Management of Transfusion Reactions and Adverse Events

This document should be read in conjunction with the Disclaimer

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Transfusion Monitoring

Patients receiving transfusions must be monitored for signs and symptoms of potential complications and any deterioration must be investigated urgently. Severe reactions are most likely to occur within the first 15 minutes of the start of each component and patients MUST be closely observed during this period. Unless otherwise indicated by the patient’s clinical condition, the rate should be no greater than 5mL/minute for the first 15 minutes. The following observations MUST be undertaken and recorded in the observations chart in the medical notes:

- **T,P,R,BP** and **O₂ sats Base line** before the start of each infusion
- **T,P,R,BP** and **O₂ sats 15 minutes after commencing** each blood component
- Then **hourly measurements** of **T,P,R,BP** and **O₂ sats**
- A final **T,P,R,BP** and **O₂ sats** at the **end of each transfusion** episode
The patient should be located in an area where they can be observed by clinical staff throughout the transfusion. Closer observation should take place for babies and patients who are unable to verbalise symptoms due to mental or physical limitations.

**Transfusion Reactions**

Each blood product transfused carries a small risk of an acute or delayed adverse reaction. The most common immediate adverse reactions are fever, chills and urticaria. The most potentially significant reactions include acute and delayed haemolytic transfusion reactions, febrile non-haemolytic transfusion reaction, bacterial contamination of blood products, anaphylaxis and Transfusion Related Acute Lung Injury (TRALI).

Transfusion reaction can be fatal, so it is important these incidents are recognised promptly and managed appropriately. Acute transfusion reaction can occur up to 24 hours following administration of the blood product. Delayed transfusion reactions occur days or even weeks following the transfusion. All significant adverse events should be reported *immediately* to the Blood Bank Transfusion Medicine Unit (TMU) and Consultant Haematologist for advice on immediate management and investigation. All cases will also be reviewed by the Hospital Transfusion Committee and reported to the supplier (ARCBS or CSL) when appropriate. **Remember, report any adverse events immediately. If the cause is product related other patients may be at risk from components manufactured from the same blood donation.**

For a full explanation and definition of what constitutes an adverse event please click on the link

[Haemovigilance - Definition of Transfusion related adverse Events](#)

A completed [Transfusion Reaction Investigation Form](#) must be sent to the TMU to ensure the event is recorded and investigated appropriately. (Click link above to download form or you can ring TMU on extension 82748 to obtain a hard copy). Serious non-infectious adverse events will be reported to the Australian Incident Monitoring System (AIMS) as appropriate.
Immediate management of acute transfusion reactions

The following table provides a summary of the main requirements for immediate management of a suspected transfusion reaction.

<table>
<thead>
<tr>
<th>RECOGNISE</th>
<th>REACT</th>
<th>REPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rise in temperature to &gt;38°C or &gt;1°C above baseline</td>
<td>Immediate nursing action: <strong>STOP transfusion (leave IV line in place)</strong>, then</td>
<td>Complete the Transfusion Reaction Investigation Form</td>
</tr>
<tr>
<td>Chills/rigors</td>
<td>Provide emergency patient care</td>
<td>Document all treatment and actions in the medical record.</td>
</tr>
<tr>
<td>Urticaria (hives), pruritis</td>
<td>Arrange immediate medical review. <strong>Medical Emergency Team</strong> (MET). <strong>Call/Code Blue if necessary</strong></td>
<td>Refer to <strong>Staff Responsibilities Flowchart</strong> for reporting and notification responsibilities in the event of a reaction and for advice of investigations required.</td>
</tr>
<tr>
<td>Hyper/hypotension</td>
<td>Keep IV line open with normal saline (do not flush existing line – use a new IV line if required)</td>
<td></td>
</tr>
<tr>
<td>Tachycardia</td>
<td>Repeat all clerical and identity checks of the patient and blood pack</td>
<td></td>
</tr>
<tr>
<td>Dyspnoea/stridor/wheeze</td>
<td><strong>Vital observations at least every 15 minutes until stable (document in medical record)</strong></td>
<td></td>
</tr>
<tr>
<td>Pain (chest, back, IV site)</td>
<td><strong>For a guide to further treatment and management of the patient refer to the Transfusion Reaction Flowchart</strong></td>
<td></td>
</tr>
<tr>
<td>Bleeding, oozing</td>
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<tr>
<td>Dark urine (haematuria)</td>
<td></td>
<td></td>
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<tr>
<td>Unexplained bleeding</td>
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<td></td>
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<tr>
<td>Nausea/vomiting</td>
<td></td>
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<tr>
<td>Tachycardia</td>
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</tr>
</tbody>
</table>
TRANSFUSION REACTION FLOWCHART

