# Blood transfusion and Blood and marrow transplantation


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# Topics being covered

- Types and numbers of transplants at Southampton and where do patients come from
- Blood group changes
- HLA typing and selection of HLA matched products
- Irradiation and CMV requirements
- Transfer of pt info regarding blood product requirements

# Types of Transplant at Wessex Blood and Marrow Transplant Unit.

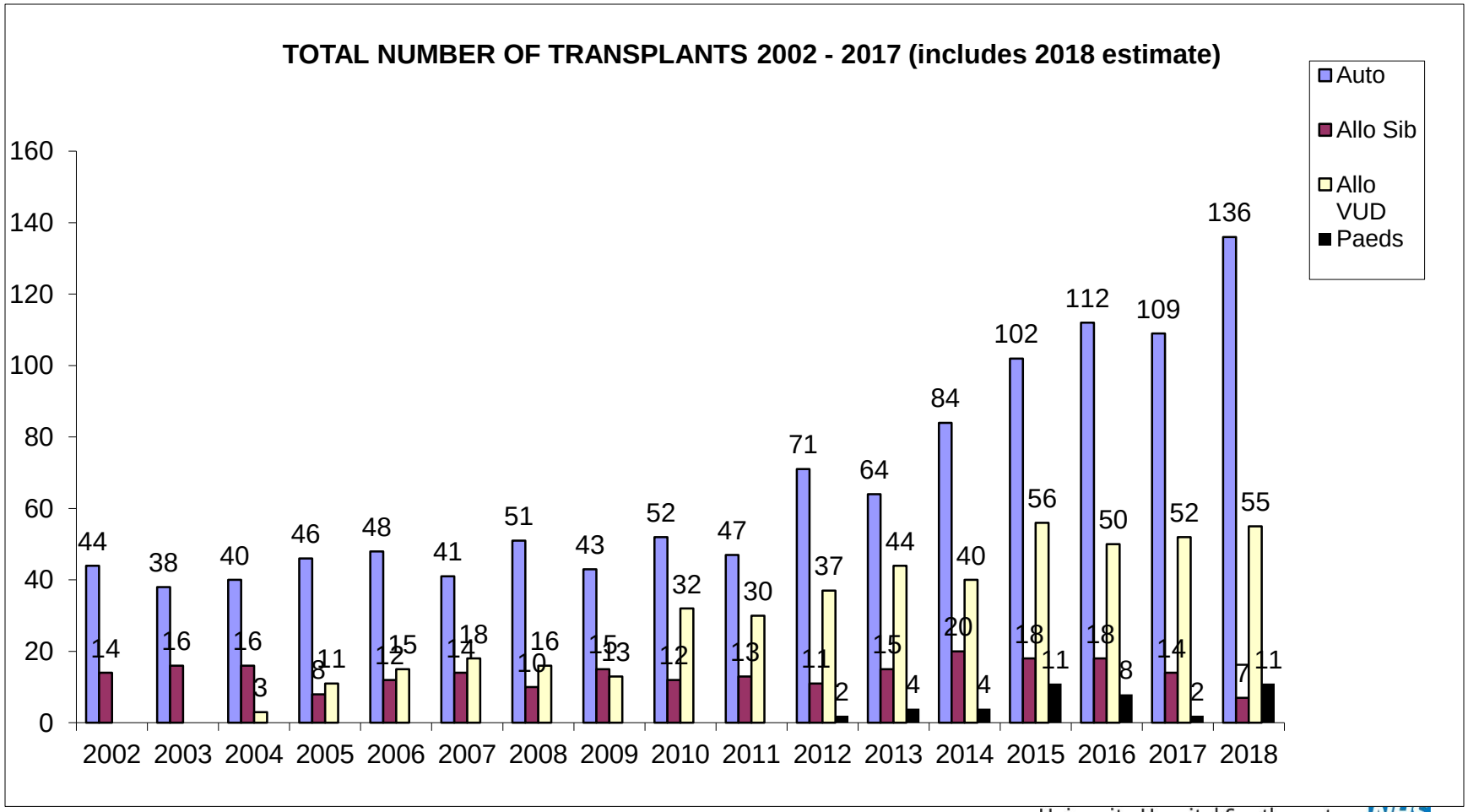
## Autologous

- Cells are from self,
- Harvested 2-3 weeks in advance of treatment
- Processed and cryopreserved at -180$^{o}$C
- Admission 3-4 weeks
- Recovery 2-3 months
- Myeloma, lymphoma, germ cell and autoimmune conditions
- Low risk

