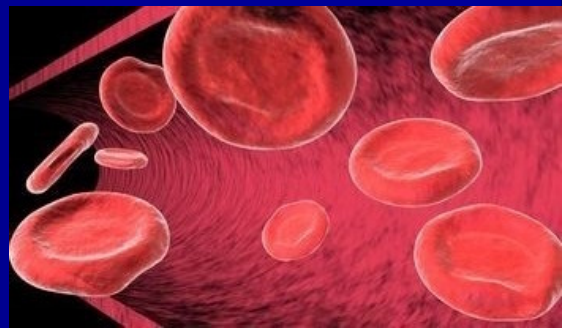
Do washed red cells decrease the frequency of HLA sensitisation?

Antony Aston



Objectives

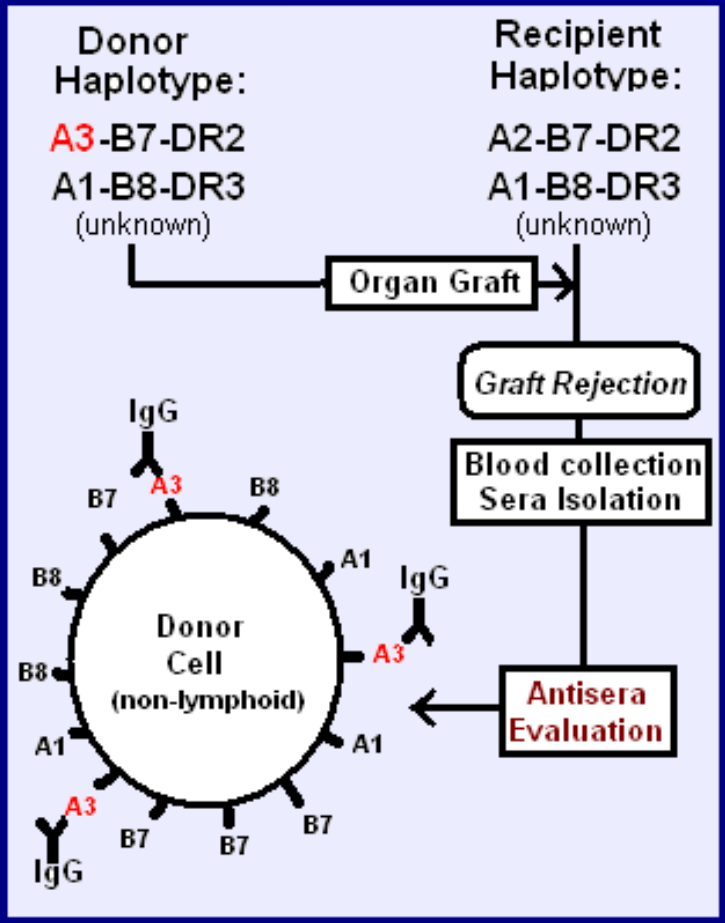
- HLA alloimmunisation
- Washed cell transfusions
- Aim
- Methods
- Results
- Suggestions for further review

Human Leucocyte Antigen

Foreign HLA proteins on transplanted organs induce antibodies against them

Donors & recipients are matched as closely as possible to prevent this

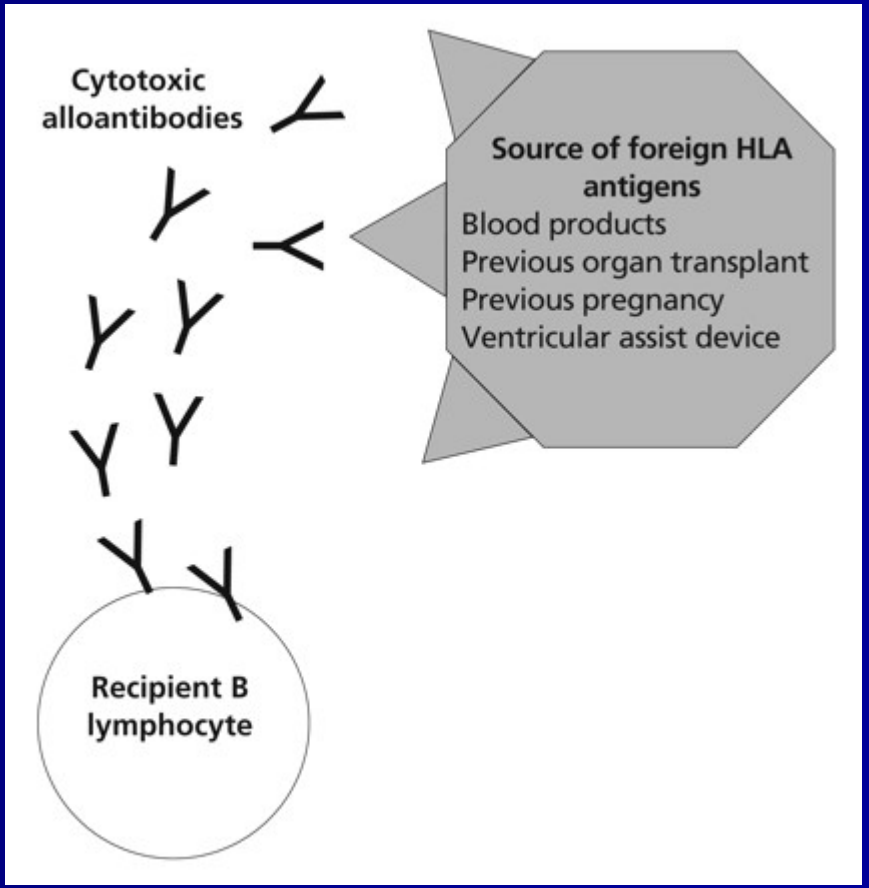
HLA antibodies are tested for when a patient is worked up for transplant



HLA alloimmunisation

How do you get sensitised?

