

A large yellow radiation warning symbol, consisting of a central black circle with three black blades extending outwards, all enclosed within a yellow circle. The symbol is set against a black background.


Irradiated Blood Products

**Michelle
Lannon
Haem SpR**



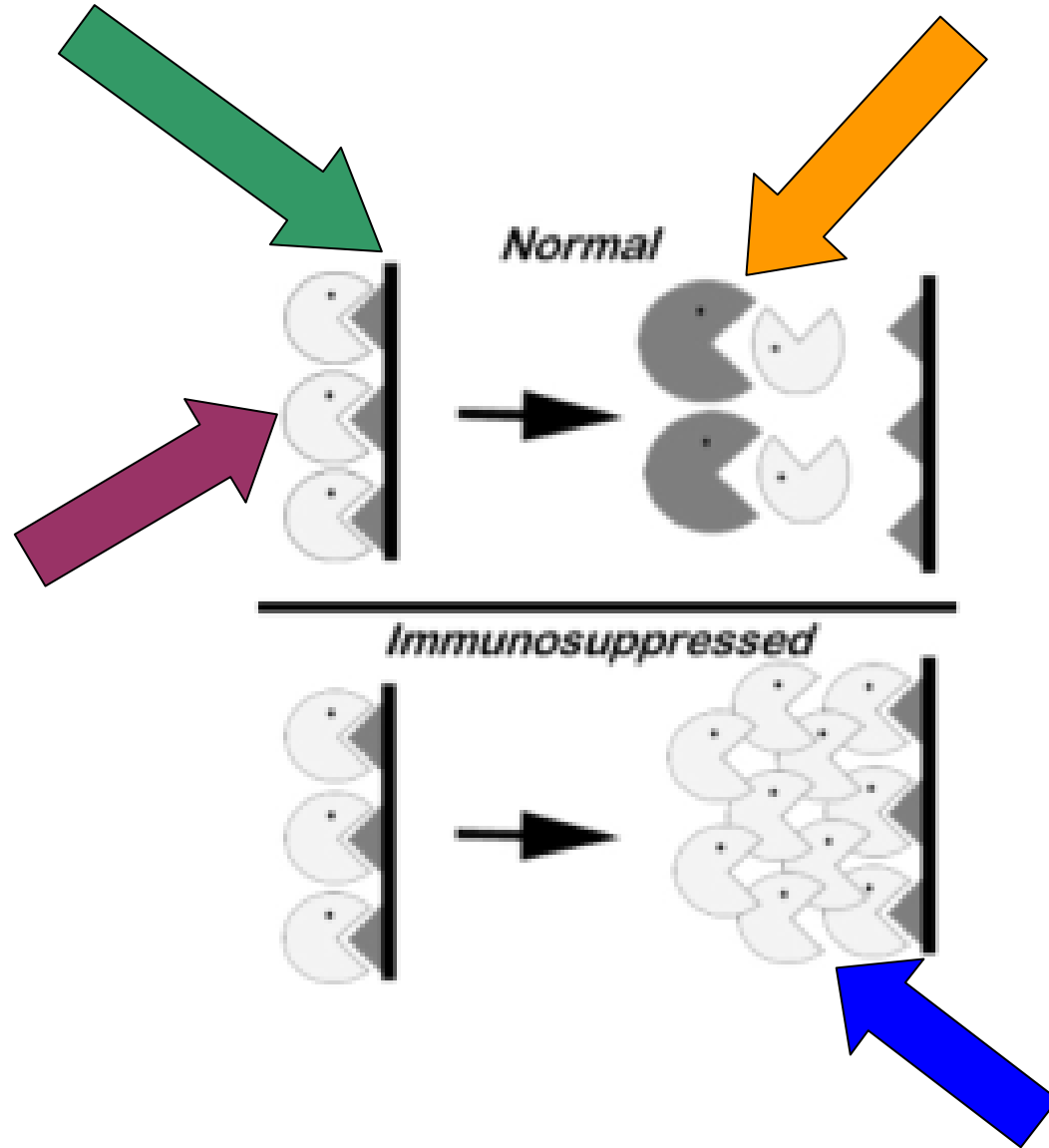
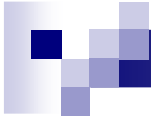
Coming Up

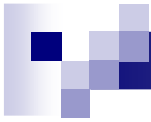
- Why does blood need to be irradiated?
- Who needs irradiated products?
 - What happens if they get non-irradiated products?
- Whose responsibility is it anyway?



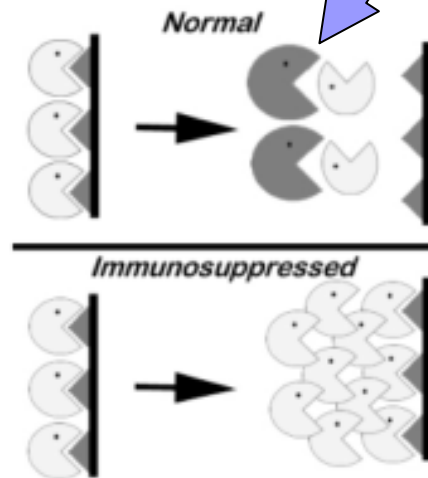
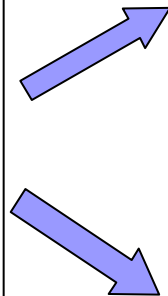
What condition are we trying to prevent when we irradiate?