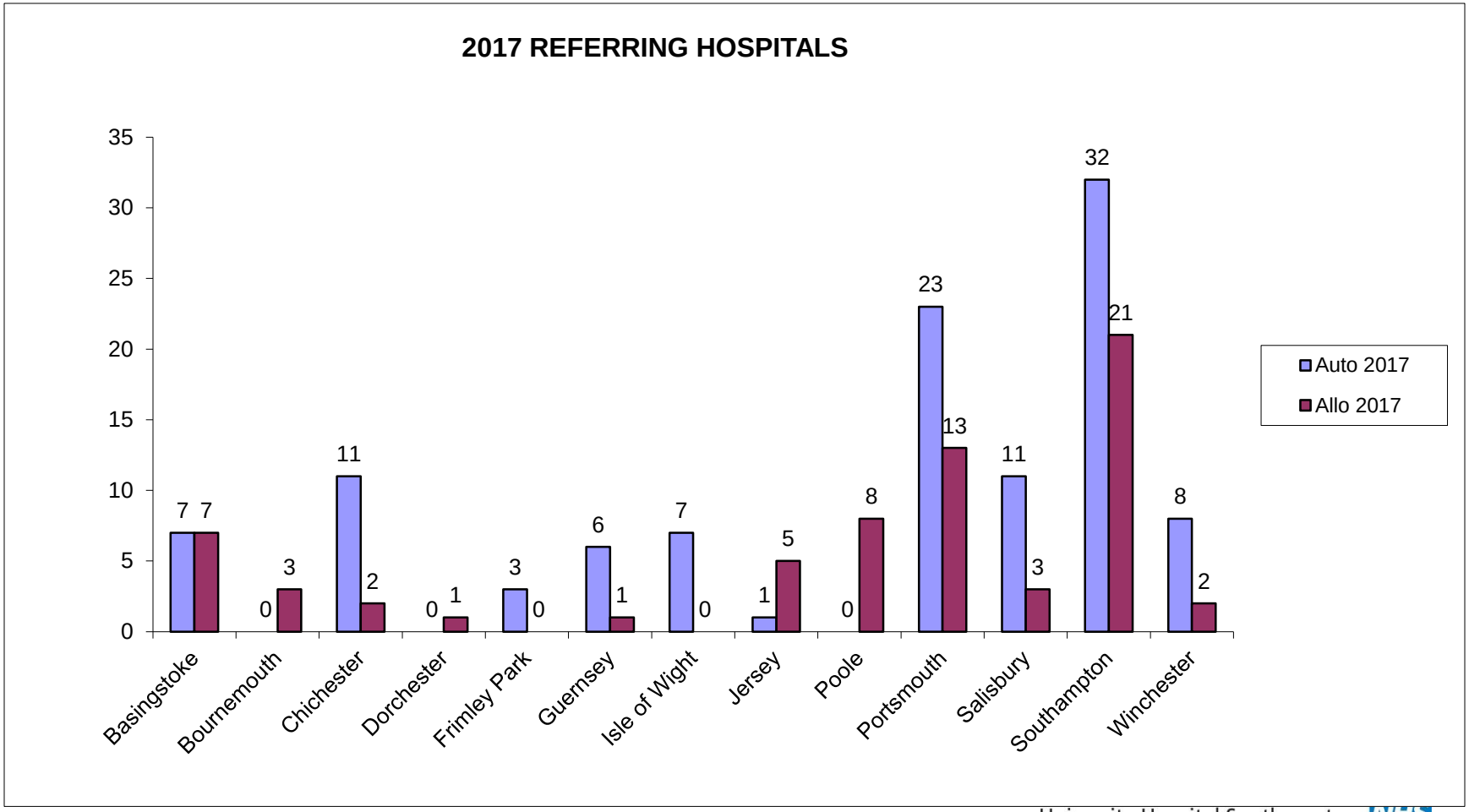
## Allogeneic

- Donor derived
- Sibling or unrelated donor
- Harvested either from peripheral blood or marrow
- Collected day of or day before infusion to patient.
- Admission 5-6 weeks
- Recovery 12 months or more
- Acute leukaemias, myelodysplasia, myeloproliferative disorders, lymphoma, myeloma or aplastic anaemia
- High risk