- Transfusion of blood products
- Transplantation
- Pregnancy
- Other



Renal transplantation UNOS data

- "About 50% of patients who receive multiple transfusions develop antibodies"
- 30% of renal patients awaiting transplant are sensitised
- Highly sensitised patients: < 1% ever transplanted

United Network for Organ Sharing 2011

Aim

- Examine if washed cell transfusions reduce the incidence of HLA alloimmunisation in patients with Chronic Kidney Disease stage 4 or 5

Washed cells

- Theory
  - Supernatant in which donor blood is suspended contains debris (e.g. DNA, peptides, cell components)
  - Potentially inducing HLA sensitisation
- Removal of the supernatant could reduce the incidence of sensitisation
- Washed units available in Great Ormond Street from 2003

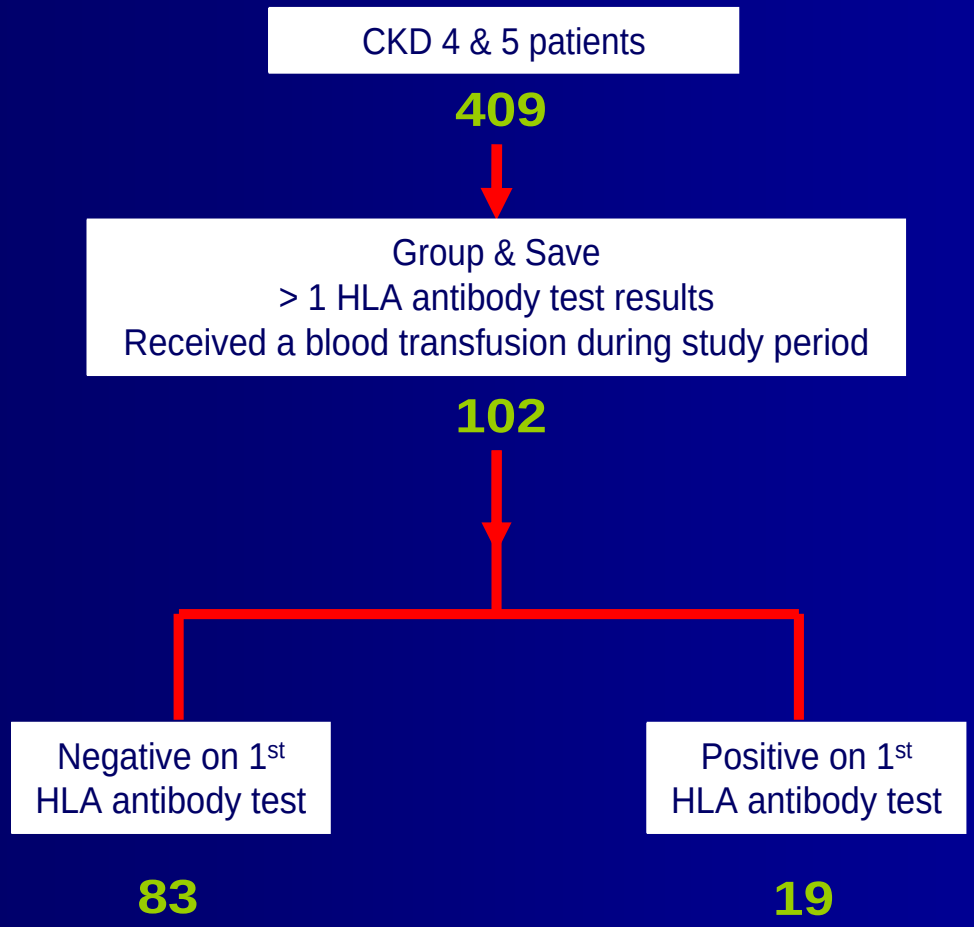
Inclusion criteria

- CKD 4+
- Group & Save
- Two or more HLA antibody test results
- Received a blood transfusion prior to any sensitisation and after their 1st HLA antibody test

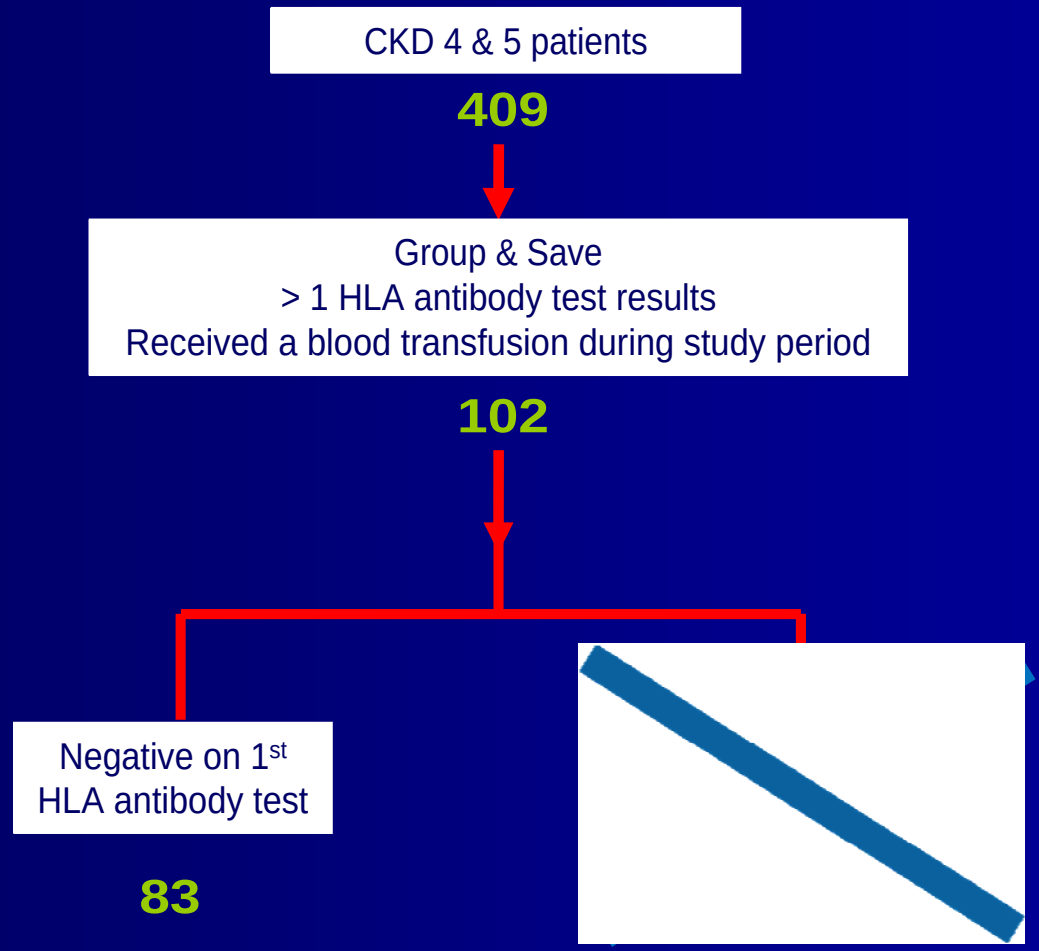
Excluded

- All results after patient has received a transplant of any kind
- All results after sensitisation
- Any pre-2000 blood transfusions

