

AUSTRALASIAN SOCIETY OF BLOOD TRANSFUSION INC.

Topics in

Transfusion

Medicine

SPECIAL EDITION:

**GUIDELINES
FOR
AUTOLOGOUS BLOOD COLLECTION**

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**Guidelines for Autologous
Blood Collection**

Revised January 2002

**Prepared by
The Scientific Subcommittee of
The Australasian Society of Blood Transfusion Inc.**

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The Scientific Subcommittee of the ASBT has revised its Guidelines for Autologous Blood Collection in line with the latest evidence based data in the literature in this area.

It is recognised that there are still several contentious areas in these recommendations, notably:

- the extent and cost of testing for transmissible disease markers
- the use / rejection of units testing not negative for transmissible disease markers.

These revised recommendations reflect the ASBT's endorsement of best practice guidelines with respect to the safety of autologous blood collection and subsequent transfusion. It is recognised however that experienced practitioners in this field may differ in their views on those issues which still remain in debate in current international literature.

The recommendations for the acceptance of donors with cardiovascular disease are not intended to be proscriptive for practitioners experienced in this field in the setting of tertiary referral cardiovascular units.

In relation to intra- and post-operative salvage and acute normovolaemic haemodilution definitive guidelines are outside the scope of this document and readers are referred to the references noted in the text and bibliography.

Nevertheless if the recommendations incorporated into this publication are followed, collection of autologous blood can be performed in a safe and efficient manner. However, they should not be taken as "Standards" by any government or regulatory authority as many points included in this document are open to individual opinion by transfusion medicine and other medical specialists. The criteria for acceptance of patients for autologous collection which are outlined here are based on the optimal safety for the patient and may well be amended by the patient's medical practitioner after consideration of all aspects of the particular case.

The committee also acknowledges the recommendations of the recent 2000 AHMAC report into alternatives to homologous blood [see next page].

Chair
ASBT Scientific Subcommittee

AHMAC REPORT

The Australian Health Ministers' Advisory Council (AHMAC) has looked into alternatives to using blood donations when blood loss occurs in medical situations. An AHMAC Committee [2000] investigated whether it was beneficial to collect and store a person's own blood for possible use during or following surgery.

The Committee found pre-donation of one's own blood had limited use. It concluded that:

1. The first goal is to prevent bleeding.
2. The second goal is to manage any bleeding without giving a blood transfusion.
3. When less than two units of blood are needed - use a blood alternative where possible.
4. If more than two units are needed - use red cells from donated blood, or pre-donated blood where requested.

After careful consideration of the expert advice presented to it, AHMAC decided that pre-donation should not be encouraged for most people in the community. There is now a very low risk of infections occurring from the general blood supply. In addition, as medical techniques improve, a blood transfusion is necessary on fewer occasions.

While not in favour of the pre-donation of blood for most people in the community, the AHMAC Committee has recommended that further new developments in alternatives to blood donation should be encouraged and closely watched.

Copies of the AHMAC Committee's detailed report, '***Review of the Alternatives to Homologous Blood Donation***' can be obtained from:

AusInfo Government Info Shops
(number)

Telephone: 132 447 (toll-free)

Facsimile (02) 6295 4888

Internet Website: <http://www.ausinfo.gov.au>

PREAMBLE

Since the early eighties, following public concerns about the risks of receiving blood and blood products, doctors and scientists have been active in seeking alternatives to blood transfusion. At this time the alternatives include:

- 1. Minimising the need for transfusions by improving surgical methods to prevent or reduce bleeding; and**
- 2. Using new procedures and medicines so as little blood as possible needs to be transfused.**

However, there will still be people who, due to the amount of blood loss, are best treated with a transfusion. Where there is expected blood loss in elective surgery a decision can be made either to collect and store the patient's own blood or for them to receive donated blood from the ARCBS.

In preparing these revised guidelines the ASBT Scientific Subcommittee (SSC) has mainly considered autologous blood collection outside of the Australian Red Cross Blood Service (ARCBS) facilities. The situation in New Zealand is different, as NZBS is responsible for collection of all blood, irrespective of whether autologous or allogeneic blood/components are involved.

The term 'autologous blood products' refers to therapeutic blood products provided by the person who is the intended recipient. **Allogeneic blood** is that collected from a **blood donor** for transfusion to another person.

However these guidelines do not address:

- Provision of autologous platelets, autologous FFP/cryoprecipitate, or frozen red cells,
- Leucodepletion of autologous units,
- Matters related to autologous stem cell collection.

The evidence-based knowledge about the value of autologous blood collection for public health is sparse.

Rationale

Autologous blood can provide an alternative to the supply of allogeneic blood products for some patients undergoing surgical procedures. It may reduce the risks of blood transmissible disease and the immunological events associated with the use of allogeneic blood. The former has now become extremely small, and the latter is in the process of being controlled. Bacterial contamination may equally affect any type of transfusion and has emerged as a statistically major transfusion risk.

Three approaches exist for the collection, handling and use of autologous blood.

They are:

- Blood collected and stored prior to an anticipated surgical or other need (predeposit)
- Blood salvaged intra- and post-operatively from surgical wounds and from cardiovascular bypass and extracorporeal membrane oxygenation [ECMO] circuits.
- A haemodilution technique where blood is collected on the day of surgery and simultaneous replacement intravenous fluid is given.

Justification

Use of autologous blood collection should be restricted to situations where there is a reasonable chance of transfusion.

Before attempting autologous blood collection in a patient scheduled for elective surgery consideration should be given to the following points:

1. **Patients undergoing surgery who would not normally require crossmatched blood should not be offered autologous collection.** Requests for autologous blood collection should be related to nationally or locally developed Maximum Blood Order Schedules.
2. **The patient should be in good general health** to tolerate phlebotomy.
3. **Transfusion of autologous blood should only occur where there are clinical indications. The decision to transfuse must not be influenced by the availability of autologous blood.**

When offered autologous blood collection, patients should be informed that the procedure has its own inherent risks. A decision for autologous collection is a matter of assessing and balancing the relative risks of autologous collection and transfusion against using blood from voluntary donors. They should also be informed that blood replacement requirements may exceed their autologous collections and that allogeneic transfusion may still be necessary.

Risks

Autologous blood collection is a technique aimed at minimising the use of allogeneic blood. However, **autologous blood is not 100% safe.** It carries some of the same risks of allogeneic blood, **eg, bacterial contamination; incorrect collection, storage and transportation; and clerical/human errors, including incorrect infusion.**

The risk of clerical error may actually increase in the presence of an autologous programme. The consequences of such errors may be more severe because autologous blood does not necessarily match the usual qualitative requirements of regular volunteer unpaid donor blood.

Finally, autologous blood is more readily transfused because autologous patients tend to reach surgery with lower haematocrits, and some physicians adopt more liberal criteria when autologous red cells or plasma is available.