# WBMTU Transplantation Activity 2017



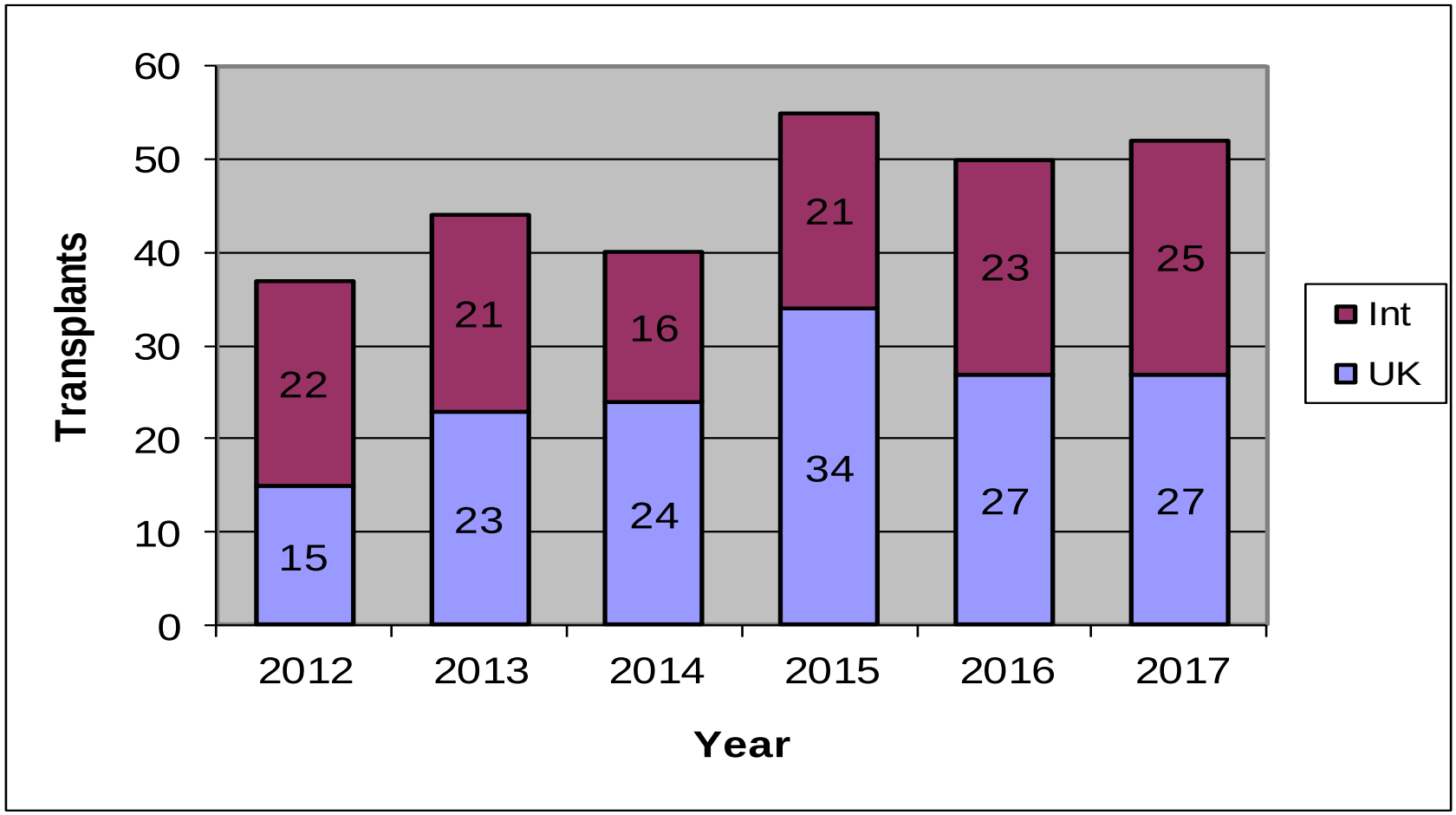
# WBMTU Transplantation Activity 2017



# Unrelated Donor Selection

- If choice of A,B,C,DR, DQ identical donors select donor based on
  - CMV status
  - Blood group
  - Age
  - Gender
- If no 10/10 matched donors, option to accept mismatch 9/10 or 8/10 mismatch or continue to search
- Additional testing includes:
  - HLA antibody testing, HLA-DPB1 typing, crossmatch if HLA mismatched donor selected
  - NHSBT can also provide red cell phenotyping / genotyping, HPA antibody testing, HPA genotyping

# Source of Final donor used
# UK and International donors



# HLA and CMV matching

| | 2017 | 2016 | 2015 | 2014 | 2013 |
|---|---|---|---|---|---|
| **HLA 10/10 match** | **40 (77%)** | 36 (72%) | 37 (66%) | 28 (70%) | 35 (80%) |
| **HLA 9/10 match** | **12 (23%)** | 13 (26%) | 18 (32%) | 11 (28%) | 9 (20%) |
| **CMV matched** | **44 (85%)** | 46 (92%) | 51 (93%) | 37 (93%) | 40 (91%) |
| **Blood group match /compatible** | **41 (79%)** | 46 (92%) | 49 (89%) | 33 (83%) | 35 (96%) |

In 2017 77% transplants were performed with a fully matched (10/10) donor.

85% were CMV matched and 79% were blood group matched or compatible.