PATIENT EXHIBITING POSSIBLE FEATURES OF AN ACUTE TRANSFUSION REACTION
which may include: fever, chills, rigors, tachycardia, hyper- or hypotension, collapse, flushing, utricaria, pain (bone, muscle, chest, abdominal), respiratory distress, nausea, general malaise

STOP THE TRANSFUSION - undertake rapid clinical assessment, check patient ID/blood compatibility label, visually assess unit, maintain IV access with saline

Evidence of:
- Life-threatening Airway and/or Breathing and/or Circulatory problems and/or wrong blood given and/or evidence of contaminated unit

SEVERE/LIFE-THREATENING
- Call MET/CODE BLUE
- Initiate resuscitation - ABC
- Discontinue transfusion (do not discard implicated units)
- If in doubt of ongoing haemorrhage seek urgent haematological advice on suitable blood product support
- Maintain venous access
- Monitor patient e.g. TPR, BP, SpO2, urinary output

- If likely anaphylaxis/severe allergy treat for anaphylaxis
- If bacterial contamination likely start antibiotic treatment
- Use BP, pulse, urine output (catheterise if necessary) to guide intravenous physiological saline administration
- Perform appropriate investigations (Consultant Haematologist will advise which samples to collect; see Table 1)

Yes

Inform medical staff

No

MODERATE
- Temperature >39°C or rise >2°C from baseline and/or
- Other symptoms/signs apart from pruritus/rash only

- Consider bacterial contamination if the temperature rises as above and review patient's underlying condition and transfusion history
- Monitor patient at least 15 minutes until stable e.g. TPR, BP, SpO2, urinary output

MILD
- Isolated temperature >39°C and rise of 1-2°C from baseline and/or
- Pruritus/rash only

- Consider symptomatic treatment
  (Paracetamol +/- antihistamine)
- Continue transfusion
- Monitor patient at least 15 minutes until stable e.g. TPR, BP, SpO2, urinary output
- If symptoms/signs worsen, manage as moderate/severe reaction (see left)

If consistent with underlying condition of transfusion history consider continuation of transfusion at slower rate and appropriate symptomatic treatment

Not consistent with condition or history
- Discontinue (do not discard implicated units)
- Perform appropriate investigations
  (Consultant Haematologist will advise which samples to collect; see Table 1)

Table 1. TRANSFUSION MEDICINE INVESTIGATIONS
Please refer to the table for details on which samples to collect.

Additional scenarios:
- Consultant Haematologist will advise which blood samples to collect
- Return unit (with giving set) to TMU

More information available in KEMH Transfusion Medicine Protocols on WNHS intranet.
REPORTING A TRANSFUSION REACTION/ADVERSE INCIDENT
STAFF RESPONSIBILITIES FLOWCHART

MODERATE AND SEVERE TRANSFUSION REACTION OR ADVERSE INCIDENT

DOCTOR
- Refer to Consultant Haematologist
- Liaise with Transfusion Medicine Unit Extension 2748 or Out of Hours Shift Scientist page 3264
- Document clinical assessment of patient and adverse incident in patient medical notes
- Refer to Transfusion Reaction Flow Chart for patient management

NURSE
- Notify Doctor
- Notify Transfusion Medicine Unit Extension 2748 or Out of Hours Shift Scientist page 3264
- Complete Transfusion Reaction Investigation Form in liaison with attending Doctor
- Document adverse incident in patient medical notes
- Refer to Transfusion Reaction Flow Chart for patient management
- Return blood bags and giving sets with Transfusion Reaction Investigation Form to TMU

CONSULTANT HAEMATOLOGIST
- Expert Clinical Advice on investigation and management of reaction or adverse events
- Can be contacted through switchboard

TRANSFUSION MEDICINE UNIT (TMU) SCIENTIST
- Collate details of event as notified by Clinical Staff. Retain details for TMU Scientist in Charge.
- Advise Medical and Nursing staff to discuss with Consultant Haematologist
- Discuss process for investigation with Consultant Haematologist and proceed as instructed regarding obtaining samples and initiating testing.