Quality Assurance

The container used to hold autologous blood is a medical device and should be used according to safe handling practices. All procedures involving anticoagulants, sealed systems, unit containers, labelling, aseptic procedures, and record keeping should adhere to the relevant sections in these guidelines.

Regular quality audits (at least annually) of an Autologous Blood Collection Programme should be performed. Suggested criteria for review include:

- Types of procedures for which autologous blood is collected.
- Deferrals.
- Usage rates of autologous blood.
- Usage rates of allogeneic blood given to autologous patients.
- Record keeping and accessibility of records regarding donor's previous history.
- Adverse reactions.
- Transcription errors or transport/storage problems.
- Pretransfusion haemoglobin level.

Quality audits should fall within the scope of hospital/laboratory safety and quality departments and/or be under the auspices of hospital transfusion committees.

AUTOLOGOUS BLOOD PRODUCTS

As stated previously, the ASBT SSC encourages users of these guidelines to read the recommendations of the 2000 AHMAC report mentioned at the beginning of this document prior to any decisions about the use of autologous blood collection.

These guidelines concentrate on **autologous blood predeposit**, however some mention of other forms of autologous blood provision is appropriate. Accordingly some aspects of blood salvage and normovolaemic haemodilution are provided.

SALVAGED AUTOLOGOUS BLOOD

Intraoperative Cell Salvage

Blood salvaged during operative procedures can be reinfused to the patient under certain conditions. The indications, contraindications, potential adverse effects and a range of methods of red cell salvage have been well described.

Methods for intraoperative salvage of blood shall be safe, aseptic and ensure accurate identification of all blood collected. The equipment used shall be pyrogen-free, shall include a filter capable of retaining particles potentially harmful to the recipient and must preclude air embolism.

The following points are provided as guidelines for procedures involving intraoperative blood salvage:

- Cell salvage [CS] is appropriate where there is a clean wound.
- CS should not be used in patients with malignant disease.
- CS must not be used if there is overt or suspected bacterial contamination, or there is a risk of fat or amniotic fluid contamination of the blood during surgery .
- Blood obtained by intraoperative CS should be washed prior to reinfusion to avoid the possible higher risk of coagulopathy and autoimmune reactions.
- Salvaged blood must be clearly labelled with patient identification details including full name, date of birth and/or patient identification number and the date/time of collection. A label must be attached at the time of filling of the unit container [and flagged for 'Autologous Use Only'].
- CS blood should not leave the operating room.
- CS blood should be transfused immediately and optimally within 4 hours of the end of collection.
- If CS blood cannot be infused immediately, it must be stored between 2 and 6°C [and can then be used within 24 hours of start of collection].

[Please refer to reference no 36 in Bibliography]

Post operative cell salvage

The criteria for this process should follow those above for intraoperative salvage.

- Blood collected in this way should optimally be used within 6 hours of start of collection.

Quality Assurance of Salvaged Blood

A salvaged autologous blood QA program should be included in the hospital's overall quality assurance program.

There should be a mechanism for review of protocols and for adherence to the protocols. Audit methods should include both patient-specific chart reviews and system-wide reviews of the program. Areas and mechanisms for audit have already been stated on page 8.

Specified complications that should be documented include unexplained renal insufficiency, postoperative temperature elevation, sepsis, respiratory insufficiency, coagulopathy and positive blood cultures.

Such audits should include postoperative as well as intraoperative autologous transfusion procedures.

The quality of the salvaged blood should also be assessed. This should include periodic determination of haematocrit and plasma free haemoglobin levels on blood obtained from the reservoir prior to processing and on processed blood. If heparin is used as the anticoagulant, appropriate assays should be carried out to determine the adequacy of the washing process in removing the heparin.

Additional studies should include culture of salvaged blood and determination of free haemoglobin in transfusion recipients. Some institutions also periodically culture the recipient's blood.

ACUTE NORMOVOLAEMIC HAEMODILUTION [ANH]

ANH undertaken by hospital clinical staff from a patient immediately prior to surgery may be used providing:

- The blood is collected into standard blood collection packs.
- There is concurrent replacement with an appropriate volume of crystalloid or colloid intravenous fluid.
- It is used only where potential blood loss is >20% of blood volume.
- The patient is fit to have blood collected.
- Blood must be clearly labelled with patient identification details including the full name, date of birth and/or patient identification number and the date/time of collection. The label must be attached at the time of filling of the unit container [and flagged for 'Autologous Use Only'].
- The hospital clinical staff are responsible for the blood collection procedures and its eventual reuse.
- ANH blood should not leave the operating room.
- ANH blood should be transfused within 6 hours of collection.
- ANH blood must be stored between 2 and 6°C.

PRE-DEPOSIT AUTOLOGOUS BLOOD COLLECTION

The majority of guidelines in this document relate to blood collected and stored at 2-6° C for up to 42 days before an elective surgical procedure.

Pros & Cons

Pre-donation can only be used for elective surgery. However, not all patients can pre-donate.

Advantages

Individuals are not exposed to the blood of another person or persons.

Disadvantages

Time is needed for the collection prior to surgery.

It is more costly and uses additional resources of a hospital, the ARCBS or a private laboratory.

Patients may not be able to pre-donate all the blood they require for surgery.

Blood is discarded if not transfused back to the donor.

There is an increased probability of the patient receiving a transfusion if their blood is available.

Application

Elective surgical patients may be offered autologous blood where collection and supply is clinically feasible. Relevant points that should be taken into account include:

- There are clinical indications supporting the potential need for blood transfusion
- Selection of appropriate patients
- Clinical supervision of autologous blood collection
- The procedures for testing, storage, transport and supply of autologous blood
- Ethical and legal implications of providing or not providing access to autologous blood supply

The general fitness of the patient to tolerate several venesections over a short period of time is of primary importance, but other factors such as age, venous access and reliable dates for elective surgery are also important.

Consent

The patient or person legally responsible for the patient should give their informed consent for the procedure. If the patient is unable to sign, the consent procedure will depend upon local policy. If the patient is unable to understand English then the form can be translated and then signed and witnessed by the medical officer in charge of the patient.

This consent should include:

- The risks and benefits associated with autologous blood collection [see Appendix 3].

- That the range of tests performed will be in keeping with any current required blood transmissible disease markers for allogeneic blood, and that any test result which is not negative for these markers will result in the units being destroyed.
- That other allogeneic blood or blood products may be needed.
- Permission to notify the patient's physician of tests for blood transmissible disease markers that are not negative.
- That blood will be discarded if not used by the patient.

General Information for Patients

Patients offered autologous blood collection should be made aware that the procedure has its own inherent risks. They include:

- Clinical problems of venesection in individuals who may have a range of medical problems.
- The technical and clerical procedures required to identify the units collected and to supply them at the required time for the intended recipient.

These steps require human action and are dependent on mechanical equipment, any of which may fail. Although transfusion of the wrong blood occurs only very rarely, the risk is not zero.