Patient breakdown (2000-2009)



Patient breakdown (2000-2009)



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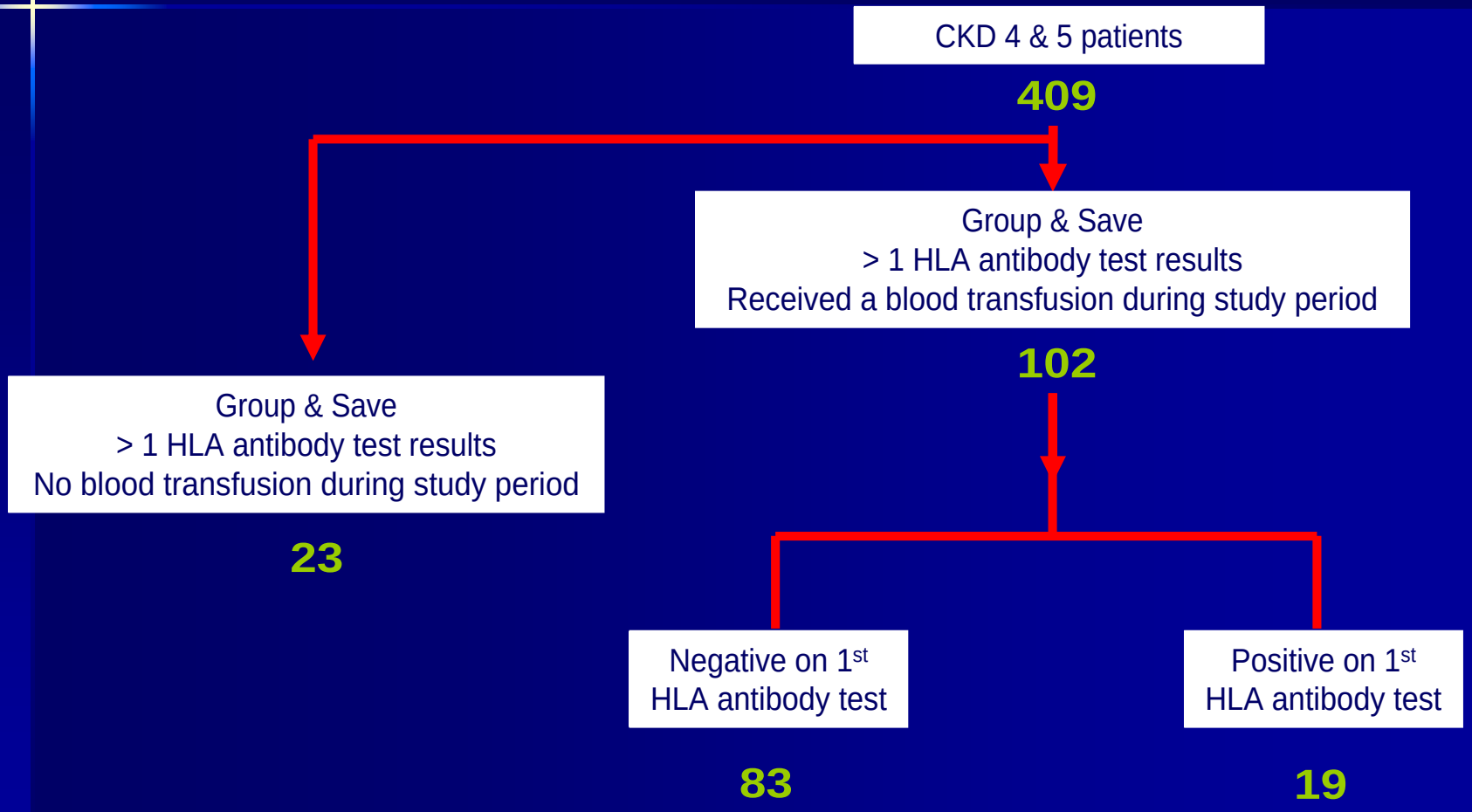

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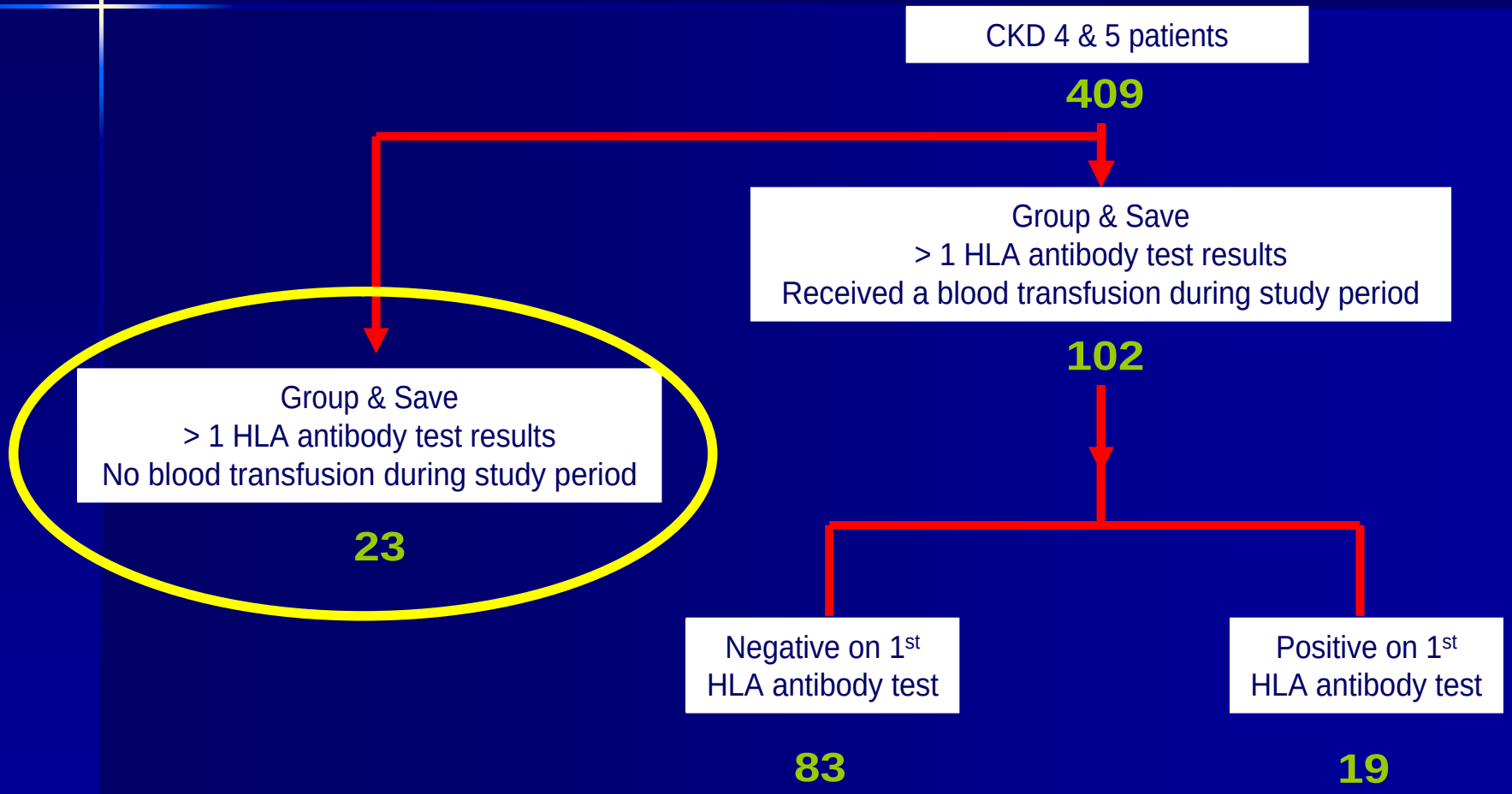

