

# **UK Living Kidney Sharing Scheme**

## **Breakout Session**

Lisa Burnapp

RC/LDC Induction, October 2020





# **Aim: Discussion**





## All about you and want you want to know



# **Possible Topics for discussion**

- 1. Background to the scheme
- 2. Why do we share living kidneys?
- 3. How does it work- matching runs and criteria; logistics; troubleshooting?
- 4. What are the challenges and what can we improve?
- 5. Who is and can be included in matching runs?
- 6. Who benefits- outcomes for patients and transplants?
- 7. International perspective and reputation?
- 8. Anything else?



# The Ambition

#### To match world class performance

Maximise opportunities for donors and recipients to contribute to and benefit from the UK Living Kidney Sharing Scheme (UKLKSS) by ensuring that it is clinically and cost effective

- 75% of matched donors proceed to donation and achieve maximum number of transplants
- All donors and recipients proceed to surgery within 8 weeks of a suitable match being identified





#### Living kidney donation Potential Donor-Recipient pair



- Blood group incompatibility
- Positive crossmatch

Approx 20-30% of possible living donor transplants

#### Background





• September 2006 Change in legal framework

Development of national scheme including matching algorithm\*

April 2007 First paired exchange matching run

First non-directed altruistic donation

Ongoing Review and refinement of the sharing schemes

\*Matching algorithm developed with University of Glasgow, Manlove et al

#### The scheme today - matching runs identify....



#### The scheme today - matching runs identify....





#### **Identifying Optimal Combination of Transplants**

- Over 200-300 pairs every 'matching run'
- This results in 2000-5000 arcs (donor-recipient matches)
- Arcs are weighted to give preference to certain matches
- Seek to maximise number of transplants according to criteria developed with transplant community



Acknowledgement: Tommy Muggleton

Matching software implemented by colleagues at University of Glasgow, School of Computing Science

## **Matching Principles**

#### Optimal Combination of Transplants<sup>1</sup>

- Maximise 2-way exchanges (inc. embedded in 3-way)
- Maximise number of transplants
- 3. Minimise 3-way exchanges
- 4. Maximise 3-way with embedded 2-way and long chains
- 5. Maximise 'score' of set of transplants

Score based on

- Previous matching runs for patient
- Sensitisation of patient
- HLA mismatch of identified transplant
- Donor-donor age difference

<sup>1</sup>Matching software implemented by colleagues at University of Glasgow, School of Computing Science

#### **Key Characteristics**

#### • UK-wide scheme; centrally run by NHSBT

- All UK transplant centres participate (adults & children)
- All work up complete
- Recipients can be registered with >1 donor
- Incompatible and compatible pairs
- Can define individual age & HLA match requirements
- Permit simple HLA or ABO incompatible transplants through scheme
- Simultaneous surgery preferred; kidneys travel
- Anonymity prior to surgery
- Annual timetable; quarterly matching runs
- 'Pre-run' to confirm inclusion of potential donor matches

 All recipients suspended from UK deceased donor transplant list once match identified

# **Underestimated the Scope**

- Compatible pairs
- Non-directed altruistic donors
- Chains v cycles
- Long waiting patients
  - Tailoring to immunological complexity
  - Ethnicity



#### UK scheme - largest in Europe





#### European Network for Collaboration on Kidney Exchange Programmes (ENCKEP)

Large, advanced programmes New, smaller programmes Programmes in development Countries with no programme





#### **Transplantation**

#### Building kidney exchange programmes in Europe - An overview of exchange practice and activities

Biró, P. et al. (2018) Building kidney exchange programmes in Europe - An overview of exchange practice and activities. <u>*Transplantation*</u>, (doi:10.1097/TP.000000000002432) (PMID:30247314) (Early Online Publication)

#### How do we manage what we have created?





# **Priorities**



- Maximise transplants
- Increase flexibility in the scheme
- Tackle non-proceeding transplants
- Improve access and awareness





#### **Increasing the Donor Pool**

- Inclusion of non-directed donors as a 'default'
- Inclusion of compatible pairs
- Desensitisation and low risk ABOi for highly sensitised recipients

