	patients request form	-	-	✓	no	no	-
	5(P)	patients request form	-	-	✓	no	no	-
B	6	none formal	✓	✓	✓	no	no	-
	7	none formal	✓	✓	✓	✓	no	-
	8	requirements on scrap	✓	✓	✓	no	no	E
	9(P)	none formal	✓	✓	✓	no	no	-
	10	requirements on tel pad	✓	✓	✓	no	no	-
C	11	none formal	✓	✓	✓	no	✓	-
	12	none formal	✓	✓	✓	no	no	no
	13	requirements on scrap	✓	✓	✓	no	no	-
	14	requirements on scrap	✓	✓	✓	no	no	no
D	15	stock level on scrap	✓*	no	no	no	no	E
	16	none formal	✓	no	no	no	no	-
	17(P)	stock level on scrap	✓	no	no	✓	no	no
	18(P)	none formal	✓	no	no	✓	-	-
E	19	none for blood; request form for some products	✓	✓	✓	no	no	E
	20	none for blood; request form for some products	✓	✓	✓	no	no	-
	21	none for blood; request form for some products	✓	✓	✓	no	no	no

* Delivery said not to be checked.

E - Dealt with elsewhere.

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APPENDIX T
(See para 70)

EXAMPLES OF INFORMATION COLLECTED IN BLOOD REGISTERS

Example 1

- a large acute hospital where they also recorded crossmatches in lab record.

Patients registration number
Name
Ward
Surgeon/physician in charge
Clinical condition
Requesting doctors name
Group rh etc
Number of bag
Date of expiry
Group of blood issued
Date of transfusion
Unused/returned (unit)
Time of removal
Signature

Example 2

- a large teaching hospital which had the register specially printed to meet their needs.

Date
Path number
Surname
1st name
Hospital serial number
Location
Patient group

Donor (Number
Donor (Group/rh
Donor (Expiry date

Compatibility tests (Results
Compatibility tests (Results read by
Compatibility tests (Date issued

Example 3

- a private hospital with 2 bloodbank staff. When blood was crossmatched the entries appropriate to the recipient and the crossmatch were made in pencil and then completed in ink if the unit was removed from the fridge and signed for.

Bag number
Group
Expiry date
Patient's name
Hospital number
Unit/Ward
Date of Xmatch
Date of transfusion
Reason for transfusion
Date of issue
Time of issue
Signature of person collecting blood
Signature of person issuing blood

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APPENDIX V
(See para 73)

INFORMATION COLLECTED ON REQUEST FORMS

Request form of 1 part used by 2 hospitals
" " 2 parts " 10 "
" " 3 " " 6 "
" " 4 " " 3 "
20 different forms were identified.
Full instructions for use entered on 14 forms.
Limited " " " " " 6 "

Patient detail on	on number of forms
Surname	20
First name	20
Mr, Mrs, Miss	1
Civil state of patient	2
A & E number	1
Date of birth	17
Age	6
Sex	16
Ethnic origin	1
Unit (hospital) number	18
Home address	12
Hospital	13
Ward	20
Date of admission	1
Consultant	18
JHO/SHO names	1
Diagnosis/reason for transfusion	20
History	
Blood group if known	18
Date previous grouping	1
BTS reference number	1
Recent Hb	8
Previously transfused date	17
Previous reference number	2
Any reactions	13
Irregular antibodies	16
Previous pregnancies	15
Previous number of still births	8
" " miscarriages	7
" " jaundiced babies	5
" " unexplained death (baby)	1
" " other baby incompatibility	1
Past child bearing	1
Any haemolytic disease	1
High risk viral hepatitis	2
" " infection	1
Any recent Dextran infusion	1
Patient on Aldomet	2

Laboratory use	on number of forms
Date and time request received	4
" of serum	2
ABO group (recipient)	20
RL group	18
Date of grouping	1
Cross-match results	17
Emergency group report	2
Irregular antibodies found	7
Date units matched	12
Time " "	2
Matched unit number(s)	19
Unit expiry date(s)	9
Group of matched blood	17
Rh " "	9
Lab reference number	13
Work number	1
Date unit issued	4
Unit returned date/time and signature	2
Laboratory check	1
Product issued	4
Dereserve warning	15
Warning no cross-match until confirmation received	1
Signature of MLSO	15
Indication of location of blood	4
Indication of second patient with that name	2
Requirements	
Whether WB packed cells	18
Urgent or full cross-match	5
Group only	6
Group-and-save-serum	12
Hb request	1
Blood cover request	1
Other products "	4
Other "	2
Date and time required	19
Request out of hours	1
Amount	19
Sample labelled by	4
Ordering doctors signature	19
Date of doctors signature	18
Name of person telephoning	1

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Ward use	on number of forms
Unit collected signature	5
" " date	5
" set up by	2
" /patient checked signature	10
Date and time transfusion began	7
" " " ended	4
Date unit used	4
Unit given by	4
Any reactions	3

Additional information	on number of forms
Remarks box	5
Specimen "	1
Investigation box	1
Account rendered to	1
For babies less than 6 months:	
mothers name	1
" address	1
" date of birth	1
" blood group	1
" BTS number	1

In 17 hospitals a copy of the request form completed by the laboratory was returned to the ward for inclusion in patient notes; 7 hospital laboratories kept more than one copy of the request.