**69% Transplants were 10/10, CMV matched and BGp match/compatible**

# UHS transplant transfusion guidelines

- Irradiation – all transplant patients for life
- CMV – CMV matched products for all patients undergoing treatment that may lead to an allogeneic transplant.
- HLA match
- Blood group changes

# Allogeneic Transplantation Outcomes 2017

## CMV Reactivation

**33/66** (50%) High risk (+/+ or +/- or -/+)

**29/33** (88%) Patients reactivated CMV

**1/33** (3%) Had a CMV result after a Neg/Neg (Primary infection)

**0/33** (0%) patients experienced CMV disease

**Details of Reactivation by patient: donor sero-status**

| CMV status | n | CMV reactivation | CMV no reactivation |
|---|---|---|---|
| neg/neg | 33 | 1 | 32 |
| neg/pos | 5 | 3 | 2 |
| pos/neg | 9 | 9 | 0 |
| pos/pos | 19 | 17 | 2 |
| equ/neg | 0 | 0 | 0 |
| equ/pos | 0 | 0 | 0 |
| **TOTAL** | **66** | **31** | **35** |

# Case study CMV reactivation

- Transplant date Sept 2017
- CMV Neg/Pos
- CMV PCR  on 5/10/17 = 8193 copies – admitted for 2 weeks of foscarnet
- CMV PCR  on 4/1/18 = 4500 copies – treated with valganciclovir for 3 weeks

# PT 2 CMV Pos/Neg

- Transplant Sept 2017
- Reactivated prior to discharge – had two weeks of IV ganciclovir at reduced dose due to AKI
- Readmitted 19/10 for 5 days of foscarnet as reactivated again.
- Reactivated 2/11/17 had cidofovir x 3 due to poor haematological counts, and poor renal function – poor response CMV PCR increased to 44,393 copies by 23/11/17
- Renal function deteriorated so required regular IV fluids

# cont

Started on valganciclovir but at a very reduced dose as eGfR 35ml/min

- Stayed on this until 14/12/17
- Reactivated again in February 2018 treated again with valganciclovir 9/2/18-22/2/18
- No full reactivations since then requiring treatment, had a couple of low level positive results in March April and May 2018.
- eGfR remains at 38ml/min

# HLA matched platelets

- Platelet refactoriness
- HLA matched platelets provided for patients with HLA antibodies and / or HPA antibodies. ABO matching not considered
- By agreement can provide to limit sensitization e.g in a mismatched tx option, or some centres for AA patients where a full match is not possible.
- HLA antibodies can have a significant impact when finding donors

68 y.o. Male Transplant 2014 for MDS post chemotherapy for disease reduction

Pt tissue typing

A 01:01, 68:01 B08:01, 27:05 C01:02, 07:01 DRB1 01:01, 10:01, DQB1 05:01

Donor

A 01:01, 02:01, B08:01, 27:05 C01:02, 07:01 DRB1 01:01, 10:01, DQB1 05:01

| Method | Result | Specificity | Ab Class |
|---|---|---|---|
| HLA-A (single antigen beads) | Positive | A11, A2, A23, A24, A3, A30, A31, A32, A36, A*66:02, A*68:02, A69, A74 | IgG |
| HLA-B (single antigen beads) | Positive | B*27:08, B35, B42, B46, B48, B49, B50, B51, B52, B53, B54, B55, B56, B57, B58, B60, B67, B7, B71, B75, B77, B78, B81, B82 | IgG |
| HLA-Cw (single antigen beads) | Negative | NEGATIVE | IgG |
| Luminex ID HLA Class II | Negative | NEGATIVE | IgG |

# Transfusion guidelines cont

- ABO incompatibility is divided into major and minor incompatibility.
- 
- Major incompatibility
  Recipient O, Donor A, B, AB or Recipient A or B, Donor AB
- Minor incompatibility
  Recipient A, B or AB, Donor O or Recipient AB, Donor A or B
- Bi-directional incompatibility
  Recipient A, Donor B or vice versa

# Blood group mismatches

- Increased risk of red cell aplasia
- Increased risk of haemolytic reactions – both when cells being returned and later
- If bone marrow source – requires red cell depletion – more complicated
- Slower engraftment of red cells
- If recipient is O and donor A, recipient might have high anti A titres pre transplant – need plasma exchanges and +/- rituximab

# Case history

- 56 y.o. Male with hypoplastic MDS – heavily transfusion dependent
- No siblings
- Unrelated donor search – no 10/10
- 9/10 blood group mismatch donor identified.
- Pt O pos donor A neg
- Anti A/B titres pre transplant