A decision by a patient to opt for autologous rather than allogeneic blood should be based on a clear understanding of the relative risks of use of these two forms of treatment for that individual.

Patients should be informed that they may require allogeneic blood and blood products in addition to the autologous blood.

Autologous supply may facilitate the supply of blood to patients who have multiple alloantibodies.

SCOPE OF THE PROGRAMME

When considering establishment and operation of a predeposit autologous blood supply programme, the following groups of patients should be considered:

- Patients who meet normal donor health criteria.
- Patients who are well and/ordinarily able to withstand the blood collection procedure but who do not meet normal donor selection criteria.
- Patients who are unwell.

The level of support needed to venesect autologous patients will vary depending on the level of fitness. Patients who do not meet the selection criteria [see page 17] should be venesected in a venue with appropriate medical support facilities.

The documentation used to refer a patient for autologous blood collection should be signed by a medical practitioner and be accompanied by a signed patient consent form. It should normally be signed by the person who has discussed autologous blood collection with the patient and obtained the patient's agreement to the procedure.

SELECTION OF PATIENTS [see selection criteria page 17]

Patients considered for autologous blood collection must be assessed by a Medical Officer who must be satisfied that they are physically fit to have the required volume of blood removed. The selection criteria for collection of autologous blood are different from those pertaining to allogeneic blood donation.

The selection criteria should not be different where a bacterial, or other clinically significant hazard may arise for the patient from the stored blood component.

An active bacterial infection in the patient [including diarrhoea/gastroenteritis] or inflamed skin at the intended site of venipuncture is a contraindication to collecting blood for autologous supply due to the potential for bacteraemia and/or contamination of the blood during the collection process and proliferation of bacteria in the unit during storage.

Patients considered suitable for elective surgical procedures requiring a general anaesthetic are generally suitable for autologous blood collection, provided that the severity of any cardiovascular, cerebrovascular or respiratory diseases from which the patient is suffering are not considered to be contraindications. Medical review is required to assess the suitability of any patient with these problems.

In particular:

- Caution should be exercised where a patient has a history of cardiovascular disease, especially ischaemic heart disease, eg. angina and myocardial infarction.
- Patients should not have a history of recent cerebrovascular symptoms, including transient ischaemic attacks or a stroke.

- Patients should not have severe hypertension. Medical review is required if the blood pressure is over systolic 180mm Hg or diastolic 100mm Hg.
- Patients should not have severe respiratory disease with breathlessness at rest.

A standard patient questionnaire (Appendix 2) including questions about high risk factors for transmission of blood transmissible disease and medical suitability should be completed by the patient at the time of each collection.

It is recommended that patients who test not negative for any of the currently approved blood transmissible disease markers should be excluded from autologous blood collection.

There are no upper age limitations to autologous collection. Patients over the age of 65 should be considered in the context of their general health. Children can have autologous units collected provided they have good venous access, are co-operative and accompanied by a parent or guardian. Blood collection from children below the weight of 25 kg is technically difficult and rarely justified. Parental consent is necessary where children are younger than the legal age of consent.

There are no weight limitations for patients undergoing autologous blood collections. Patients who weigh less than 50 kg should have 8ml/kg collected. For patients weighing less than 35 kg the volume of anticoagulant should also be adjusted accordingly. In any given collection, not more than 10% of blood volume should be venesected (see Appendix 1 for calculation of blood volume to be collected from underweight patients [$<50\text{kg}$]).

Estimation of the haemoglobin should be carried out before each blood collection and should be 110 g/L or greater. The patient may take oral iron during the collection period and continue until the day before surgery. It may be useful to provide the patient with an information leaflet on iron replacement.

Physical Examination

The patient must have suitable veins.

Pulse: Should be between 50-100/min.

If abnormalities have not been previously documented or assessed, then:

- **If $<50/\text{min}$:** Refer patient to referring medical officer for assessment.
- **If $>100/\text{min}$:** Rest for 30 minutes and recheck.
- **If irregular in rhythm and rate which was not previously known or documented, the patient may need cardiac assessment prior to collection.**

Blood Pressure: If BP $>180/100$ then rest supine for 15 min. If still $>180/100$ defer collection and refer patient to referring medical officer for assessment.

Patients with a range of medical conditions should not normally be considered for autologous collection. They include:

- **Incompletely controlled epilepsy.**
- **A history of severe fainting after blood collection.**
- **Low blood pressure with a history of fainting.**
- **Low haemoglobin, generally set a minimum level of 110g/L for females and males before each collection of blood. If it falls below this value the patient should be reviewed by the Medical Officer.**
- **Haematological conditions which will affect the storage of the red cells (eg Sickle Cell disease, unstable haemoglobinopathy etc).**

Pregnancy is not an absolute contraindication, but collection of autologous blood from a pregnant woman would rarely be considered medically appropriate [refer appendix 5].

A patient can only be accepted for autologous blood collection if suitable venous access is present.

BLOOD COLLECTION

For a patient >50kg a standard collection is 450ml \pm 10%, this translates to a collected blood volume of 405-495ml [or a pack weight range of 420-530g, after subtracting the starting weight of the collecting bag].

For a patient weighing less than 50kg please refer to Appendix 1.

Collection and storage of blood for autologous transfusion will only be initiated upon the written authority of the clinician requesting the units. Each collecting facility should have a standard referral and request form to be completed by the requesting clinician. The patient must have a confirmed operation date.

Patients considered suitable for autologous blood collection can have 1-5 units of their blood stored., Collection may commence up to 28 days prior to surgery. Each unit can be stored for up to 35 days. Autologous units are usually collected at weekly intervals (minimum recommended interval is 72 hours), with the last collection at least 72 hours before surgery to permit equilibration of plasma proteins and restoration of blood volume.

Patients must not have fasted for greater than 3 hours prior to blood collection and should rest for 15-30 minutes after the procedure. Oral fluid replacement is recommended following collection.

The doctor supervising the autologous programme may recommend a patient not to participate or continue due to medical reasons. Patients are also free to withdraw from autologous blood collection programmes at any time.

Identification

Patients must identify themselves positively by giving their full name and date of birth whenever blood is collected. It is recommended that the patient's signature should form part of the identification procedure when collecting an autologous unit of blood.

The patient should sign the primary and secondary pack label, or an attached label of each unit collected, immediately before the collection procedure.

All autologous blood units should be identified with a unique identifier so that records permit tracing of each unit from the source patient, through all procedures performed on the unit and final return to the patient, or other destination. A label specific for autologous use which complies with the appendix on labels, together with the patient's full name, date of birth and/or patient number, date/time collection, must be used.

Oral Iron Medication

Oral iron therapy and dietary advice should be offered to patients having autologous blood collection.