1st HLA results

- Negative 84%
- Positive 16%

1st HLA results

- Negative 84%
  - Of those 44% had received a transfusion pre-study
- Positive 16%
  - Of those 64% had received a transfusion pre-study

Groups

Using those who were negative at 1st testing and 2+ HLA antibody tests.

Groups

1. No transfusions 23

Groups

1. No transfusions **23**
2. Only washed transfusions **6**

Groups

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3. Only standard transfusions **59**

Groups

1. No transfusions **23**
2. Only washed transfusions **6**
3. Only standard transfusions **59**
4. Mixed washed and standard transfusions **18**

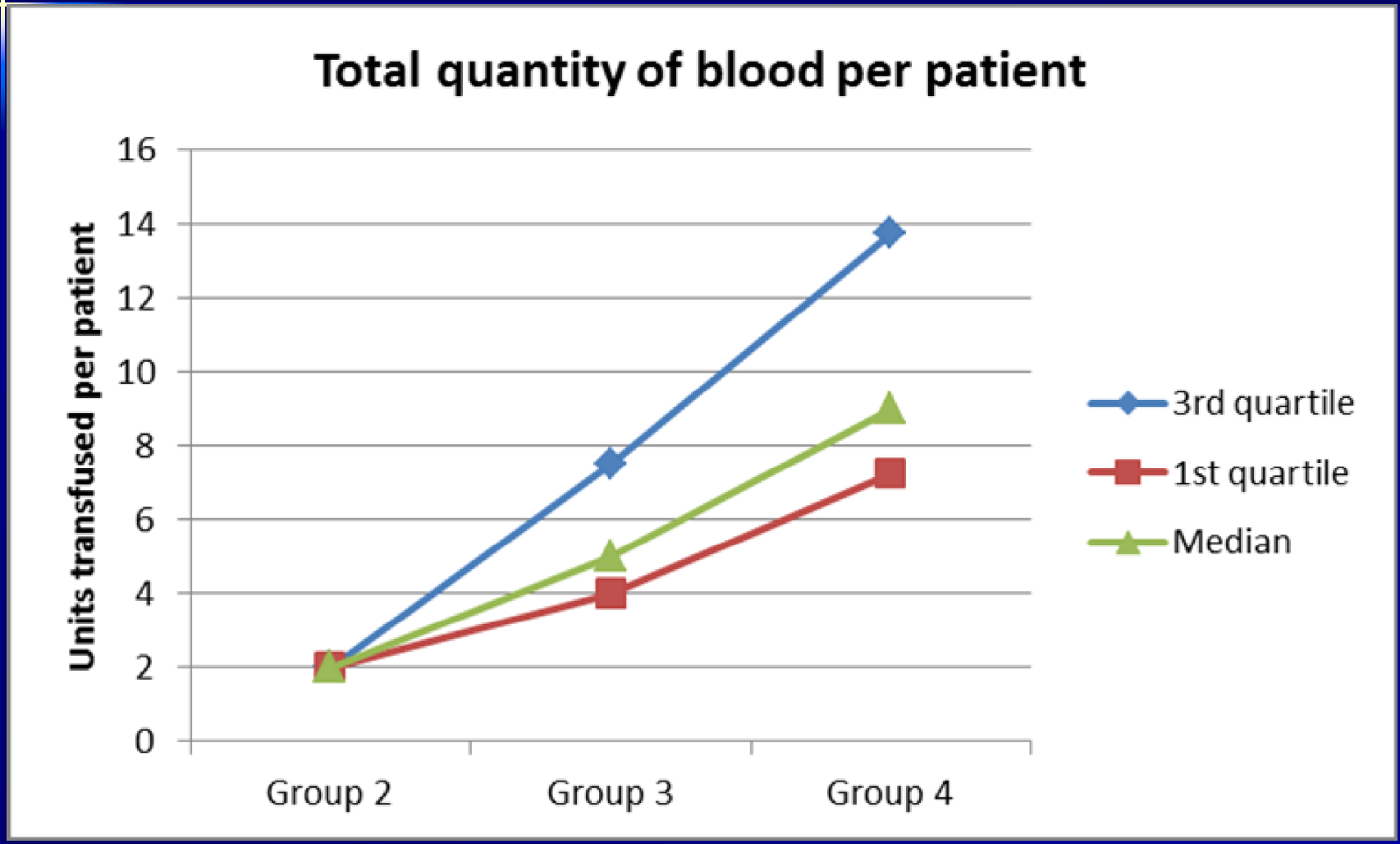
Factors

- Quantity of transfused blood
- Number of transfusions
- Frequency of transfusions