SCIENTIST IN CHARGE TMU
- Document investigations
- Provide Transfusion Coordinator with event details/TC will discuss with Haematologist/TMU team and collate further clinical evidence as warranted
- TC will collate data for KEMH Hospital Transfusion Committee and discuss with TMU team to Classify Reaction for TMU report.
Investigation Requirements

For moderate and severe reactions the Consultant Haematologist will advise medical staff which blood samples to collect. Send blood samples, 1st urine sample post reaction and blood component unit with giving set still attached to TMU, accompanied by completed Pathology request forms and a Transfusion Reaction Investigation Form.

The Consultant Haematologist may require the following tests:

- Blood Samples: Group and antibody screen, crossmatch, IgA Levels, Mast Cell Tryptase, blood cultures, plasma haemoglobin, haptoglobin, coagulation profile & FDPs and bilirubin.
- Subsequent urine samples (free haemoglobin and derivatives)

Transfusion Reaction Table

This chart is summary of the most common symptoms of Transfusion Reactions. It also gives advice on who should be notified of a reaction.

<table>
<thead>
<tr>
<th>CAUSE</th>
<th>SYMPTOMS</th>
<th>ACTION &amp; SUGGESTED TREATMENT</th>
<th>REPORT TO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ALLERGIC REACTIONS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antibodies to plasma proteins or allergens</td>
<td>Mild: Pruritus Urticaria</td>
<td>STOP or slow transfusion Administer antihistamines Resume transfusion at slower rate and observe more frequently If symptoms/signs worsen, STOP transfusion</td>
<td>Record in patient notes. If occurs frequently consider premedication. Contact TMU with patient’s name, UMRN, date and time of reaction and symptoms.</td>
</tr>
<tr>
<td>Occurs during 1-3% of transfusions</td>
<td>Severe: Wheezing or angioedematous reactions, +/- pruritus and urticaria</td>
<td>STOP transfusion Administer antihistamines hydrocortisone, adrenaline</td>
<td>Consultant Haematologist, TMU and Treating Consultant. Complete Transfusion Reaction Investigation Form and send to TMU</td>
</tr>
<tr>
<td>CAUSE</td>
<td>SYMPTOMS</td>
<td>ACTION &amp; SUGGESTED TREATMENT</td>
<td>REPORT TO</td>
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<tr>
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</tr>
<tr>
<td><strong>FEBRILE REACTIONS</strong></td>
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</tr>
<tr>
<td>Antibodies to leucocyte antigens. Cytokines in stored platelet units.</td>
<td>Mild: Temperature rise &gt;38°C or 1-2°C rise from baseline All other observations stable and patient otherwise well</td>
<td>STOP transfusion Administer paracetamol or other antipyretic Resume transfusion at slower rate and observe more frequently If symptoms/signs worsen, STOP transfusion</td>
<td>Record in patient notes. If occurs frequently consider premedication. Contact TMU with patient’s name, UMRN, date and time of reaction and symptoms.</td>
</tr>
<tr>
<td>Occurs towards end of infusion or within hours of completion in 1% of transfusions. The incidence is reduced with leucocyte-depleted blood components.</td>
<td>Moderate: Temperature increase &gt;39°C or rise &gt; 2°C</td>
<td>STOP transfusion</td>
<td>Consultant Haematologist, TMU and Treating Consultant Complete Transfusion Reaction Investigation Form and send to TMU</td>
</tr>
<tr>
<td><strong>ACUTE HAEMOLYTIC TRANSFUSION REACTION</strong></td>
<td></td>
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</tr>
<tr>
<td>ABO incompatible transfusion or haemolytic antibody. Usually result of clerical error when samples drawn or blood is administered. Rare 1 in 12,000 - 77,000 May occur during first few mLs of transfusion. 10% mortality rate. Consider possibility of renal failure and DIC Maintain blood pressure and renal perfusion</td>
<td>Anxiety, chest and or back pain, dyspnoea, chills, fever, shock Unexplained bleeding, Haemoglobinaemia, Haemoglobinurea, Cardiac arrest</td>
<td>STOP transfusion Call Code Blue if necessary Seek URGENT critical care and haematology advice Return transfused unit and giving set to TMU</td>