Compatibility Testing

Compatibility testing must be performed before releasing an autologous blood unit for transfusion. In the case of a blood centre/laboratory which also supplies allogeneic blood the test(s) should consist of the usual pretransfusion serological procedures performed.

An identification label which fully identifies the intended recipient and gives the result of compatibility and other blood grouping tests must be attached to each autologous blood unit before it is released for transfusion.

GENERAL ASPECTS OF COLLECTION PROCEDURES

Where autologous blood is collected for use as a therapeutic blood product the procedures for collection, storing, handling and transfusing autologous blood units should follow the recommended procedures for allogeneic blood donations except as specified in this section.

Disposal of Unused Autologous Units of Blood

Autologous blood products collected for possible infusion **but not required for treating the patient** who provided it, **may not be used for any other therapeutic purpose..**

The use or disposal of all autologous units must be documented and the records must be accessible as for allogeneic units.

DIRECTED BLOOD DONATIONS

As a general principle, collection of directed donations is discouraged. Directed donations are units of blood or blood products collected from individuals who have been solicited by the intended recipient, or by a clinician involved in the care of the patient in circumstances currently considered appropriate for this approach. If a directed donation is to be collected, the procedures for collecting, testing, storing, handling and transfusing the unit should follow the procedures currently recommended by ARCBS or NZBS standards, including such steps as irradiation etc.

SELECTION CRITERIA FOR PRE-OPERATIVE COLLECTION OF AUTOLOGOUS BLOOD

CONTRA-INDICATIONS

These are guidelines only, specific parameters may vary between institutions.

1. No definite surgical date.
2. Current systemic infection - viral, bacterial or fungal.
3. Poor venous access.
4. Anaemia: Hb <110 g/L prior to commencement of autologous collection.

Patients with the following medical conditions should not generally be considered for autologous blood collection:

5. **CARDIAC DISEASE**
 - a. aortic stenosis: gradient > 80 mmHg
 - b. mitral stenosis valve area < 1.0 cm
 - c. unstable angina
 - d. crescendo angina
 - e. angina within 48 hours prior to collection
 - f. left main coronary artery disease > 60%
 - g. uncontrolled CCF
 - h. 2nd degree or complete heart block
 - i. pulmonary hypertension
 - j. cyanotic congenital heart disease
 - k. acute myocardial infarct within last 3 months
 - l. ejection fraction <30%
 - m. acute onset of S.V.T
 - n. severe hypertension: systolic >180 diastolic >100
 - o. marked hypotension: systolic <90 diastolic <60
 - p. idiopathic hypertrophic sub-aortic stenosis
 - q. cardiomyopathy - any type
6. **CEREBROVASCULAR DISEASE**
 - a. symptomatic disease (T.I.A, CVA)
 - b. any patient with a cerebral tumour with signs or symptoms of raised intracranial pressure
7. **RESPIRATORY DISEASE**
 - a. acute U.R.T.I. or L.R.T.I. receiving antibiotics
 - b. acute onset of asthma
 - c. FEV1/FVC <50% of predicted normal
 - d. DLCO <50% of predicted normal
 - e. pO₂ <65 mmHg room air
 - pCO₂ >45 mmHg room air
 - Hb O₂ saturation <94% room air
8. **PREGNANCY** with any of the following
 - a. any condition with impaired placental blood flow
 - b. intra-uterine growth retardation
 - c. hypertension
 - d. pre-eclampsia
 - e. concomitant:
 - (1) cardiac disease
 - (2) severe asthma
 - (3) insulin dependent diabetes

9. Symptomatic ulcerative colitis/Crohn's Disease
10. Patients who have been blood donors and have sustained a delayed faint, ie. weakness or loss of consciousness several hours after collection, should not be considered
11. Uncontrolled epilepsy

HIGH RISK

Autologous units from high risk patients should only be collected in centres where accredited CPR facilities and appropriate monitoring are readily available.

All patients who fall within the high risk category should have a written declaration by their attending physician stating that they are medically stable for venesection of up to 10% of their blood volume. The attending venesection physician retains the final decision to proceed with the collection procedure.

Patients who have cardiac disease requiring cardiac surgery should be monitored with ECG and if necessary have fluid replacement during blood collection

Persons collecting autologous blood should maintain adequate training in CPR

Indicators of high risk

1. HYPERTENSION MODERATE
Diastolic >95 <100 mmHg
Systolic >160 <180 mmHg

Hypertensive patients are more at risk of having coronary artery disease and congestive cardiac failure.

In general, patients with mild, controlled hypertension on a single or double agent therapy of diuretics, ACE inhibitors, low dose vasodilators or low dose calcium antagonists are acceptable. Patients with more resistant hypertension requiring multiple agent therapy or who are on β -blockers are at increased risk of hypotension and must be closely assessed and require regular blood pressure monitoring during collection.

2. HYPOTENSION MODERATE
Systolic 90-100 mmHg. Check with attending physician as to patient's normal BP. Volume replacement may be necessary if blood pressure falls after collection.
3. MULTIFOCAL Ventricular Ectopic Beats (VEB) or MORE THAN 4 VEBs per minute. May be secondary to ischaemia. Refer patient for 12 lead ECG. Check with local medical officer before collection if patient is scheduled for cardiac surgery, then do not collect if the VEBs are a new finding. ECG and BP monitoring may be required.
4. BRADYCARDIA ie. Heart rate [HR] <50/min.
May be due to β blockers or calcium channel blockers. If patient is fit it may be his/her normal heart rate. If necessary refer patient for a 12 lead ECG to eliminate heart block. ECG and BP monitoring may be required.
5. MYOCARDIAL INFARCT [MI]
History of MI in preceding 3 months - **exclude**.
 - a. must monitor HR and BP before and after collection.
 - b. volume replacement may be required.

6. ANGINA
 - a. must monitor HR and BP before and after collection.
 - b. volume replacement may be required.
 - c. Oxygen may be required

7. PATIENTS on β Blockers, Vasodilators, ACE inhibitors, Nitrate and Calcium Channel Blockers.

May get hypotension and if on β blockers unable to get reflex tachycardia and increased cardiac output in response to hypotension.

 - a. must monitor HR and BP before and after collection.
 - b. volume replacement may be required.

8. VALVULAR HEART DISEASE
Moderate Aortic and Mitral Valve Stenosis: Monitor BP and HR every 5 minutes during collection.

9. GENERALISED ARTERIO-SCLEROSIS or LARGE VESSEL DISEASE
Patients with these conditions are at increased risk of occult ischaemic heart disease and should be assessed accordingly (ie patients undergoing elective aortic aneurism repair or large vessel bypass surgery).

10. ASTHMA INDUCED BY ANXIETY
 - a. must have their bronchodilators readily available.

11. DIABETES - INSULIN REQUIRING
Not necessarily high risk, but are more at risk of ischaemic heart disease and cerebrovascular disease and should be assessed accordingly.