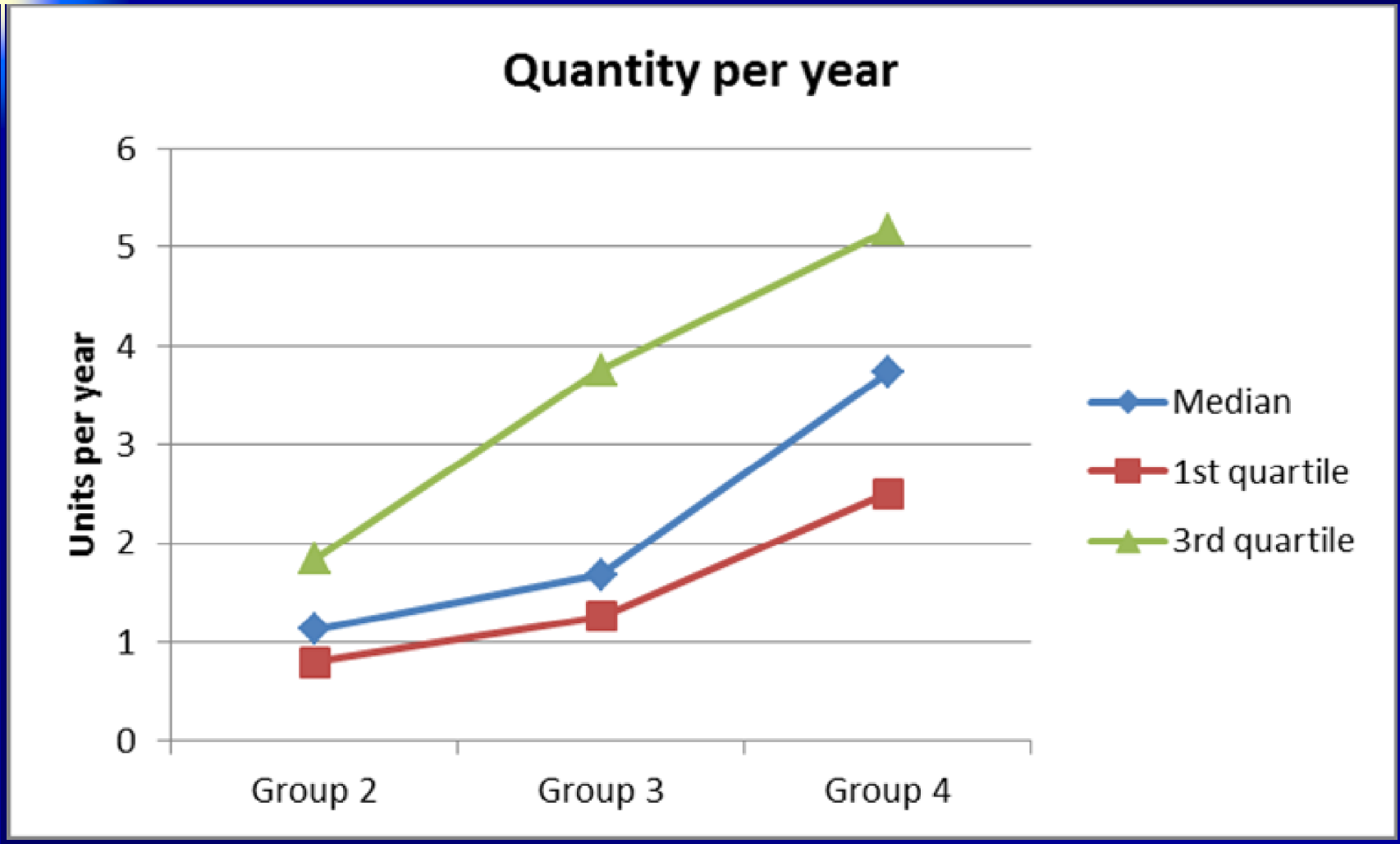
Factors

- Quantity of transfused blood (units)

Quantity of blood transfused



Quantity of blood transfused



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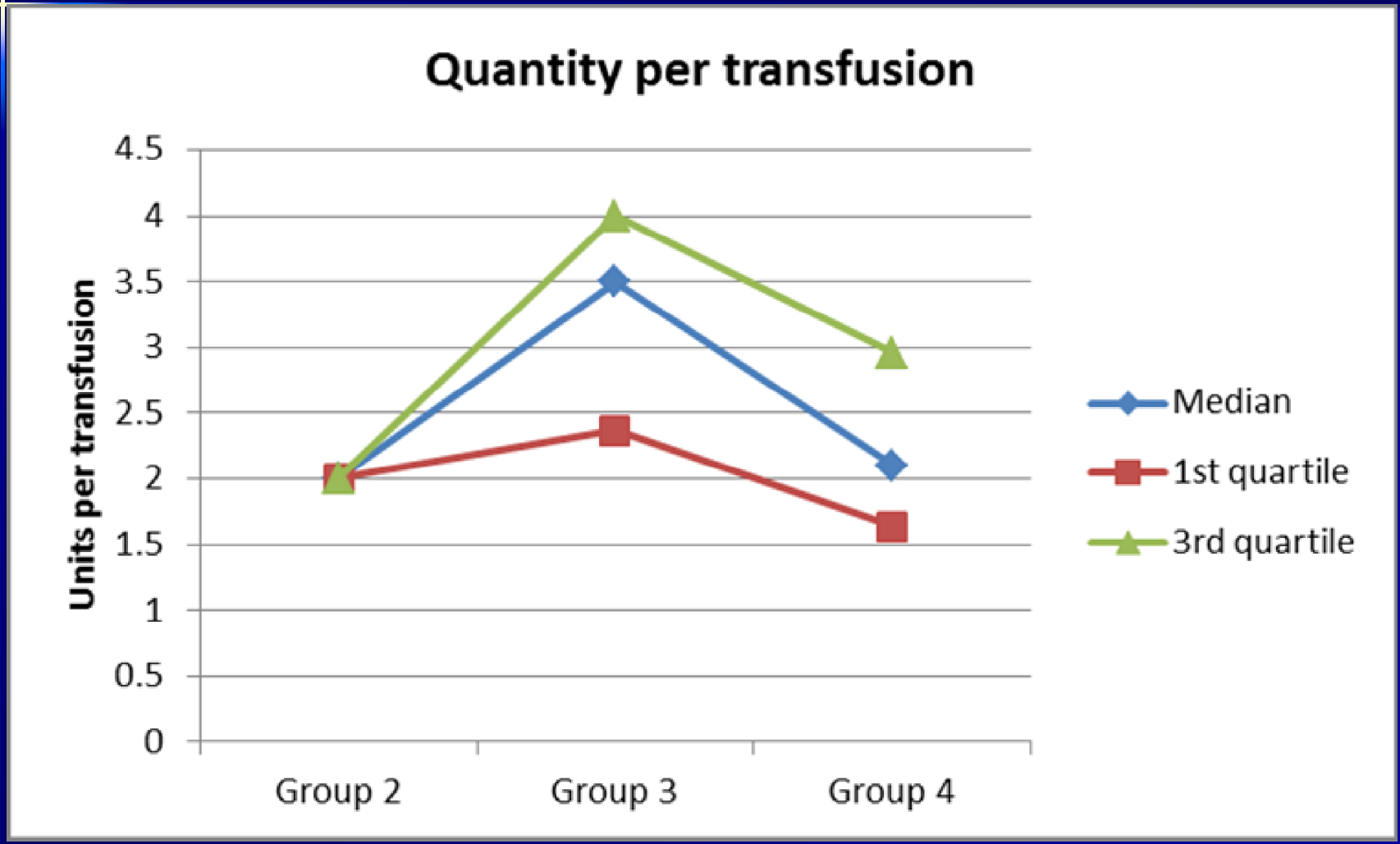
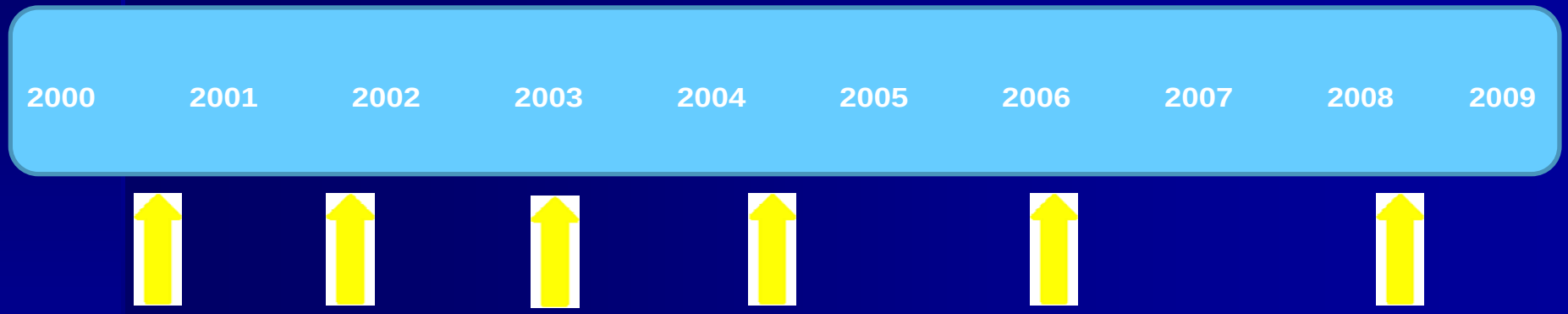