<td>Consultant Haematologist, TMU and Treating Consultant Complete Transfusion Reaction Investigation Form and send to TMU Complete Clinical Incident Form (AIMS).</td>
</tr>
<tr>
<td><strong>ANAPHYLACTIC/ANAPHYLACTOID/SEVERE ALLERGIC REACTIONS</strong></td>
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</tr>
<tr>
<td>Patient antibodies to donor IgA Very rare but may be fatal. 1 in 20,000-170,000. Rapid and often during first few mLs of infusion</td>
<td>Coughing, bronchospasm, laryngospasm, respiratory distress, Nausea, abdominal cramps, vomiting, diarrhoea, shock, loss of consciousness</td>
<td>STOP TRANSFUSION Call Code Blue Administer adrenalin/corticosteroids. Treat hypotension. Seek URGENT critical care and haematology advice. Return transfused unit and giving set to TMU</td>
<td>Consultant Haematologist, TMU. Treating Consultant. Complete Transfusion Reaction Investigation Form and send to TMU</td>
</tr>
<tr>
<td>CAUSE</td>
<td>SYMPTOMS</td>
<td>ACTION &amp; SUGGESTED TREATMENT</td>
<td>REPORT TO</td>
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<tr>
<td>--------------------------------------</td>
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<td>------------------------------------------------</td>
</tr>
<tr>
<td>INFECTIVE SHOCK</td>
<td></td>
<td></td>
<td>Consultant Haematologist, TMU. Treating Consultant. Complete Transfusion Reaction Investigation Form and send to TMU</td>
</tr>
<tr>
<td>Bacterial contamination of blood component RARE but very severe with high mortality rate. Usually during first 100mL.</td>
<td>Onset of high fever, Severe chills, hypotension or circulatory collapse during or soon after transfusion</td>
<td>STOP TRANSFUSION Manage sepsicaemia. Fluids and intravenous antibiotics. Seek URGENT critical care / haematology advice Return transfused unit and giving set to TMU</td>
<td></td>
</tr>
<tr>
<td>TRANSMISSION RELATION ACUTE LUNG INJURY (TRALI)</td>
<td></td>
<td></td>
<td>Consult Haematologist/ TMU urgently: (may be other associated products from the same donation. TMU may notify Australian Red Cross Blood Service.) Complete Transfusion Reaction Investigation Form and send to TMU</td>
</tr>
<tr>
<td>Donor plasma containing antibodies to patient leucocytes Occurs during or within 6 hours in 1 in 5,000-10,000 transfusions May be life threatening</td>
<td>Acute respiratory reaction with fever, tachycardia, hypotension, hypoxia and pulmonary oedema</td>
<td>STOP TRANSFUSION Call Code Blue if necessary O2 support Seek URGENT critical care and haematology advice Return transfused unit and giving set to TMU</td>
<td></td>
</tr>
<tr>
<td>DELAYED HAEMOLYTIC TRANSFUSION REACTION</td>
<td></td>
<td></td>
<td>Consultant Haematologist, TMU. A Group and Antibody Screen request must be sent to TMU together with a completed Transfusion Reaction Investigation Form (print form or call TMU for hard copy).</td>
</tr>
<tr>
<td>Patient produces allo-antibodies to recently transfused red cells</td>
<td>Unexplained fever, jaundice, unexplained drop in haemoglobin</td>
<td>If delayed haemolytic transfusion reaction is suspected consult the Consultant Haematologist/ TMU for further advice regarding patient management.</td>
<td></td>
</tr>
<tr>
<td>POST TRANSFUSION PURPURA</td>
<td></td>
<td></td>
<td>Consultant Haematologist, TMU. Treating team Consultant.</td>
</tr>
<tr>
<td>Patient has high titre platelet specific antibody</td>
<td>Profound unexplained thrombocytopenia 7-10 days post transfusion</td>
<td>Seek urgent advice from Consultant Haematologist</td>
<td></td>
</tr>
<tr>
<td>TRANSFUSION ASSOCIATED GRAFT VERSUS HOST DISEASE</td>
<td></td>
<td></td>
<td>Consultant Haematologist, TMU. Treating team Consultant.</td>
</tr>
<tr>
<td>Immune reaction of donor T cells against the recipient who is often immune-deficient.</td>
<td>Symptoms 4-30 days post transfusion. Include fever, rash, liver and renal failure and pancytopenia</td>
<td>Seek urgent haematology advice from Consultant Haematologist</td>
<td></td>
</tr>
<tr>
<td>Iron Overload</td>
<td></td>
<td></td>
<td>Seek Consultant Haematologist advice</td>
</tr>
<tr>
<td>Transfusion Transmitted Infectious Diseases</td>
<td></td>
<td></td>
<td>Seek Consultant Haematologist/ Microbiologist advice. Inform TMU</td>
</tr>
</tbody>
</table>
Transfusion Reaction Investigation Form

