Emily Graves
Haem SpR

Please join in, take a guess, ask those ‘stupid’ questions...

Coming Up

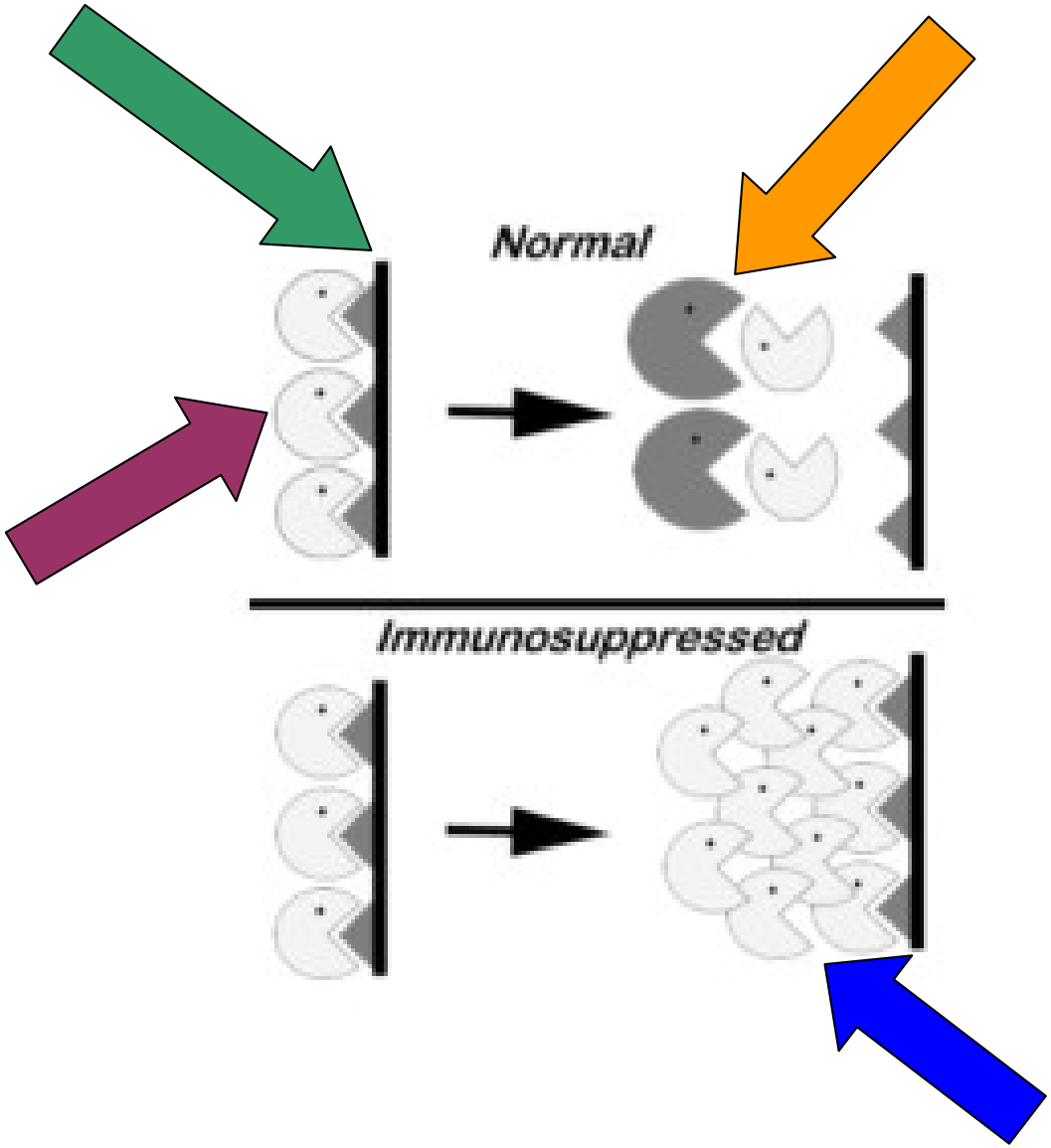
- Why does blood need to be irradiated?
- Who needs irradiated products?
  - What happens if they get non-irradiated products?
- Whose responsibility is it anyway?