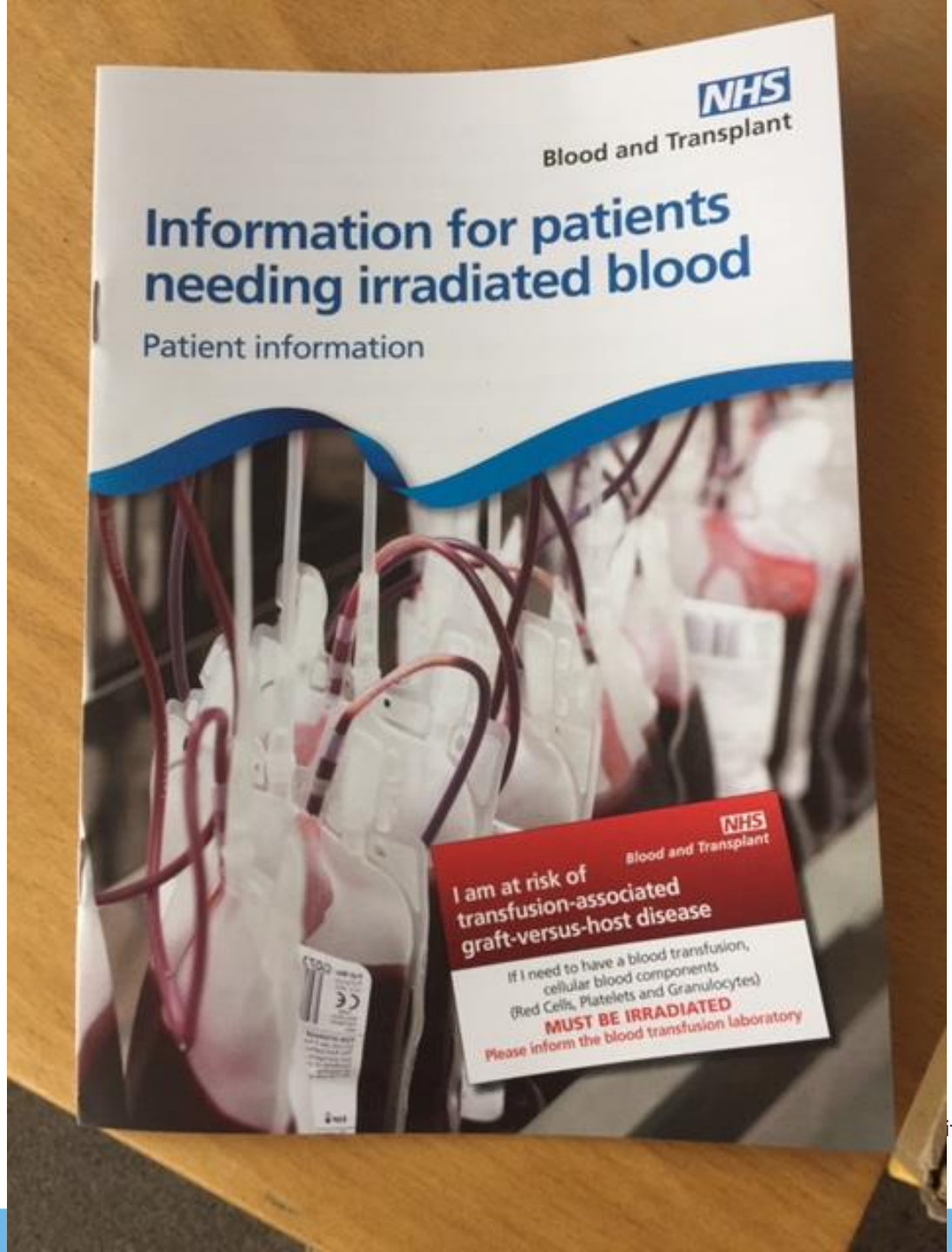
  Anti A 2048

  Anti B 256

# cont

- Pre transplant –
- 4 x plasma exchange
- 100mg rituximab day -10
- Anti A titres 64 during transplant
- BMT 25/9/18
- Last BG 5/6/19 – O Neg Anti A =8
- Transfusion independent.

# How do we keep patients and referring hospitals informed of blood product requirements


NHS
Blood and Transplant
Information for patients needing irradiated blood
Patient information
NHS
Blood and Transplant
I am at risk of transfusion-associated graft-versus-host disease
If I need to have a blood transfusion, cellular blood components (Red Cells, Platelets and Granulocytes)
MUST BE IRRADIATED
Please inform the blood transfusion laboratory

# Acute Myeloid Leukaemia
## Post Transplant Schedule

**Patients Details**
Name.....
D.O.B.....
Disease.....
CGN at time of diagnosis.....
Pre Transplant .....
Pre Transplant Treatment
.....
.....
.....
.....
.....
.....
.....

**Transplant Treatment**
Conditioning.....
Date of Transplant.....
Blood Group.....CMV Status.....
GVHD Prophylaxis .....

**Donor Details**
Name (if known).....
Sex .....
Age.....
Type of match.....
Blood Group.....CMV Status.....

**Blood Products required post transplant**
CMV Neg / Pos
Irradiated
Blood should be Group ..... Or if unavailable .....
Platlets should be Group..... Or if unavailable .....
(The above blood products should be given until patient is fully crossmatching for donor group.)
**OR**
No Change in Blood Group .....