#### **Non-directed Altruistic Donors (NDADs)**



		Total NDADs	NDADs direct to transplant list	NDADs donating to UKLKSS	Total transplants from 'Chains'	Total transplants from NDADs
	2012	60	57	3	6	63
	2013	107	85	22	44	129
<	2014	110	87	23	46	133
	2015	94	73	21	54	127
	2016	85	59	26	63	122
	2017	87	61	26	64	125
	2018	64	33	31	79	112
<	2019	102	50	53	136	186

# **Pair Inclusion by Matching Run**



Figure 4.2 Pairs included in matching runs, 1 April 2013 - 31 March 2019

Source: Annual Report on Living Donor Kidney Transplantation 2018/19, NHS Blood and Transplant

# **Compatible Pairs**

• In total, 206 patients have appeared in a matching run with a compatible donor

- 119 of these have received a transplant through the scheme
  - 71% matched in one matching run
  - 81 had a better HLA match
  - 42 had a better age match

29 had better age and HLA match

• Of those 87 not transplanted in the scheme, 63% appeared in 1 matching run only

# **Compatible Pairs**

	Number of transplants				
Transplant year	Compatible Pairs	Transplants completing the exchange	Total due to inclusion of compatible pairs		
2012	3	2	5		
2013	2	2	4		
2014	4	6	10		
2015	10	19	29		
2016	10	17	27		
2017	17	24	41		
2018	25	27	52		
2019	41	50	91		
	112	147	259		

## **Pair Inclusion by Centre**





Figure 4.3 Number of pairs included in matching runs, 1 April 2013 - 31 March 2019

\*Guy's team assess donors and perform transplants for GOSH recipients

Source: Annual Report on Living Donor Kidney Transplantation 2018/19, NHS Blood and Transplant

# **Compatible Pairs**

Figure 4.7





Patients transplanted by pair incompatibility in matching

\*Guy's team assess donors and perform transplants for GOSH recipients

Source: Annual Report on Living Donor Kidney Transplantation 2018/19, NHS Blood and Transplant

## **Increasing Flexibility**

- Recipient age and HLA preferences required at inclusion
- Simplified timetable of key dates for matching runs
- Non-simultaneous surgery
- Prioritisation for transplant for 'paired' recipients if they miss out on a transplant
- Designated weeks of surgery across all centres

#### Reducing non-proceeding transplants: Non-simultaneous surgery

- Introduced in 2015 to facilitate 'long chains' and logistically complex exchanges
  - Most due to theatre availability/capacity in individual centres
- Risk of transplants not proceeding associated with
  - Clinical reasons for staggering
- Extended intervals between transplants

• Low risk of non-proceeding transplants



#### Reducing non-proceeding transplants: Non-simultaneous surgery

- Introduced in 2015 to facilitate 'long chains' and logistically complex exchanges
  - Most due to theatre availability/capacity in individual centres

Risk of transplants not

- Clinical reasons for sta
- Extended intervals be

64 non-simultaneous exchanges have facilitated 172 transplants to date

• Low risk of non-proceeding transplants



## **Timeliness of Transplantation**





Figure 4.9 Centres meeting the 8 week standard, 1 April 2018 - 31 March 2019

Source: Annual Report on Living Donor Kidney Transplantation 2018/19, NHS Blood and Transplant

#### **Non-proceeding Transplants**





#### October 2017- July 2018 (46 reasons)



#### **Centre-Specific Data**





## **My Mantra**

# 'If in doubt, leave them out'



## **Improving Access and Awareness**

- Public and patient engagement
- Shared learning
- Annual activity and centre specific reports
- UK Living Donor Kidney Network meeting
- Quarterly newsletter and update
- Key contacts within ODT
- On-line decision-making resources<sup>1</sup>
- Extended portfolio of donor-recipient information<sup>2</sup>

<sup>1</sup>https://www.odt.nhs.uk/living-donation/living-donor-kidney-transplantation/ <sup>2</sup>https://www.organdonation.nhs.uk//about-donation/living-donation/