12. PREGNANCY - Last trimester. Discourage. 99.5% do not need transfusions.
 - a. collect as per Royal College of Obstetricians and Gynaecologists' guidelines.
 - b. may require volume replacement.
 - c. collect blood in lateral position.
 - d. foetal monitoring.

A patient who suffers from severe vaso-vagal syncope following a collection should not continue with the program.

Appendix (5) provides an extensive list of deferral criteria for autologous blood collections.

TECHNICAL AND PROCEDURAL ASPECTS

Labelling

The patient must state their name and date of birth whenever blood is collected. After checking all the details on the autologous label are correct the patient must sign the label which must be affixed to the bag during the collection procedure.

The autologous label for each unit should include all necessary information for correct identification of the patient and should have a suitable adhesive for refrigerated storage.

The labels must clearly state:

1. Autologous Blood
2. Unique blood pack number.
3. Blood group.
4. Collection and expiry date.
5. Place of collection.
6. Patient details (name, DOB, hospital number).
7. Patient's signature.

The label may also include:

1. Final destination (hospital at which blood will be stored/transfused).
2. Summary of the test results for infectious disease markers.

It is recommended that the labels are green.

Appendices 6 and 7 give examples of an Autologous Blood Pack label and Notification of Autologous Collection Forms.

Traceability of all autologous units must be possible, consequently transfusion records must permit tracking of each unit from the patient, through all procedures performed on the unit, to transfusion to the patient, or disposal.

In addition to the unique autologous label, blood pack labels indicating the blood group (ABO / Rh D) and any compatibility tests may be affixed to each unit by the laboratory performing these tests.

Laboratory Testing

Each pre-deposited autologous unit must be tested for ABO and Rh D to confirm the patient's blood group.

It is recommended that screening for currently approved blood transmissible disease markers for allogeneic blood be performed on autologous units. This testing of autologous units, despite increased costs, maximises safety.

Units not negative for blood transmissible disease markers should be destroyed.

If a unit is found to be not negative for blood transmissible disease markers, the referring doctor must be contacted and informed of the results. It is recommended that the clinician in charge of the patient who orders the collection of blood inform the patient of the result.

Pre-transfusion testing including a group and antibody screen should be performed on the patient prior to surgery, as allogeneic blood may be required in addition to the autologous blood previously collected.

Requirements for screening for currently approved blood transmissible disease markers on autologous collections vary in the international literature.

However as recently as November 2001, the Blood and Blood Products Committee of AHMAC has endorsed the following [for Australia]:

- a) screening for transmissible disease markers should be performed each time an autologous collection is taken; and**
- b) the level of testing for autologous collections should be the same as that required for homologous (allogeneic) blood.**

Storage

Predeposit autologous blood should be stored in a refrigerator at a controlled temperature between 2-6°C, with alarms set at 3-5°C, and physically separated from allogeneic blood stocks and cross-matched blood. This refrigerator should be equipped with a recorder and with an alarm similar to those on other fridges used for blood storage and comply with AS3864-1997.

Transport

Autologous collections must be transported in a manner known to maintain temperatures compliant with AS3864-1997.

Disposal of Unused Autologous Units

An unused unit of blood collected for autologous transfusion must not be transfused to another patient. Unused units of autologous blood should be kept until expiry and then be discarded.

Records

The fate of each autologous unit of blood must be fully documented to ensure that each unit can be accounted for. All consent forms, questionnaires and donor records should be retained in accordance with the guidelines for allogeneic units.

Appendices

1. Procedure for collecting autologous blood from underweight patients.
2. Patient questionnaire.
3. Patient information sheet.
4. Consent form.
5. Alphabetical listing of deferrals.
6. Autologous blood pack label.
7. Notification of autologous blood collection form.
8. Bibliography.

Appendix 1

PROCEDURE FOR COLLECTING AUTOLOGOUS BLOOD FROM UNDERWEIGHT PATIENTS

If a patient **weighs less than 50kg** and a doctor declares them medically fit then he/she may have autologous blood collected providing that the guidelines below are followed.

It is important that these guidelines are strictly adhered to, to avoid -

- a. Hypotensive episodes (decrease in blood pressure, fainting, light-headedness) during and following blood collection.
 - b. Citrate toxicity when being transfused with their autologous blood.
1. **The amount of blood collected must not exceed 10% of the patient's total blood volume.** If less than 450 ml is to be collected, a proportionate volume of anticoagulant solution should be transferred from the primary collection container to a satellite container. For standard primary containers intended for collection of 450 ml of blood, the volume of anticoagulant solution (CPD, CPDA-1) is 63ml, otherwise it should be adjusted accordingly. The total blood volume of the patient can be calculated using a figure of 80ml/kg.

Example:	Weight of patient	35kg
	Total blood volume	35kg x 80ml/kg = 2800 ml
	Volume of blood to be collected	2800 x 10% = 280ml

2. The amount of anticoagulant in a 500 ml blood pack is 63 ml. This is the amount required for a 450 ml blood collection and is proportional to the volume of blood to be collected. If the volume of blood to be collected is less than 450 ml it is necessary to adjust the amount of anticoagulant accordingly, **prior to blood collection.**

To calculate the amount of anticoagulant required for a given volume and hence the amount of excess anticoagulant to be removed, use the following equation.

$$\frac{\text{volume of blood collection} \times 63}{450} = \text{volume of anticoagulant}$$

Example:	volume of blood collection:	280 ml
	volume of anticoagulant:	$\frac{280 \times 63}{450} = 39 \text{ ml}$
	excess anticoagulant	$63 - 39 = \mathbf{24 \text{ ml}}$

A double collection pack is required. Transfer the excess anticoagulant into attached plasma bag **prior to blood collection** without breaching the closed system.

NOTE - These volumes do not have to be exact.

Consider IV fluids if systolic BP < 100 following collection.

Appendix 2

MEDICAL QUESTIONNAIRE AUTOLOGOUS BLOOD COLLECTION

NAME:.....BLOOD PACK NUMBER:.....

To the best of my knowledge my answers to the following are true.

*Partner is defined as a person with whom you have had sexual contact in the last 12 months

1. Have you or your partner* any reason to believe that you have been infected with HIV, the virus that causes AIDS?
2. In the last 6 months have you had:
 - persistent night sweats?
 - unexplained weight loss?
 - persistent fever?
 - persistent diarrhoea?
 - persistent swollen glands?
3. Have or your partner had sexual activity in the last 5 years with any person whom you know to have been exposed to HIV [the virus that causes AIDS], Hepatitis B or C, or Syphilis?
4. Are you in good health today?
5. Do you currently have a cold, the flu, or any other illness or infection [including diarrhoea or gastroenteritis]?
6. Have you ever had any serious illnesses or operations
7. Have you ever had:
 - rheumatic fever?
 - high blood pressure?
 - diabetes?
 - kidney disease?
 - gastric or duodenal ulcers?
 - heart disease?
 - liver disease?
 - chest trouble?
 - bleeding disorders?
 - asthma or hay fever?
 - other allergies?
 - cancer?
 - a stroke?
8. Have you ever had hepatitis or any other blood transmissible disease?
9. Do you suffer from fits, fainting or are afraid of needles?
10. Have you taken any medications within the last 3 days? Please list.