**The following tests need to be done post transplant**

Lumbar Punctures X 2 with Intrathecal cytarabine to commence approximately D+33

| Date Due | Hospital | Signed |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

Bone marrow aspirate, trephine, and CGN at 3, 6,12,

WESSEX BLOOD AND MARROW TRANSPLANT - BLOOD PRODUCT SUPPORT SCHEDULE FOR HAEMATOLOGICAL TRANSPLANTATION FORM

# BLOOD PRODUCT SUPPORT SCHEDULE FOR HAEMATOLOGICAL TRANSPLANTATION FORM

HOSPITAL NO:
SURNAME:
FORENAME
DOB:
ADDRESS:

Please use addressograph if available

**TYPE OF TRANSPLANT** (tick appropriate procedure)

| | |
|---|---|
| Peripheral Blood Stem Cell Autograft | ☐ |
| Bone Marrow Autograft | ☐ |
| Sibling Bone Marrow Allograft | ☐ |
| Sibling Peripheral Blood Stem Cell Allograft | ☐ |
| Unrelated Bone Marrow Allograft | ☐ |
| Unrelated Peripheral Blood Stem Cell Allograft | ☐ |
| Other Type: Specify …… | ☐ |

Recipient Blood Group.....

§ Donor Blood Group.....

Recipient CMV antibody status: POS/NEG (delete as appropriate)

§ Donor CMV antibody status POS/NEG (delete as appropriate)

**STATUS OF BLOOD PRODUCTS TO BE GIVEN**

Blood Group for Red Cell Transfusions*.....

Blood Group for Platelet/FFP Transfusions*.....

CMV: POS/NEG (delete as appropriate)

**IRRADIATION OF BLOOD PRODUCTS**

Start date (usually start of conditioning) .....

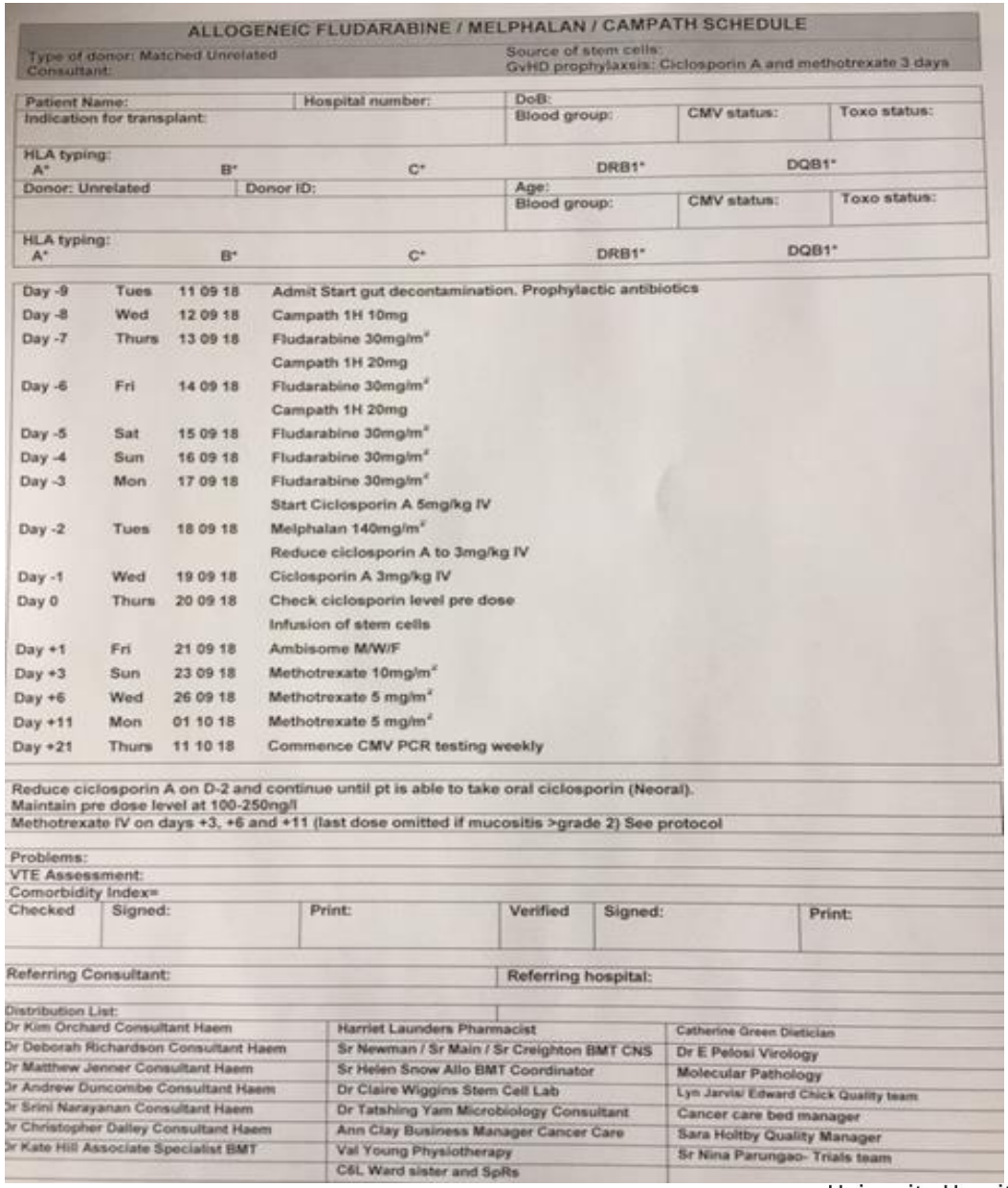
**NOTE:**

- **All blood products given after this date should be *IRRADIATED* indefinitely**
- **Allogeneic transplant recipients should receive *HepE NEGATIVE BLOOD PRODUCTS* for a minimum of 6 months post transplant, or for as long as patient is immunosuppressed**