Factors

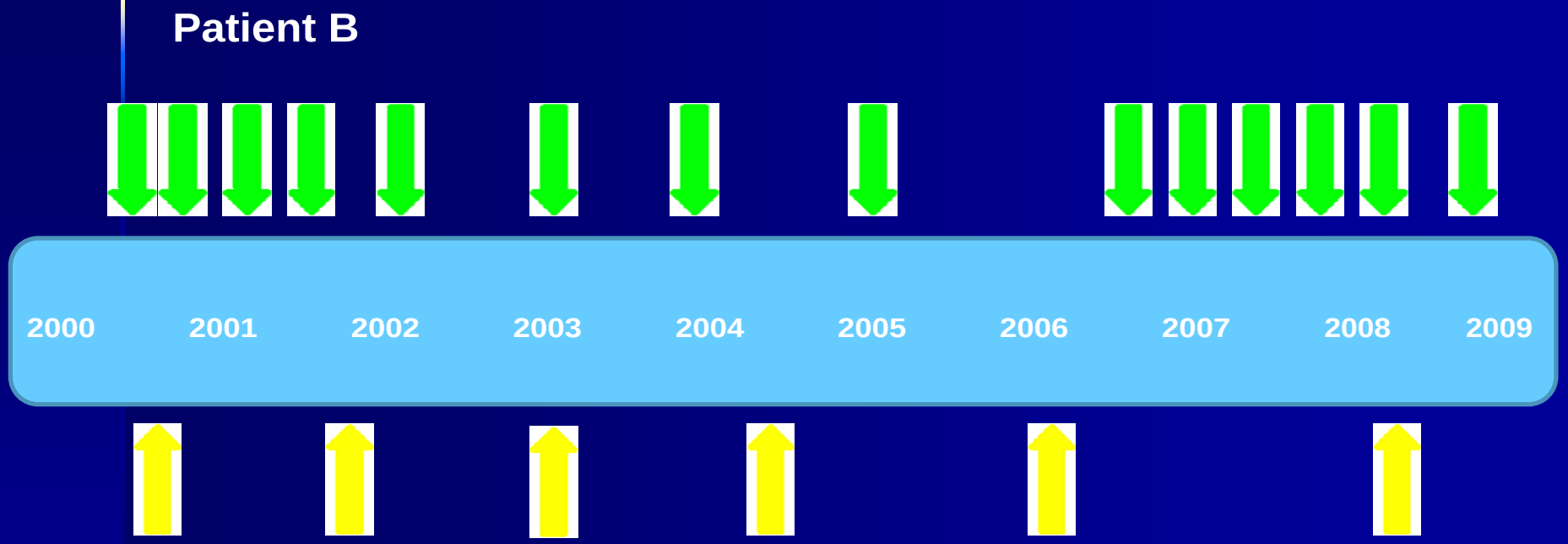
- Quantity of transfused blood
- Number of transfusions