SIGNATURE..... DATE.....

WITNESS..... DATE.....

Appendix 3

FACTS ABOUT AUTOLOGOUS BLOOD COLLECTION AND TRANSFUSION FOR PATIENTS ABOUT TO HAVE SURGERY

Introduction

Some people who undergo surgery require blood transfusion during or just after the operation. Whether you will need a blood transfusion or not will vary with the type of operation. It is possible to collect and store some of your blood (autologous blood) before surgery for use during the operation, instead of using blood from someone else (allogeneic blood). Blood can be stored for up to 42 days between collection and use. This service is now available for suitable patients who would like to have their own blood collected. When you see your doctor you should take the opportunity of asking whether you are suitable. It is not compulsory to do so.

What are the advantages of autologous blood?

Autologous blood collection and transfusion reduces the possible risk of blood transmissible diseases, and formation of antibodies or allergy to red cells, platelets and plasma proteins.

Are there any problems?

In general, collection of autologous blood carries some of the same minimal risks as any blood collection. A doctor will assess you before collection of blood and determine whether you are suitable for participation in the program.

When is it collected?

The blood is collected weekly within the four (4) weeks prior to the date of the operation.

How long does the procedure take?

The whole procedure of blood collection takes about 30 minutes each time. At the end of this time the nurse will apply a bandage which should not be disturbed for 1-2 hours. Sometimes a small scab forms, but will disappear in a few days. To aid the healing process, keep the arm dry and avoid strenuous activity for a few hours after collection.

You may be asked to rest for 15 minutes before leaving the collection centre. You can drive if you feel perfectly well, but should inform the nurse in charge if you have any doubt. Some occupations involve some personal safety risks or include responsibility for the safety of others. If you have such an occupation, ask the nurse how long you should wait before resuming your duties.

Most people feel well after having autologous blood collected.

However, if you should feel light-headed when you get up from the bed, it may mean your body has not had quite enough time to adjust. You will be assisted to lie down and asked to rest for a while.

Drinking extra fluids helps to replace some of the fluid portion of the blood you have had taken. If you are on a fluid restricted diet, discuss this with your doctor.

Eating a balanced diet with lots of fluids helps your body to produce other necessary elements of your blood. Some foods recommended to help restore the iron content of your blood are red meats, liver, kidneys, beans and nuts.

1 to 2 hours after your blood collection, you may remove the bandage from your arm.

If your arm starts to bleed, do not be alarmed; simply raise the arm over your head and apply pressure immediately on the needle entry site until the bleeding stops.

Occasionally the area may appear bruised.

The discolouration will disappear within a few days and should cause you no concern.

Usually the venipuncture site heals without difficulty.

However, if the site should become reddened and some discomfort results, see your own doctor immediately.

What else is involved?

Your blood count will be checked and your blood tested for Hepatitis B & C, HIV (AIDS) HTLV and Syphilis each time you donate. For cardiac patients, during the collection, your electrocardiograph (ECG) and blood pressure may be monitored.

Does the collection of autologous blood make certain that allogeneic blood will not be used?

In most cases, allogeneic blood will not be needed if you have had your own blood collected. However, should you bleed more than average during or after the operation, it may be necessary to give you allogeneic blood. You should remember that the risk of complications from allogeneic blood is very low. The doctors will determine the need for allogeneic blood products, depending on your clinical condition.

What happens to the autologous blood if it is not used?

Unused autologous blood, when it has expired, is discarded by the hospital blood bank/laboratory .

Further queries

If you have any enquires or wish to use this service, please contact the hospital or laboratory where your blood was collected.

Appendix 4

NAME:.....

**STATEMENT OF CONSENT FOR AUTOLOGOUS BLOOD COLLECTION
AND TRANSFUSION**

1. The nature of autologous blood collection and transfusion and the risks and possible complications have been explained to me. I have read and understand the information on the sheet entitled "Facts about autologous blood collection and transfusion for patients about to have surgery".
 2. I consent to the withdrawal of blood by authorised staff for autologous transfusion.
 3. I am aware that my blood will be tested for Hepatitis B, Hepatitis C, HIV, HTLV and Syphilis and that my doctor will be notified of any positive results.
 4. (Optional clause - cross out if not applicable and initial)
If my blood is not required for autologous transfusion, I consent to the use or disposal of that blood in a manner deemed appropriate by the blood bank/laboratory.
-

SIGNATURE..... DATE.....

WITNESS..... DATE.....

Appendix 5

DEFERRALS

The following are common examples and serve only as a guide. The deferral period may be extended at the discretion of the medical officer.

Arthroscopy		Defer 1 week
Bronchoscopy	-without biopsy	Defer 48 hours
	-with biopsy/lavage	Defer 1 week
Colposcopy and cone biopsy		Defer 1 week
Colonoscopy	-without biopsy	Defer 48 hours
	-with biopsy	Defer 1 week
Dental work	-filling	Defer 48 hours
	-extractions	Defer 1 week
Diarrhoea/Gastroenteritis		Defer minimum 1 week after recovery
Dilatations and curettage (D&C)		Defer 1 week
Endoscopic procedures	-without biopsy	Defer 48 hours
	-with biopsy	Defer 1 week
Fine needle biopsy		Defer 48 hours
Lumbar puncture		Defer 48 hours
Myelogram		Defer 48 hours
Puerperium (post childbirth)		Inappropriate to collect
Prostatic massage		Defer 1 week
Radiological procedures	-angiogram	Defer 48 hours
	-sialogram	Defer 48 hours
Trauma	-cuts and abrasions	Defer until healed
	-sutures	Defer until healed

The other guidelines are listed in alphabetical order

Accept for autologous blood collection provided general criteria acceptable

Note: Not all medical conditions are covered in these guidelines. Those not included should be discussed with the responsible medical officer

A

Accident	Accept if injuries healed
Acne	Accept unless purulent
Alcoholism	Accept if sober and co-operative
Allergies	Accept if clinically stable
Angina	See high risk category
Arrhythmia	See high risk category
Arthritis	Accept
Asthma	Accept if mild-moderate and clinically stable; severe (may accept if stabilised on treatment.)