§ Applicable if Allograft
*For Autografts, use recipient group. For Allografts ask a Consultant Haematologist for advice

When all sections of this form are completed, please send a copy to Chief MLSO, Transfusion Haematology, SGH and keep the original on the inside cover of the patient's notes

This is a controlled document. It must not be



## ALLOGENEIC FLUDARABINE / MELPHALAN / CAMPATH SCHEDULE

Type of donor: Matched Unrelated
Consultant:

Source of stem cells:
GvHD prophylaxsis: Ciclosporin A and methotrexate 3 days

| Patient Name: | Hospital number: | DoB: | | |
|---|---|---|---|---|
| Indication for transplant: | | Blood group: | CMV status: | Toxo status: |
| HLA typing: A* | B* | C* | DRB1* | DQB1* |
| Donor: Unrelated | Donor ID: | Age: | | |
| | | Blood group: | CMV status: | Toxo status: |
| HLA typing: A* | B* | C* | DRB1* | DQB1* |

| | | | |
|---|---|---|---|
| Day -9 | Tues | 11 09 18 | Admit Start gut decontamination. Prophylactic antibiotics |
| Day -8 | Wed | 12 09 18 | Campath 1H 10mg |
| Day -7 | Thurs | 13 09 18 | Fludarabine 30mg/m$^2$ |
| | | | Campath 1H 20mg |
| Day -6 | Fri | 14 09 18 | Fludarabine 30mg/m$^2$ |
| | | | Campath 1H 20mg |
| Day -5 | Sat | 15 09 18 | Fludarabine 30mg/m$^2$ |
| Day -4 | Sun | 16 09 18 | Fludarabine 30mg/m$^2$ |
| Day -3 | Mon | 17 09 18 | Fludarabine 30mg/m$^2$ |
| | | | Start Ciclosporin A 5mg/kg IV |
| Day -2 | Tues | 18 09 18 | Melphalan 140mg/m$^2$ |
| | | | Reduce ciclosporin A to 3mg/kg IV |
| Day -1 | Wed | 19 09 18 | Ciclosporin A 3mg/kg IV |
| Day 0 | Thurs | 20 09 18 | Check ciclosporin level pre dose |
| | | | Infusion of stem cells |
| Day +1 | Fri | 21 09 18 | Ambisome M/W/F |
| Day +3 | Sun | 23 09 18 | Methotrexate 10mg/m$^2$ |
| Day +6 | Wed | 26 09 18 | Methotrexate 5 mg/m$^2$ |
| Day +11 | Mon | 01 10 18 | Methotrexate 5 mg/m$^2$ |
| Day +21 | Thurs | 11 10 18 | Commence CMV PCR testing weekly |

Reduce ciclosporin A on D-2 and continue until pt is able to take oral ciclosporin (Neoral).
Maintain pre dose level at 100-250ng/l
Methotrexate IV on days +3, +6 and +11 (last dose omitted if mucositis >grade 2) See protocol