#### **NHS** Blood and Transplant

#### Information to support decision making



**NHS** Blood and Transplant



#### **Blood and Transplant**

	Deceased Donor	NLDKSS	ABOI	HLA
6 Months	-	-	-	-
1 Year		-	-	-
3 Years		-	-	

	Transplant Survival Rates					
	Deceased Donor	NLDKSS	ABOI	HLAI		
6 Months		-	•			
1 Year	-					
3 Years	-	-	-			

#### Disclaimer: The information is provided for guidance only

Note: Chances of transplant through the NLDKSS could be increased by considering and antibody incompatible transplant within the scheme For a more accurate estimation of waiting time for a deceased donor transplant based on more variables, please visit http://www.odt.nhs.uk/doc/chance of transplant.xls





Figure 2.2 shows the number of adult living donor kidney transplants performed in the UK between 1 April 2003 and 31 March 2018. The number of transplants increased from 412 in 2003/04 to 940 in 2017/18.



#### Incompatible Pairs Living Donor Information Application

Variable Select
Recipient Blood Group Select
Calculated Reaction Frequency
Donor Blood Group Select
ABO iTX with willing Donor Select
Recipient Age Select
Reset

http://www.odt.nhs.uk/living-donation

**NHS** Blood and Transplant



# **Attracting public attention**

The Guardian 10<sup>th</sup> November, 2018

BBC 'Hospital', 2019

# World Kidney Day- 14th March

#### UK's living kidney sharing scheme to hit 1000th transplants milestone this week Non-directed donors are 'game changers' in fight to cut kidney transplant

#### 11 March 2019

waiting list

NHS Blood and Transplant is marking the week of World Kidney Day (14 March) by announcing the 1000<sup>th</sup> kidney transplant under the UK Living Kidney Sharing Scheme (UKLKSS) is due to be carried out this week.

The scheme started in April 2007 because many 'difficult to match' patients had friends and family who wanted to donate a kidney but weren't a compatible match by blood group or tissue (HLA) type.

If the patient enters the sharing scheme with their friend or family member, the pair may be matched with another couple in the scheme so that each recipient receives a kidney from the other's friend or family member. This kidney exchange programme increases the number of people who can receive transplants from living kidney donors and the opportunities for patients who wait a long time for a transplant.

The latest 'matching run' to pair up donors and recipients has taken place and the resulting operations will lead to the 1000<sup>th</sup> transplant scheduled this week (the week commencing March 11). All donors and recipients in the scheme are anonymous and the transplant recipient who becomes the 1000<sup>th</sup> will come down to how operations are scheduled by hospitals this week.



f 🍠 in 🖴

#### Blood and Transplant

#### A new hope for those in need of a transplant **By Richard Branson** 28 May 2019 @richardbranson **f** 💙 in 🖂 Organ donation can be a difficult subject, it's something many of us find hard to talk about and often know little about. In doing so, we're missing out on some of the most exciting progress being made to SIGN UP TO THE save lives across the world.

#### Reach 251 million

#### 7000 unique views and social media posts

That's where living donation comes in - for those suffering from kidney disease, a transplant from a living donor is a much better option than a deceased donation. People who receive a kidney from a living donor usually live longer than those who receive one from a deceased donor and their statistical life expectancy is far longer than if they did not receive a kidney transplant at all.

Unfortunately, living donation isn't always straightforward. Depending on the country, 40% or more of recipients are incompatible with their intended donors. In some places, that means potential donors are simply turned away, forcing those in desperate need of a transplant to wait until another compatible donor turns up.

You don't have to know much about the organ donation system to realise that doesn't make much sense. That's why I was interested to learn about Kidney Exchange Programs (KEPs). KEPs increase the number of transplants by pooling and matching pairs of donors and recipients.

The matching process allows one previously incompatible donor-recipient pair, say a kidney patient and a family member willing to donate, to be matched with another pair. Under a KEP, donors are then swapped, resulting in two new compatible pairs. It can sound a little complicated but this video provides a clear explanation.

I was pleased to learn that the UK Living Kidney Sharing Scheme (UKLKSS) has become the largest operating KEP in Europe, allowing pairs to match in two and three-way swaps.