No. of transfusions



Patient A

No. of transfusions



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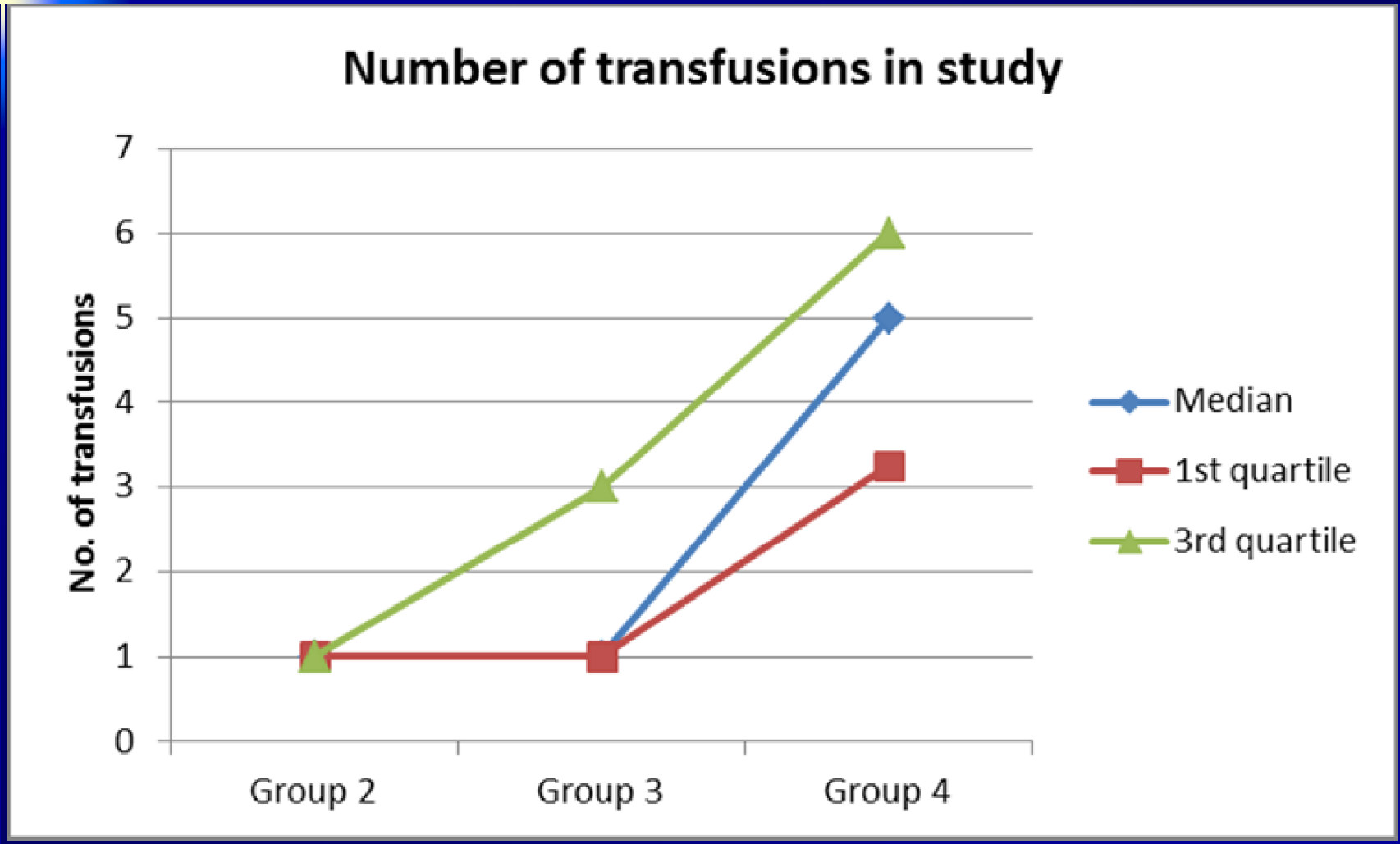

Factors

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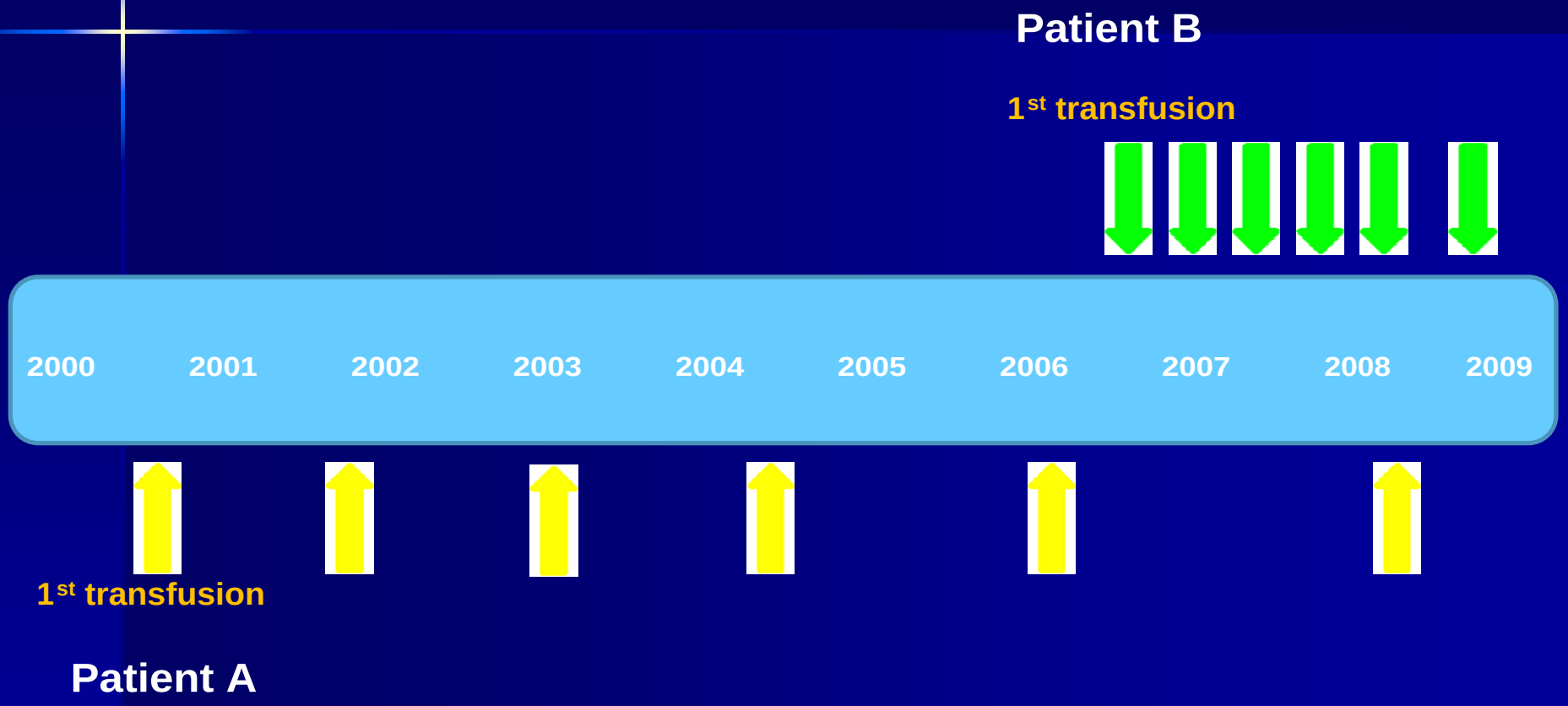
Frequency of transfusions