56 year old man

- Transfused two units of blood following an orthopedic procedure.
- Saw GP two weeks later with easy bruising. GP requested bloods including a FBC:
- Hb 95, plts 6, WCC 2, neuts 0.5.
- What's going on? What to do next?

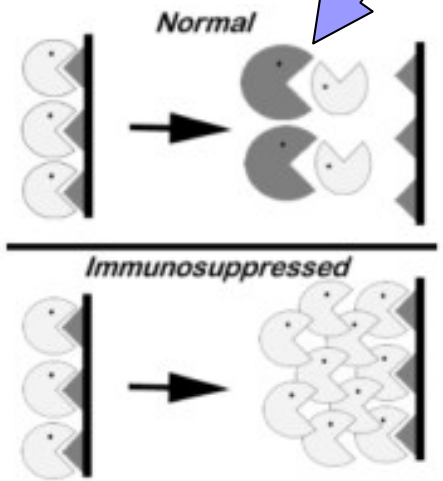
What condition are we trying to prevent when we irradiate?

Transfusion associated GVHD


Normal
Immunosuppressed

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

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

Manifestations of TaGVHD

Rash

Jaundice (liver inflammation)

Severe diarrhoea (gut inflammation)

Fever

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?

Relevant to Adult Haem-Onc practice:

- Hodgkins Lymphoma (lifelong)
- Fludarabine recipients (lifelong)
  - CLL – FCR, FMC, single agent
  - AML – FLAG
  - NHL – FC, single agent
- Other purine analogues/antagonists (lifelong)
  - cladribine, pentostatin, clofarabine, bendamustine
- Campath* (lifelong)
- Rabbit ATG** (lifelong?)

* Aplastic anaemia, CLL, some conditioning protocols

** Aplastic anaemia

So, who is at risk?

Relevant to Adult Haem-Onc practice (cont'd)

- Autologous transplant recipients
  - 7 days prior to harvest, then from conditioning until 3 months post transplant
- Auto patients receiving Total Body Irradiation (for 6 months)
- Allogeneic transplant recipients
  - From conditioning until 6 months post transplant
  - OR: lymphocytes greater than 1
  - OR: GVHD prophylaxis or treatment discontinues; if have ongoing GVH then irradiation continues indefinitely
- Bone marrow donors (seven days prior to donation)

