Kidney anatomy – Kidney Advisory Group
January 2023

Introduction

Kidney anatomy is verbally transmitted to ODT hub operations and then on to the accepting centres at the end of the retrieval operation, centres then consider this information before the communication loop returning to hub and then to the SNOD – at least 10 touch points. No other organ offering/accepting process has a similar 'anatomy' related call process.

The current process can be quite lengthy, may carry a risk of information accuracy, leads to delays in NORS teams leaving the donor hospital, increases CIT for the organs and results in a high volume of calls with multiple verbal transmission episodes of clinical data resulting in significant risk of potential of errors.

This proposal looks to remove anatomy calls where there is no surgical damage and when there is 'normal' anatomy therefore expediting the movement of both the kidneys and pancreas without delays at the donor hospital. 'Normal' kidney anatomy for the purposes of decision making in relation to this paper is defined as one artery on one patch, one vein, one ureter and no branches tied with no damage.

Data

NHSBT statistics team have reviewed all deceased donors between 1 October 2020 and 30 September 2022 to identify the time the SNOD called with the anatomy information and a spreadsheet provided by IMT, the transport provider, was used to obtain dispatch time from the donor hospital.

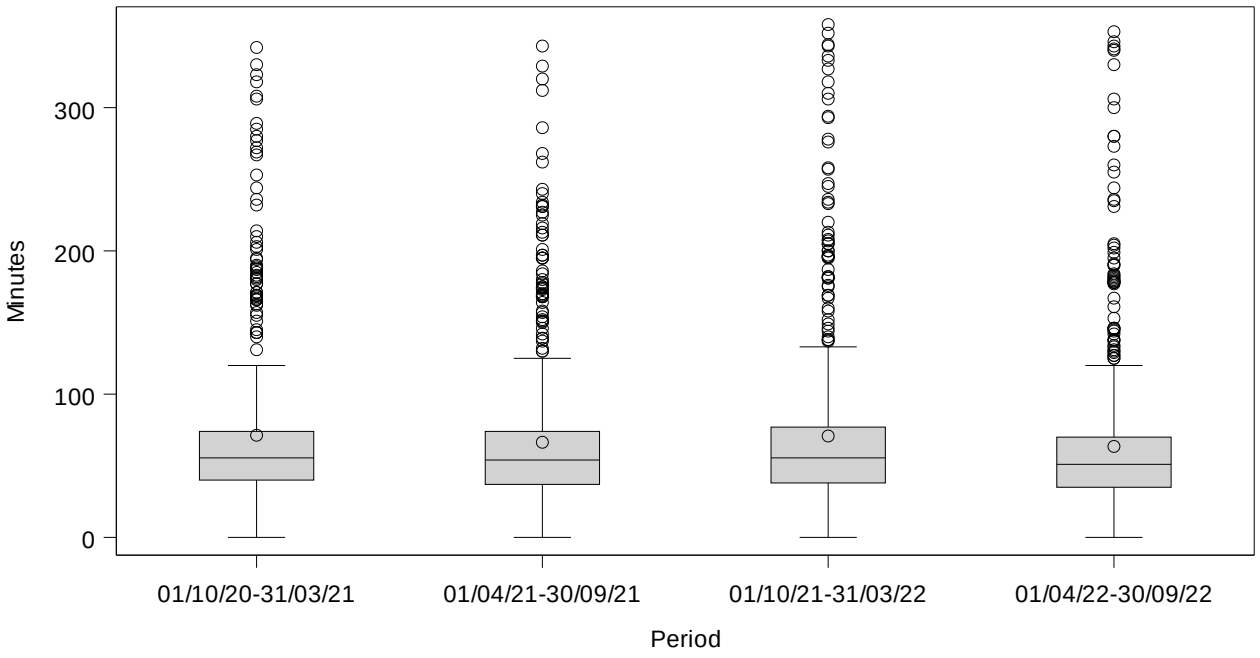
The following data is a summary of the duration of time it takes from SNOD call to the Hub with kidney anatomy to the point the kidney is dispatched. In the following tables and boxplot, a breakdown of medians (Inter-quartile range (IQR)) are shown in 6-month periods, as well as by SNOD team and by Abdominal NORS team. Data were not available for all cases and so total cases and reported cases are shown in the tables.