**TRANSFUSION REACTION INVESTIGATION FORM**

<table>
<thead>
<tr>
<th>UMRN</th>
<th>Consultant</th>
<th>Ward</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Requesting Doctor (print)</td>
<td>Signature</td>
</tr>
<tr>
<td></td>
<td>Request date</td>
<td></td>
</tr>
</tbody>
</table>

**CLINICAL HISTORY:**
- Previous transfusion(s)? Y / N
- Previous pregnancy(s)? Y / N
- On medication? Y / N
- Previous transfusion reaction? Y / N
- Specify

**REACTION:**
- Date _______ Time _______ Reason for Transfusion

- Component (Red cell, platelet etc) __________________
- Volume infused __________

- Donation number of offending unit(s) __________

- Transfusion ceased? Y / N
- Used bag(s) returned to Blood Bank? Y / N

**SYMPTOMS**
- Please tick boxes that apply.
  - Pyrexia: ________ °C
  - Chills/Rigors
  - Urticaria
  - Tachycardia
  - Chest pain
  - Nausea/Vomiting
  - Burning around vein
  - Hypotension
  - Uramia
  - Dyspnoea
  - Lumbar pain
  - Haemoglobinuria
  - Jaundice
  - Excessive bleeding
  - Shock
  - Bronchospasms

- Other symptoms:

- Treatment given:

**OUTCOME:**

**BLOOD BANK USE ONLY**

- Request received: Date _______ Time _______
- Clerical labelling error check: Pass / Fail
- Post-transfusion EDTA haemolysed? Y / N
- Jaundice (delayed transf reaction)? Y / N

<table>
<thead>
<tr>
<th>Patient Sample</th>
<th>Laboratory number</th>
<th>Blood Group</th>
<th>Antibody screen</th>
<th>DAT</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>Post-transfusion</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Donation ID</th>
<th>Blood Group</th>
<th>DAT</th>
<th>Compatibility</th>
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<tbody>
<tr>
<td></td>
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<td>Pre</td>
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<td></td>
<td></td>
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<td>Post</td>
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</tbody>
</table>

**CONCLUSION:**

- Reported to BTC: Date _______ Minute No: _______ TR Panel resulted? Y / N
- Scientist-in-Charge TM Sign __________ Date _______
References


- ARCBS Blood Component Information Booklet


Related policies

- National Safety and Quality Health Service Standards, October 2012. Standard 7: Blood and Blood Products

Related WNHS policies, procedures and guidelines

- KEMH Blood Transfusion Checking Procedure
- WNHS Transfusion Medicine Blood Product Prescription Consent and Refusal
- Women & Newborn Health Service Patient Identification Policy
- WNHS Checking Procedure Pre Administration of Blood Products
- WNHS Blood Transfusion Equipment and Administration
- Neonatology Clinical Care Guidelines
- Obstetrics and Gynaecology Clinical Guidelines
<table>
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<tr>
<th>File path</th>
<th>WNHS.HAEM.ManagementOfTransfusionReactionsAndAdverseEvents.pdf</th>
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</thead>
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<tr>
<td>Keywords:</td>
<td>Blood, Prescription, risk of transfusion, transfusion reaction, refusal of blood products, patient blood management guidelines, indication for blood products, special requirements for blood products, irradiated blood products, CMV Negative blood products, washed red cells, IgA deficient components, Delayed transfusion reaction, allergic transfusion reaction, TRALI, Transfusion Reaction classification, Transfusion observations, management of transfusion reaction and adverse events, post transfusion purpura, transfusion infective shock, Transfusion Reaction Flowchart, reporting a transfusion reaction, transfusion reaction investigation form</td>
</tr>
<tr>
<td>Document owner:</td>
<td>Chair of KEMH Hospital Transfusion Committee</td>
</tr>
<tr>
<td>Author / Reviewer:</td>
<td>Consultant Haematologist, Scientist in Charge Transfusion Medicine, KEMH Transfusion Coordinator</td>
</tr>
<tr>
<td>Date first issued:</td>
<td>01 01 2005</td>
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<tr>
<td>Last reviewed:</td>
<td>01 12 2017</td>
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<td>Next review date:</td>
<td>01 12 2020</td>
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<tr>
<td>Endorsed by:</td>
<td>KEMH Hospital Transfusion Committee</td>
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<td>Date:</td>
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</tr>
<tr>
<td>Standards Applicable:</td>
<td>NSQHS Standards: 1 Governance, 2 Consumers, 5 Patient ID/Procedure Matching, 7 Blood Products</td>
</tr>
</tbody>
</table>

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