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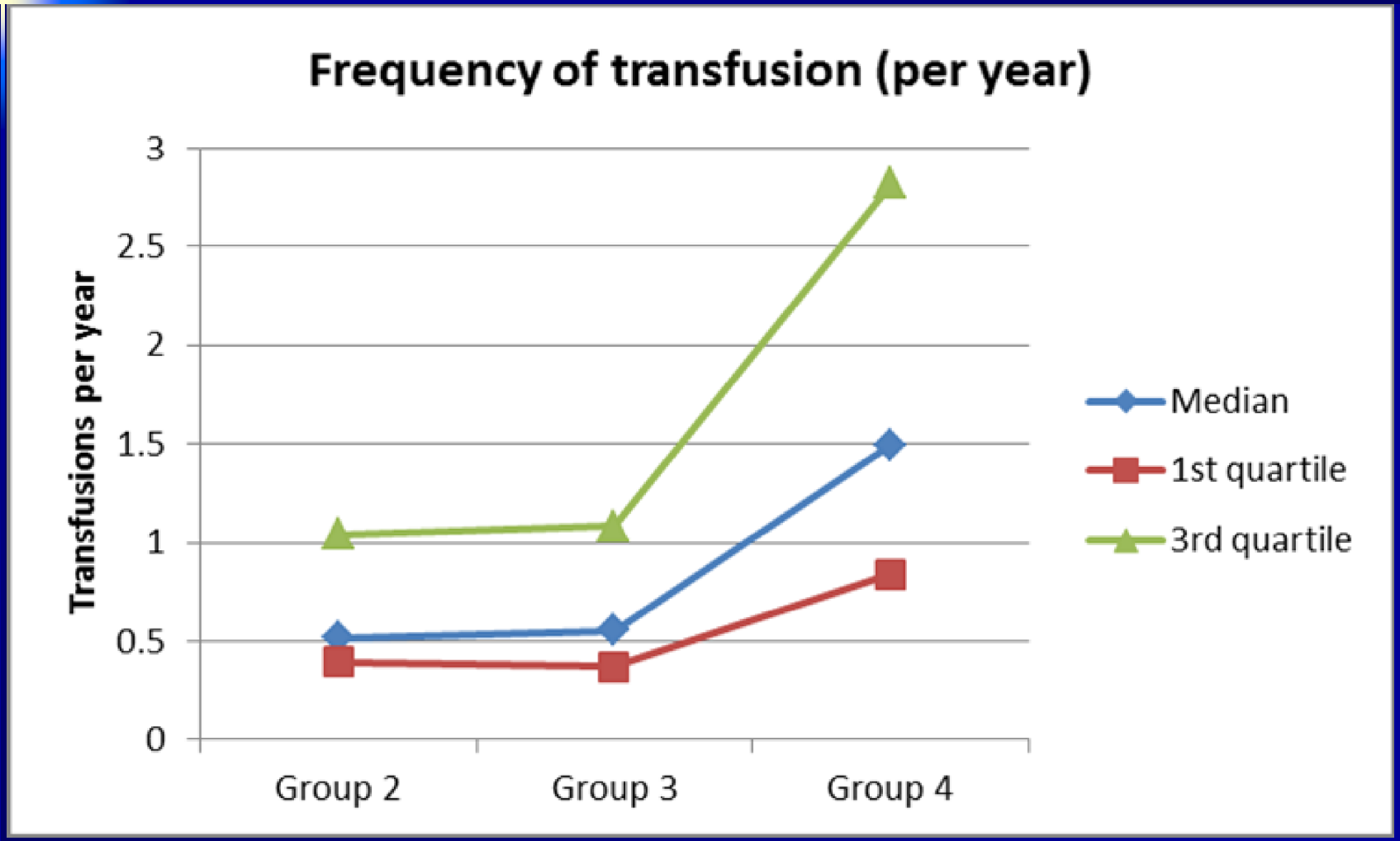

Sensitisation

		Total patient numbers	Observed sensitisation	
Group 1	No transfusions	23	6	26 %
Group 2	Washed transfusions only	6	1	16.7 %
Group 3	Standard transfusions only	59	28	44 %
Group 4	Mixed transfusions	18	8	44 %

< 1 year old

- Frequent blood priming of haemodialysis lines - exposed to multiple donors
- 7 patients tested under the age of 1 year
- 1 already sensitised

  (aged 7 months with no preceding transfusions)
- 1 developed antibodies
  - 1 transfusion (4 unwashed units) pre-sensitisation (incidence 17%)

< 1 year old

- The 6 negative on 1st HLA antibody testing received:
  - 48 units of blood (26 of those were washed units)
  - 5 transfusions per patient
  - 1.9 transfusions per year
  - 1.5 units per transfusion
  - 2.9 units per year

Other blood products

- Platelets
- FFP & cryoprecipitate

Limitations

- Does diagnosis make a difference?
- No ethnicity data
- No regular HLA testing (?missing transient sensitisation)
- Very few patients received only washed cell transfusions

Summary

- Higher rate of sensitisation in those receiving standard blood transfusions (26% vs. 44%)
- < 1 year old group
  - low rate of sensitisation despite frequent and large amount blood

Summary

- Possible reduction in sensitisation using washed cells
  - 16.7 % sensitisation rate (washed transfusions only)
  - Mixed transfusion group has same sensitisation rate as standard transfusions (44% vs. 44%)
  - Despite receiving more units of blood and more frequently than the other groups

Summary

- Possible reduction in sensitisation using washed cells
  - 16.7 % sensitisation rate (washed transfusions only)
  - Mixed transfusion group has same sensitisation rate as standard transfusions (44% vs. 44%)
  - Despite receiving more units of blood and more frequently than the other groups

BUT:

- Not statistically significant
- Small groups

Conclusion

- This data suggests that continuing using washed cell transfusions may reduce the incidence of HLA sensitisation
- Further research is needed for more definitive evidence

Suggestions

- Stricter regular HLA antibody assessment in addition to testing post sensitisation events

- British Transplant Society recommendations
  - Quarterly serum screening for patients (adult) awaiting renal transplantation.
  - Samples should also be submitted between 14 and 28 days following any known sensitising event (e.g. transfusion).

Thank you

- Dr Rees (Paediatric Nephrology Consultant, Great Ormond Street Hospital)
- Olivia Shaw (Serology Section Head, Clinical Transplantation Laboratory, Guys hospital)
- Sylvia Hennem (Specialist Practitioner of Transfusion, Great Ormond Street Hospital for Children)
- Helen Nulty (Specialist Practitioner of Transfusion, Great Ormond Street Hospital for Children)