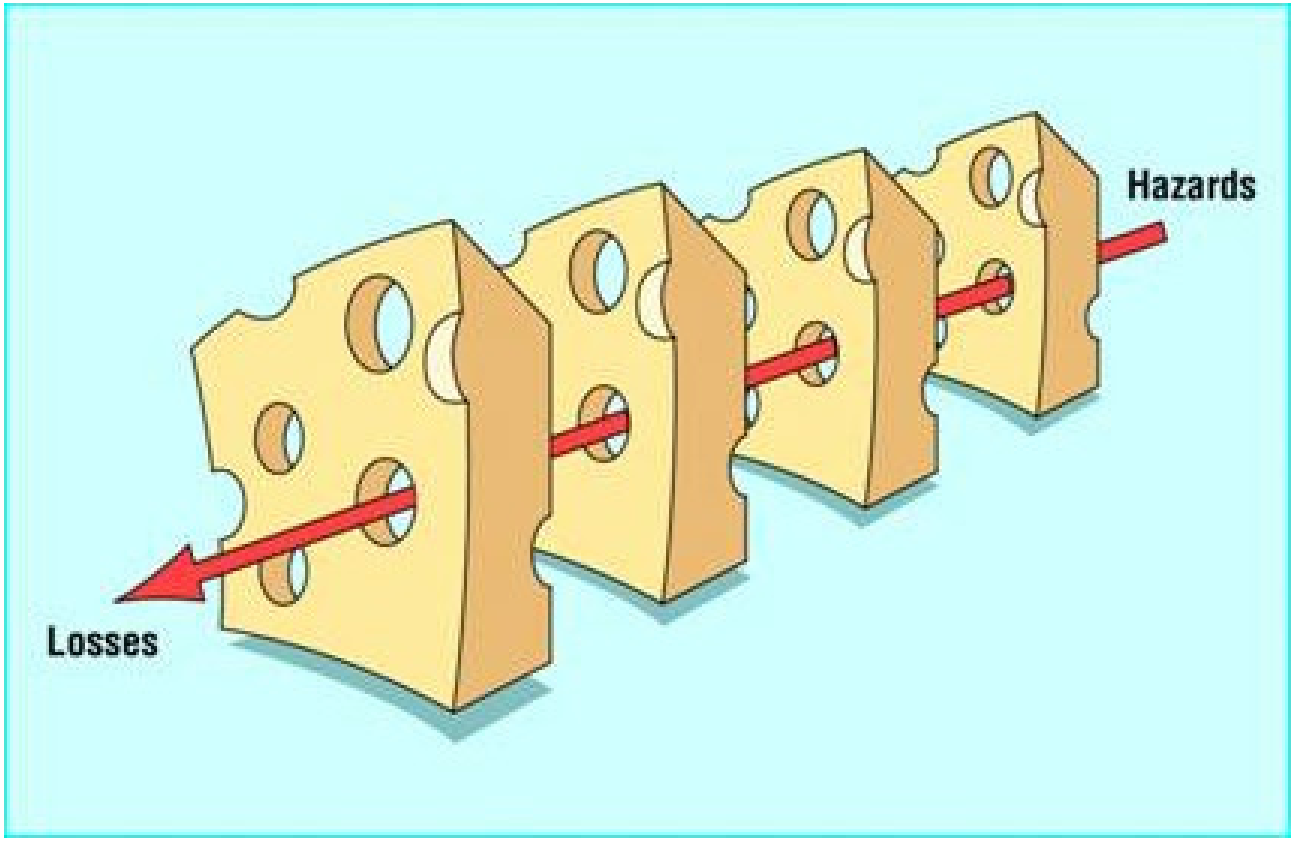
Who is at risk – rarer scenarios

- Donations from family members
- (HLA matched products)
- Intrauterine transfusions
- Neonatal exchange transfusions (if time allows)
- T lymphocyte deficiency syndromes (Di George etc)

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?