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APPENDIX W
(See para 77)

RETURNS OF BLOOD TO CENTRES

Region	Hospital	Estimated return rate %	Record of unique number made on despatch	Record of volume made on despatch	Record of receipt made at Centre	Remarks
A	1	N/A	No	✓	✓	
	2	N/A	No	✓	✓	
	3	4	✓	✓	✓	
	4 (P)	N/A	No	No	✓	Top copy of request form shows unused units.
	5 (P)	N/A	No	✓	✓	Top copy of request form shows unused units.
B	6	*9	No	No	✓	Delivery note showing fate of each unit sent back eventually
	7	*3	✓	✓	✓	
	8	*20	No	No	✓	Advised not to return delivery note.
	9 (P)	*32	✓	✓	✓	
	10	*2	No	No	✓	
C	11	*20	✓	✓	✓	
	12	*14	✓	✓	✓	Hospital quote 13% reducing to 10%
	13	*38	✓	✓	✓	
	14	*11	✓	✓	✓	Issue voucher kept for 1 month only
D	15	*4	No	No	✓	Hospital quoted 9%
	16	*1	No	No	✓	
	17 (P)	0	✓	✓	✓	Recorded in register.
	18 (P)	*2	No	No	✓	
E	19	*6	No	No	✓	Blood issued elsewhere may be returned from here
	20	*1	✓	✓	✓	
	21	*3	No	No	✓	

*Details obtained from Centre

NA = Not available

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APPENDIX X
(See para 79)

HOSPITAL BLOOD BANK RECORDS FOR ISSUE OF BLOOD PRODUCTS

REGION	HOSPITAL	Register or record held for issue of				
		PPF	FACTOR VIII	FFP	CRYO	PLATELETS
A	1	no	W	✓	✓	✓
	2	✓	-	✓	✓	✓
	3	no	E	✓	✓	✓
	4(P)	-	-	-	-	-
	5(P)	-	-	-	-	-
B	6	no	-	R	R	R
	7	✓	✓	✓	✓	✓
	8	no	-	✓	✓	✓
	9(P)	no	-	✓	✓	✓
	10	✓	-	R	R	R
C	11	✓	-	✓	✓	✓
	12	✓	no	✓	no	✓
	13	no	-	R	-	-
	14	no	T	T	T	T
D	15	no	E	✓	✓	✓
	16	✓	-	✓	✓	✓
	17(P)	✓	-	✓	✓	-
	18(P)	-	-	✓	✓	✓
E	19	✓	✓	✓	W	✓
	20	no	no	✓	✓	✓
	21	✓ø	✓ø	✓	E	✓

ø Topped up by voucher system

W At ward

E Elsewhere in laboratory

R Recorded on request form

T Recorded on treatment record sheet

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APPENDIX Y
(See para 85)

RESEARCH PROJECT: DATA HANDLING SYSTEMS FOR A TRANSFUSION LABORATORY

BRIEF OUTLINE OF PROPOSED SYSTEM

1. The system could be supplied in various forms suitable for a single operator or for multiple simultaneous users (from 2 up to a maximum of 6) and would use hardware supplied by Midlectron Limited of Belper. The equipment would comprise a keyboard/VDU unit for each operator, a processor unit with disc drive, a light pen to read Codebar labels for each operator, and a printer. Details of this equipment will be found in the attached sheets.

2. The softwear would be written by Mrs Margaret Peters (Woolfson Institute, Birmingham) in a very flexible form which would be tailored to suit the individual requirements of each laboratory. The core of the programme would cover the following very basic functions:-

2.1 The logging of blood products upon receipt from the BTS, recording the type of blood product, ABO and Rhesus group, pack serial number, and expiry date.

2.2 The reservation of blood when required for matching.

2.3 The dereservation of blood after a set period of time, if not used or if not held for a further period for the same patient. Dereserved blood would be transferred automatically to the stock of blood available for re-use provided it had not become out of date.

2.4 The ability to have displayed at any time, either on the VDU screen or in printed form, full details of blood held in stock and available for re-use, and full details of blood held matched for patients.

2.5 Information about the use of blood would be recorded on disc for period transmission to the BTS Centre.

3. Depending on individual requirements there are many optional extras including the facility to include details of the patient's name, consultant's name, ward, clinical details, when blood is crossmatched. If the patient's group is already known this could be included and if blood of an incompatible group is selected for that patient, a warning could be flashed on the VDU screen as a safety measure. Compatability labels could be printed out for each unit crossmatched and the equipment is capable of handling the recording of the grouping and compatability tests although this is development beyond the present pilot study.

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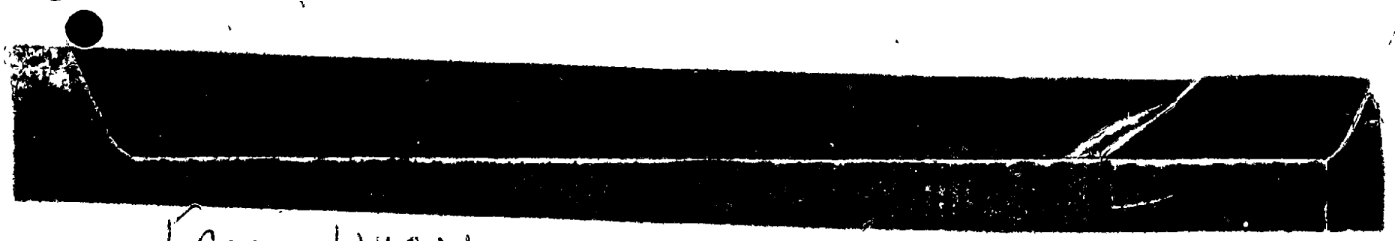

FROM. - WILSON

Par Avion

[redacted]

To

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Lettre

LETTRE

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