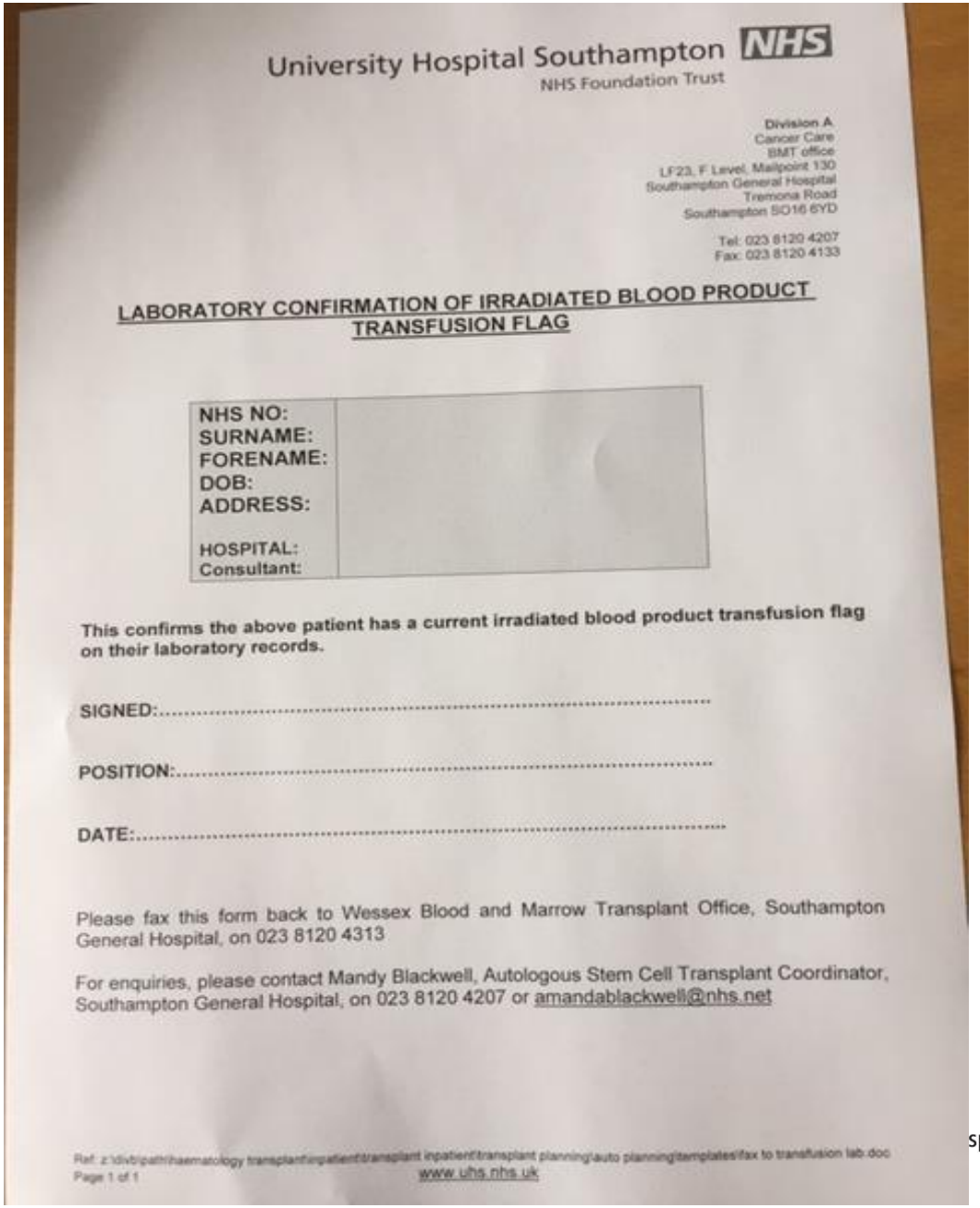
Problems:
VTE Assessment:
Comorbidity Index=

| Checked | Signed: | Print: | Verified | Signed: | Print: |
|---|---|---|---|---|---|
| | | | | | |

Referring Consultant: Referring hospital:

Distribution List:

| | | |
|---|---|---|
| Dr Kim Orchard Consultant Haem | Harriet Launders Pharmacist | Catherine Green Dietician |
| Dr Deborah Richardson Consultant Haem | Sr Newman / Sr Main / Sr Creighton BMT CNS | Dr E Pelosi Virology |
| Dr Matthew Jenner Consultant Haem | Sr Helen Snow Allo BMT Coordinator | Molecular Pathology |
| Dr Andrew Duncombe Consultant Haem | Dr Claire Wiggins Stem Cell Lab | Lyn Jarvis/ Edward Chick Quality team |
| Dr Srini Narayanan Consultant Haem | Dr Tatshing Yam Microbiology Consultant | Cancer care bed manager |
| Dr Christopher Dalley Consultant Haem | Ann Clay Business Manager Cancer Care | Sara Holtby Quality Manager |
| Dr Kate Hill Associate Specialist BMT | Val Young Physiotherapy | Sr Nina Parungao- Trials team |
| | C6L Ward sister and SpRs | |



University Hospital Southampton NHS
NHS Foundation Trust

Division A
Cancer Care
BMT office
LF23, F Level, Mailpoint 130
Southampton General Hospital
Tremona Road
Southampton SO16 6YD

Tel: 023 8120 4207
Fax: 023 8120 4133

**LABORATORY CONFIRMATION OF IRRADIATED BLOOD PRODUCT TRANSFUSION FLAG**

| | |
|---|---|
| NHS NO:<br>SURNAME:<br>FORENAME:<br>DOB:<br>ADDRESS:<br><br>HOSPITAL:<br>Consultant: | |

**This confirms the above patient has a current irradiated blood product transfusion flag on their laboratory records.**

**SIGNED:**.....

**POSITION:**.....

**DATE:**.....

Please fax this form back to Wessex Blood and Marrow Transplant Office, Southampton General Hospital, on 023 8120 4313

For enquiries, please contact Mandy Blackwell, Autologous Stem Cell Transplant Coordinator, Southampton General Hospital, on 023 8120 4207 or amandablackwell@nhs.net

Thank you for listening

# Any Questions?