Transfusion associated GVHD

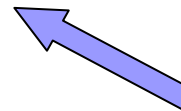
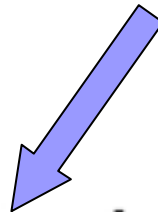




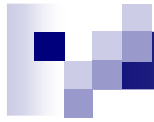
Lymphocytes in the transfused blood 'look around' the body of the recipient and realise it is foreign to them – this puts them into attack mode.



In **immunocompetent** patients: the recipient's own lymphocytes mount a counter attack, and being in the majority, will win.



In **immunocompromised** patients: the recipient's own lymphocytes are absent or useless and thus the invading lymphocytes take over; the attack continues!



Manifestations of TaGVHD


Jaundice (liver
inflammation)

Rash

Fever

Severe diarrhoea (gut
inflammation)

Death (in 100%)



Irradiation prevents TaGVHD by...
stopping cell division.

Which products need irradiating?

YES

- Red cells
- Platelets
- Buffy coat/
granulocytes

NO

- FFP
- Cryoprecipitate
- PCC/factor etc
- IVIG
- Albumin

Irradiation is performed at blood centres using either gamma or x-ray sources.



So, who is at risk?

Haematology-Oncology practice:

- Hodgkins Lymphoma (lifelong)
- Fludarabine recipients (lifelong)
- Other purine analogues/antagonists (lifelong)
- Campath* (lifelong)
- Rabbit ATG** (lifelong?)

Transplant Patients

- All allogeneic patients from conditioning until lymphocyte recovery and end of immunosuppression.
- Autologous patients prior to stem cell collection and for three months post transplant



Auto v Allo

- What is an auto transplant?
 - Own cells harvested in advance and given back after high dose chemo.
 - Method to allow delivery of intensive chemotherapy.
 - Used in Myeloma and Lymphoma.




Non-irradiated blood for an allo patient

- The donor marrow is vulnerable and could be ousted by a new 'army' of lymphocytes.



Which patients does this translate to?

- All allo transplant patients.
- Relapsed AML patients.
- Increasingly low grade leukaemia and lymphoma.



Other indications (Not Haemato-Oncology)

- IUT
- Neonates who have previously had an IUT
- Recipients of blood products donated by a relative



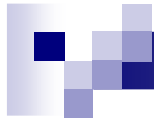
Who doesn't need irradiated products?

- Top Up Transfusions
 - Neither premature nor term infants require irradiated blood products for top-ups, even multiple top ups.
- Routine cardiac patients.
- HIV/AIDS patients.



What a long list – why not zap the lot?

- Red cells become leaky after irradiation – potassium and free haemoglobin levels in the fluid increases.
- Therefore irradiated red cells can't be stored for as long as usual.
 - Must be less than 14 days old and then only stored for a maximum of 14 days, compared to usual red cell storage life of 35 days.
- And it's not cheap!

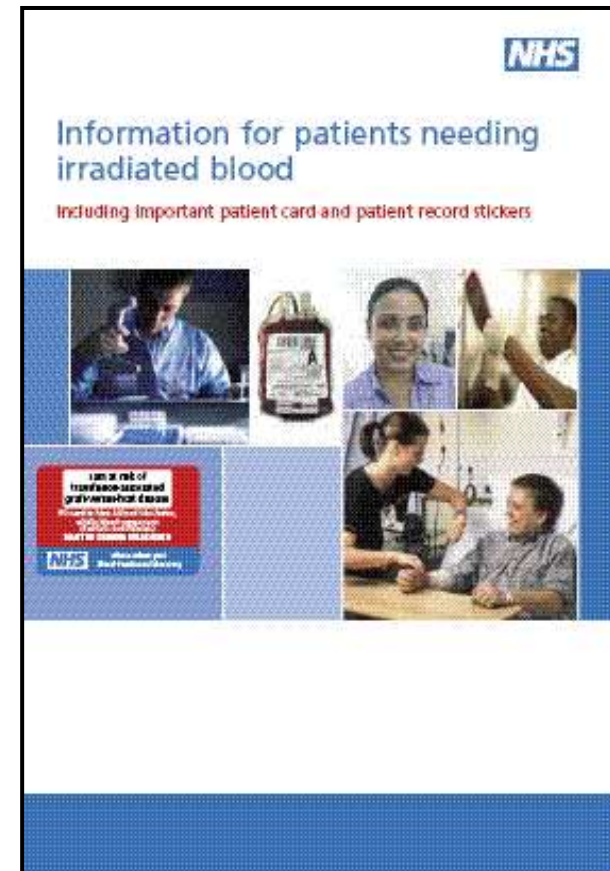
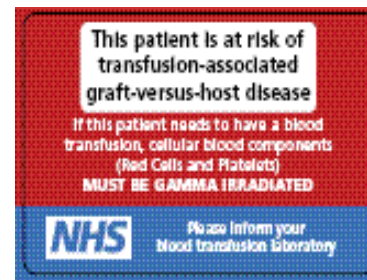



Whose responsibility is it anyway?