B

Blood Disease	Requires medical specialist approval
Blood Pressure	Systolic >180 diastolic >100. Rest and recheck. If still high defer for local medical officer review
Boils	Defer until healed

Bradycardia		See physical examination
Bronchitis	-acute	Defer until well - 4 weeks
	-chronic	Accept if well
Bypass		See high risk category

C

Cancer		Accept if other criteria satisfactory
Cardiac arrhythmia		See high risk category
Cerebrovascular disease		See high risk category
Cholangitis		Defer 4 weeks
Cholecystitis		Accept after 1 week if well
Cirrhosis		Accept if other criteria satisfactory
Colitis	-simple	Defer 4 weeks
	-ulcerative	Defer if active disease
Concussion	-mild	Defer 4 weeks
	-moderate/severe	Defer 3 months
Convulsions		Accept if stable on medication
Coronary Heart Disease		See high risk category
Crohn's Disease		Defer if active disease

D

Dental work	-filling	Defer 48 hours
	-extraction	Defer 1 week
Dermatitis	-local	Accept if minor and collection site clean
	-generalised	Defer until healed
Diabetes Mellitus	-diet	Accept
	-oral hypoglycaemic	Accept
	-insulin	Accept at discretion of medical officer.
Diarrhoea		Check causes. [Accept minimum of 1 week after recovery]
Diverticulitis		Defer if active disease
Drugs		See 'Medications'

E

Eczema	-local	Accept if minor and collection site clean
	-generalised	Defer until healed
Embolism		Check causes. Accept if well. [Anticoagulant drugs acceptable]
Emphysema	-mild-moderate	Accept if stable and not septic
	-severe	At discretion of medical officer
Epilepsy		Accept if well-controlled
Epistaxis		Accept

F

Fainting		Defer if previous severe faints or delayed loss of consciousness after blood collection
Fractures	-minor	Accept
	-major	Accept when healed

G

Gallstones	Accept
Gastroenteritis	Accept minimum of 1 week after recovery
Glaucoma	Accept
Gout	Accept

H

Haemochromatosis	Accept
Hay Fever	Accept
Head Injury (mod-severe)	Defer 3 months
Heart Murmur	See high risk category [If asymptomatic or surgery for another reason accept with authority of specialist medical officer]
Hepatitis (A, B, C)	See Infections - ACUTE
Hypertension	Accept if controlled. Defer if BP>180/100
Hyperthyroidism	Accept if controlled
Hypotension	Defer if BP<95/50 [Refer back to referring medical officer]

I

Immunisation	
Passive or Active	Accept
Infections - ACUTE	
Bacterial	Accept 1 week after recovery
Boils	Defer until healed
Common cold	Accept when well
Cystitis	Accept if asymptomatic for 1 week
Gastroenteritis	Accept minimum of 1 week after recovery
Hepatitis A	Defer until fully recovered
Hepatitis B	Defer until HbsAg negative. Carrier state - permanent deferral
Hepatitis C	Permanent deferral
HIV	Permanent deferral
Impetigo	Accept if asymptomatic and healed
Sore throat	Accept when recovered
Thrush	Accept when recovered
Viral (others)	Accept when recovered
Infections - CHRONIC	
Infected hip/knee prosthesis	Permanently deferred
Osteomyelitis	Defer until 6 months after recovery
Irregularity of pulse	Accept if between 50-100/min and occasional
VEB;	otherwise send back to referring medical officer.

J

Jaundice - Obstructive	Accept
------------------------	--------

K

Kidney disease		
Nephritis	- acute	Accept when recovered
	- chronic	Accept if well
Pyelonephritis		Accept if asymptomatic and MSU clear
Renal calculi		Accept when well

L

Lipidaemia		Accept
Liver disease		Check cause
		[Accept with authority of specialist medical officer.
Lupus erythematosus		See also Infections/Acute/Hepatitis]
		At discretion of medical officer

M

Malaria	Previous infection	Accept once well
	Travel to area	Accept
Malignant disease		See 'Cancer'
Meniere's disease		Accept
Migraine		Accept
Miscarriage		Defer 1 week
Myocarditis		Accept with authority of specialist medical officer.
		[If symptomless then accept for hospital based blood collection with monitoring as recommended]

MEDICATIONS

Many patients undergoing autologous blood collection are on long-term medication at the time of collection. These patients are generally acceptable to have blood collected, but must be assessed on an individual basis.

β -Blocker therapy is considered a relative contra-indication, but patients may be acceptable for blood collection if pulse and BP are satisfactory and collection is monitored.

Any patients on antibiotic therapy for an **active infection should be deferred**. Patients must have completed a course of antibiotics and have no sign of the infection recurring for at least 5 days before they are accepted to have blood collected.

Note: Exceptions do exist; see 'Antibiotics' below.

DRUGS

Analgesics - No contra-indications to autologous collection provided patient is clinically stable.

Anti-arrhythmic - See high risk section.

Anti-asthmatic drugs - No contra-indications to autologous collection.

Antibiotics - Depends on why patient is on antibiotics, if long-term treatment for acne or long-term prophylaxis for U.T.I. or bronchitis - accept for autologous blood collection. Any active infection requires temporary deferral or permanent deferral (eg. infected prosthetic hip). If infection resolved and asymptomatic defer for 5 days or after cessation of treatment.

Anticoagulants and anti-platelet drugs eg. aspirin, NSAIDS (non-steroidal anti-inflammatory drugs), Warfarin, S/C Heparin. Accept for autologous collection. Aspirin/like drugs cease 5 days prior to surgery.

Anti-convulsant drugs - No contra-indications to autologous collection provided patient is clinically stable.

Anti-diabetic agents - Oral - accept; Insulin at discretion of medical officer.

Anti-histamines - No contra-indications to autologous collection provided patient is clinically stable.

Anti-inflammatory - No contra-indications to autologous collection provided patient is clinically stable. Cease 5 days prior to surgery.

Anti-malarial - No contra-indications to autologous collection provided patient is clinically stable.

Anti-neurotic - No contra-indications to autologous collection provided patient is clinically stable.

Anti-Parkinson's drugs - No contra-indications to autologous collection provided patient is clinically stable.

Anti-psychotic medication - No contra-indications to autologous collection provided patient is clinically stable.

Anti-thyroid drugs - No contra-indications to autologous collection provided patient is clinically and biochemically stable.

Cardiac and anti-hypertensive drugs - See High Risk Category. No contra-indications to autologous collection providing pulse and BP satisfactory and no history of unstable angina. Care with β -Blockers - may require a longer period of supervision.

Immunosuppressive agents - (prednisolone, cytotoxics). No contra-indication to autologous blood collection provided other criteria, eg. Hb is met.

N

Nephritis	acute chronic	Accept when recovered. Accept if well.
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O

Obstructive -	Jaundice	Accept.
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Osteomyelitis
Osteoarthritis

Defer until 6 months after recovery.
Accept.

P

Paget's disease	Accept.
Parkinson's disease	Accept.
Peptic ulcer	Accept if asymptomatic.
Pericarditis	Defer until full recovery. Then accept with authority of specialist medical officer.
Peripheral vascular disease	See High Risk Category.
Phlebitis	Defer until well.
Pleurisy	Defer until well.
Pneumothorax	Accept at discretion of medical officer.
Polycythaemia Vera	Accept.