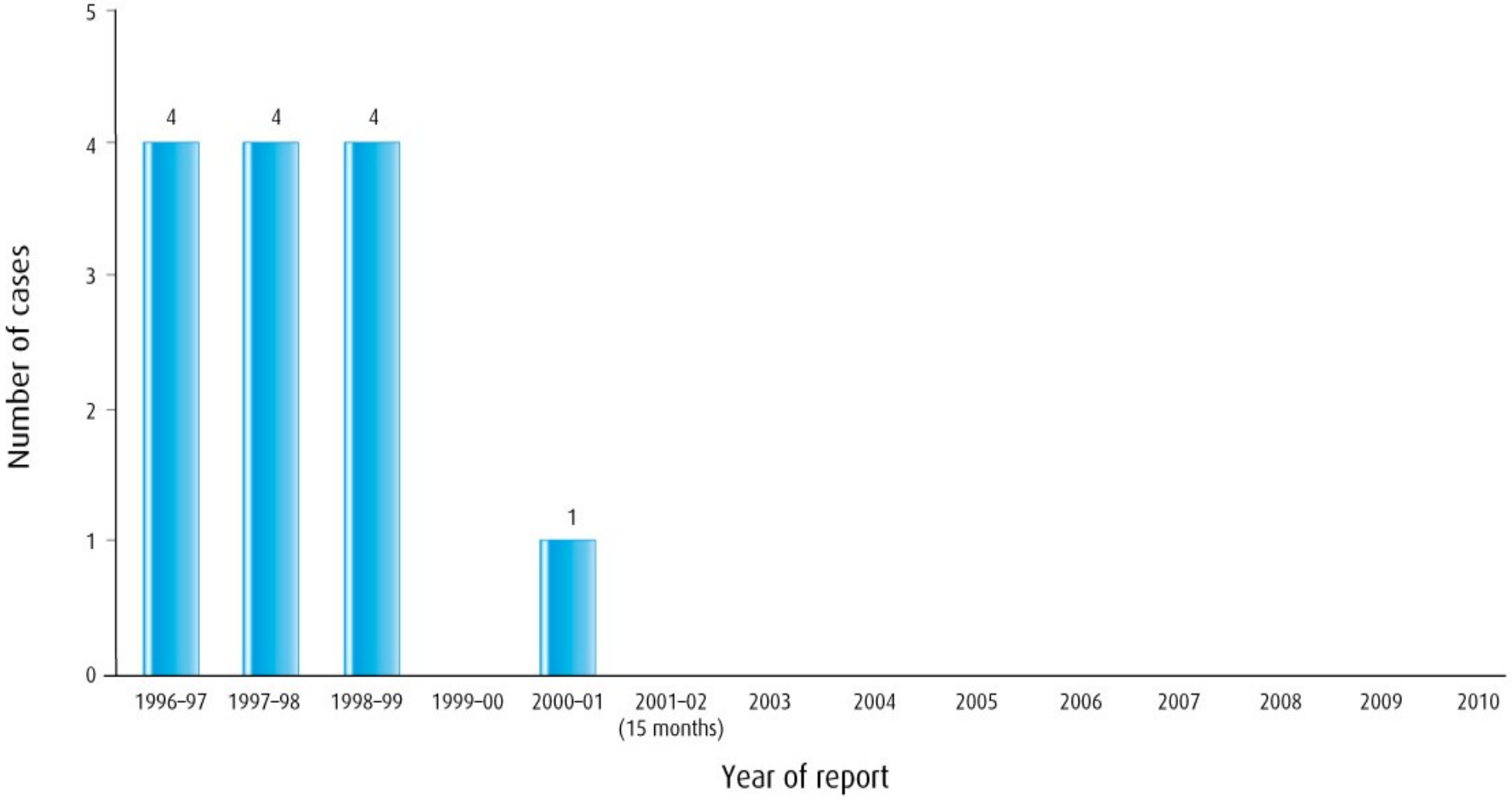
Who’s responsibility is it anyway?

- Communication is a big problem
  - Consultant/SpR
  - Pathologist
  - Pharmacist
  - Blood bank
  - Transplant centres
  - Prescribers
  - Nurse
  - Patient?

The good news

- Universal leucodepletion was introduced in 1999.
- No cases of TaGVHD have been reported since 2001 (and only once since leucodepletion began)
- 686 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!

Figure 17
Number of cases of TA-GvHD reported to SHOT each year



A Few Cases

- Who made the mistake?
- What could be done differently?

- **Wife’s knowledge overlooked by staff**

  A male undergoing chemotherapy for Hodgkin’s disease was to receive his first transfusion. The request was made by a consultant haematologist, who failed to request irradiated components and did not supply the patient with an NHS card. When admitted to the haematology ward the following day, the wife questioned the need for irradiated components but was reassured by the nursing staff that this was not necessary.

- **Correspondence from Transplant Centre in medical records**

  A patient was referred back to his local hospital following a stem cell transplant. The Transplant Centre had written a discharge summary, which had included the requirement for the patient to receive both irradiated and CMV negative blood components. However, this correspondence was not available in the case notes at the time of the transfusion and was only passed on to the team from medical records several days later.

- **Patient on fludarabine receives non-irradiated red cells despite pharmacy protocol**

  A hospital transfusion laboratory receives a monthly report from the pharmacy of the patients who have been prescribed fludarabine. However, a locum haematologist prescribed fludarabine in the middle of the month and failed to give the patient an alert card or annotate the patient's case notes or inform the laboratory. Later that month the patient was transfused with 2 units of non-irradiated red cells, prior to the laboratory being aware through the monthly pharmacy report of the requirement.

THANK YOU!

Questions?

Sources, references

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