#### **Outcomes**



#### UK Living Kidney Sharing Schemes Performance Figures







#### **Adult living donor kidney transplants**





# **Antibody Incompatible Transplantation**

#### Adult

**NHS** Blood and Transplant



Paediatric

**NHS** Blood and Transplant





Source: Annual Report on Living Donor Kidney Transplantation 2018/19, NHS Blood and Transplant

# **Recipient CRF by Transplant Type**

#### **NHS** Blood and Transplant

#### Adult

**NHS** Blood and Transplant



Paediatric

**NHS** Blood and Transplant



ood and Transplant Source: Annual Report on Living Donor Kidney Transplantation 2018/19, NHS Blood and Transplant

Source: Annual Report on Living Donor Kidney Transplantation 2018/19, NHS Blood and Transplant



#### **Chance of transplant by blood group**

2012 - 2017

**Recipient ABO** 

		0	А	В	AB
	0	95/307	81/144	21/43	6/12
		(31%)	(56%)	(49%)	(50%)
Donor	А	106/429	56/192	27/57	2/14
ABO		(25%)	(29%)	(47%)	(14%)
	В	32/107	21/54	13/44	1/6
		(30%)	(39%)	(30%)	(17%)
		4/17	8/16	3/14	0/5
	AD	(24%)	(50%)	(21%)	(0%)

#### Chance of transplant by blood group

2012 - 2017

**Recipient ABO** 

		0	А	В	AB
	0	95/307	81/144	21/43	6/12
		(31%)	(56%)	(49%)	(50%)
Donor	А	106/429	56/192	27/57	2/14
ABO		(25%)	(29%)	(47%)	(14%)
	В	32/107	21/54	13/44	1/6
		(30%)	(39%)	(30%)	(17%)
		4/17	8/16	3/14	0/5
	AB	(24%)	(50%)	(21%)	(0%)

# **Recipient Ethnicity**

#### Adult

**NHS** Blood and Transplant



#### **Paediatric**

**NHS** Blood and Transplant



Source: Annual Report on Living Donor Kidney Transplantation 2018/19, NHS Blood and Transplant

Source: Annual Report on Living Donor Kidney Transplantation 2018/19, NHS Blood and Transplant

#### **The next revolution?**



#### Post 2020

- Continue to innovate and maximise transplant opportunities
  - –More compatible pairs; longer 'chains'; management of higher immune risk recipients within the scheme
- Enhance capacity to meet demand including timeliness of transplantation

-Collaboration between centres; IT solutions

Develop IT infrastructure to support

–Donor-recipient registration and organ offering; theatre scheduling and coordination between centres

• Explore options for collaboration with other European countries

–Partner in COST European Network for Collaboration on Kidney Exchange Programmes (ENCKEP)

-Identify possible EU partners for collaboration; set up MoUs

## **Summary**

- The UKLKSS has revolutionised the approach to antibody incompatible transplantation in the UK
- It is the largest national scheme in Europe- international reputation
- Continued evolution will help to make the most of every transplant opportunity to benefit patients waiting for a kidney transplant
- There is more to do!



## Resources

- <u>https://www.odt.nhs.uk/living-donation/uk-living-kidney-sharing-scheme</u>
- <u>https://www.organdonation.nhs.uk/become-a-living-donor/</u>
- <u>https://bts.org.uk/guidelines-standards/</u>
- http://www.giveakidney.org.uk/



#### Acknowledgements

NHS Blood and Transplant colleagues

Matthew Robb, Lisa Mumford, Rachel Johnson, Chloe Brown, Iain Harrison, Lin Shelper, David Clegg, Sam Thomas

University of Glasgow (matching algorithms) David Manlove, Peter Biro, Gregg O'Malley, James Trimble

Transplant centres and referring renal units

Kidney Advisory Group Chair, Chris Watson; CSO, Sue Fuggle

LDKT 2020 Strategy Implementation Group Chair, Aisling Courtney







**Blood and Transplant** 

NHS

# **BTS NHSBT LIVE 2021**

Online Congress 24-25 February

- 2 day educational programme
- Live streamed, online and on demand
- Networking opportunities
- 1:1 meetings, sponsored symposia
- CPD pending