Pregnancy -

There are few indications for autologous blood collection in pregnancy. If indicated, the Royal College of Obstetricians and Gynaecologists recommend pregnant women can have 300-500 mls of blood collected for autologous transfusion on not more than 3 occasions during the 2 weeks before anticipated delivery. The pregnant woman must also have a haemoglobin greater than 110g/L.

Note: Since <2% of pregnant woman would be transfused, autologous collection would not appear to be indicated unless there is a specific reason to suspect that the woman will require transfusion. Routine blood collections in the third trimester of pregnancy could aggravate iron deficiency found during pregnancy or may compromise the foetus. Attending obstetrician to advise.

If a decision is made for autologous blood collection from a pregnant patient;

- The patient must not be in a supine position during collection due to the risk of IVC obstruction and the supine hypotensive syndrome with potential sequelae for the mother and foetus.
- Continuous foetal monitoring must be undertaken during collection and for 30 mins after completion of collection.

Psoriasis	Accept if localised.
Psychotic disorder	Accept if stable.
Pulse	Accept if 50-100/min and regular [Defer if >100 after rest]

R

Rheumatic fever	Defer until full recovery. Then accept with authority of specialist medical officer. Rheumatoid arthritis Accept if other criteria are satisfactory.
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S

Septicaemia	Accept 6 months after recovery.
Shingles	Accept after healed.
Sprains	Accept.
Stroke	At discretion of medical officer.

T

Tonsillitis		Accept once recovered, or until 5 days after antibiotics completed.
Tooth extraction		Defer 1 week.
TIA		At discretion of medical officer.
Thalassaemia minor		Accept.
Thyrotoxicosis		Accept if stable.

U

Ulcer	peptic	Accept if asymptomatic.
	leg, sacral, foot	Defer until healed

V

Vaccination:	Live or killed	Accept.
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Appendix 6

BLOOD PACK LABEL REQUIREMENTS

Blood for autologous transfusion should be identified with an over stick label * which includes the following information:

BLOOD FOR AUTOLOGOUS TRANSFUSION ONLY

COLLECTION SITE

SURNAME

GIVEN NAMES

DATE OF BIRTH

HOSPITAL NUMBER

COLLECTION DATE

EXPIRY DATE

ABO and Rh D TYPES

COMPONENT TYPE

COLLECTION NUMBER

PATIENT'S SIGNATURE

The patient must state their name and date of birth before signing the pack to confirm that the details on the label (apart from the ABO and Rh D type which may not be entered when the first unit is drawn) are correct. The signature can also be compared as part of a pre-transfusion checking procedure with the signature on the consent form which by then will be in the patient's notes.

* This label should not occlude the information given on the manufacturer's standard pack label.

Where possible bar-coded autologous labels and collection numbers should be used.

* **Autologous labels should be black printed text on a green background.**

AUTOLOGOUS BLOOD PACK LABEL

This is an example of an autologous label.

Appendix 7

Example 1

NOTIFICATION OF AUTOLOGOUS BLOOD COLLECTION

This form is to be **sent** to the hospital blood bank or private pathologist performing pre-transfusion testing after first unit is collected.

TO: _____
Hospital **or** Pathologist performing pre-transfusion testing

FROM: _____
—
Collection Centre Address

Telephone Fax

The first autologous unit has been collected

today _____
(date)

from _____
Surname First Name Date of Birth

It is planned that a further _____ unit/s will be collected, if possible.

The patient _____ is scheduled to have:
_____ performed
(procedure)

on _____
(date)

by _____ at _____
(surgeon) (hospital)

Example 2

NOTIFICATION OF AUTOLOGOUS BLOOD COLLECTION

To: _____

Via: _____

Please find enclosed _____ units of Autologous Blood

Collection Number	Collection Date

Collected from:

_____ (NAME OF PATIENT AND DATE OF BIRTH)

is scheduled to have a

_____ (TYPE OF SURGERY)

on _____ at _____
(DATE OF SURGERY) (NAME OF HOSPITAL)

being performed by _____
(NAME OF SURGEON)

If you have any queries regarding these units, please
call.....
On.....

Time and date despatched: _____

Time and date received: _____

Please phone _____ on receipt

Appendix 8

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OBJECTIVES: To determine, in patients undergoing total hip arthroplasty (THA), clinical predictive criteria for preoperative autologous blood donation and to propose guidelines to increase the efficiency and reduce the cost of preoperative autologous blood donation.

PATIENTS AND METHODS: In this retrospective analysis of 165 adult patients undergoing primary THA, a stepwise regression analysis was used to determine which clinical variables predict erythropoiesis in patients donating autologous blood before THA. The surgical blood order equation (SBOE), which includes values for haemoglobin lost at surgery, preoperative haemoglobin level, and minimal acceptable haemoglobin level, was used to estimate the number of units of red blood cells (RBCs) needed for each patient at surgery and thus identify which patients should have made preoperative autologous blood donations. **RESULTS:** The statistically significant indicators for RBC production were predonation haemoglobin concentration ($P<.001$) and male sex ($P=.003$). Combining the regression equation for erythropoiesis with the SBOE allowed development of guidelines for the use of preoperative autologous RBC donation and erythropoietic therapy. For primary THA surgery, a patient with a predonation haemoglobin level higher than 14.7 g/dL does not need preoperative autologous donation. Preoperative autologous RBC donation would be effective for men with haemoglobin concentrations of 14.7 g/dL or less and for women with predonation haemoglobin levels of 13.2 to 14.7 g/dL. In women whose haemoglobin level is less than 13.2 g/dL, erythropoietic therapy should accompany autologous donation. **CONCLUSION:** Incorporation of patient factors with the SBOE system may result in increased efficiency and decreased cost of autologous blood ordering practices before THA.

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21. Strategies to reduce the need for allogeneic blood include autologous predonation, acute normovolaemic haemodilution perioperatively, and the salvage of shed blood. Autologous predonation eliminates many disease risks while keeping costs at least comparable to allogeneic blood. Acute normovolaemic haemodilution offers the advantage of low cost and the use of autologous fresh blood at the end of the operation. In the future, artificial blood substitutes now undergoing clinical trials, may play an important role in reducing the need for allogeneic transfusions. Two promising agents are haemoglobin-based oxygen carriers and perfluorocarbons. Both offer the advantage of long shelf life and eliminate the need for crossmatching, but they are limited by short half-life. [References: 29]
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Perioperative Autologous Collection

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change the concentration of these substances in samples from the patients. Coagulation factors and various split products showed that drainage blood was defibrinated. Reinfusion of drainage blood did not change the coagulative capacity of the patients. Drainage blood appears to be defibrinated and contains various extracellular leucocyte-derived and platelet-derived bioactive substances. Reinfusion does not change the coagulative capacity or the concentration of bioactive substances of patients.

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Acute Normovolaemic haemodilution

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