Who's responsibility is it anyway?

■ Communication is a big problem

- Consultant/SpR
- Pathologist
- Pharmacist
- Blood bank
- Transplant centres
- Prescribers
- Nurse
- Patient?



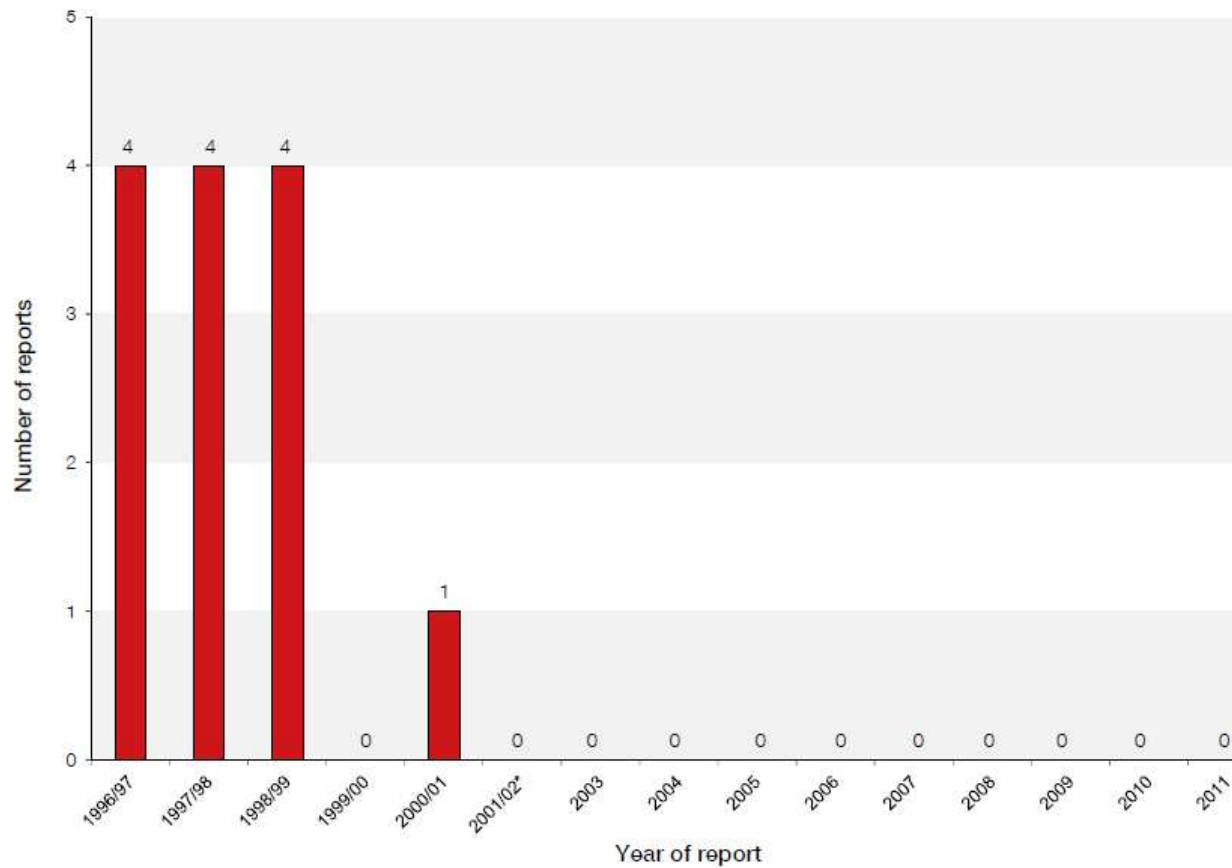


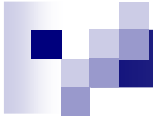
The good(ish) news...

- Universal leucodepletion was introduced in 1999.
- No cases of TaGVHD were reported between 2001 and 2012 (and only once since leucodepletion began, excepting recent IUT case)
- 877 cases of errors related to irradiated products reported to SHOT over this time.
- Leucodepletion may be enough to make blood is safe, but no-one is sure – so we can't forget irradiation!

How are we doing?

Figure 20.1:
Number of cases of
TA-GvHD reported
to SHOT each year





THANK YOU!

Questions?



Sources, references

- BCSH Guideline 2010
(www.bcshguidelines.com)
- Haemovigilance: www.shotuk.org
- The blood bank guy (www.bbguy.org)