Table 1 **Median time from SNOD kidney anatomy call to kidney dispatch, by Period, 1 October 2020 – 30 September 2022**

Period	Number of cases	Reported cases	Median (IQR) in mins
01/10/20-31/03/21	634	454	56 (40-74)
01/04/21-30/09/21	808	602	54 (37-74)
01/10/21-31/03/22	731	550	56 (38-77)
01/04/22-30/09/22	809	598	51 (35-70)
Total	**2982**	**2204**	**54 (37-74)**

A Kruskal-Wallis test was performed, p=0.01, suggesting that there is statistical evidence to suggest a difference between the time periods.

Figure 1: **Boxplot of time from SNOD kidney anatomy call to kidney dispatch, by period, 1 October 2020 – 30 September 2022**



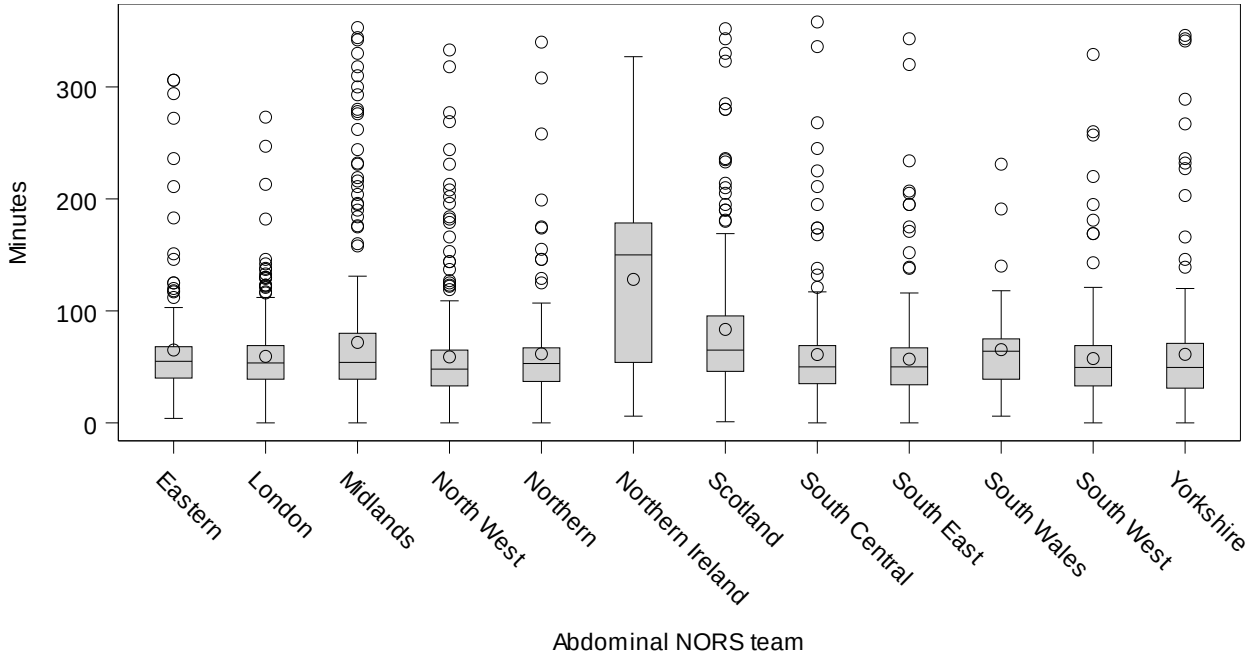
The data has been reviewed by SNOD and NORs teams and although there is some variation seen this may be explained by geographic location of the donation and logistics rather than any other contributing factor. See table 2 and 3 and figure 2 and 3.

SNOD team:

Table 2 **Median time from SNOD kidney anatomy call to kidney dispatch, by SNOD team, 1 October 2020 – 30 September 2022**

SNOD team	Number of cases	Reported cases	Median (IQR) in mins
Eastern	205	167	55 (40-68)
London	319	218	54 (39-69)
Midlands	441	293	54 (39-80)
North West	366	262	48 (33-65)
Northern	185	153	53 (37-67)
Northern Ireland	149	136	150 (54-179)
Scotland	209	168	65 (46-96)
South Central	252	179	50 (35-69)
South East	301	221	50 (34-67)
South Wales	80	61	64 (39-75)
South West	200	158	50 (33-69)
Yorkshire	275	188	50 (31-71)
Total	**2982**	**2204**	**54 (37-74)**

Figure 2: **Boxplot of time from SNOD kidney anatomy call to kidney dispatch, by SNOD team, 1 October 2020 – 30 September 2022**

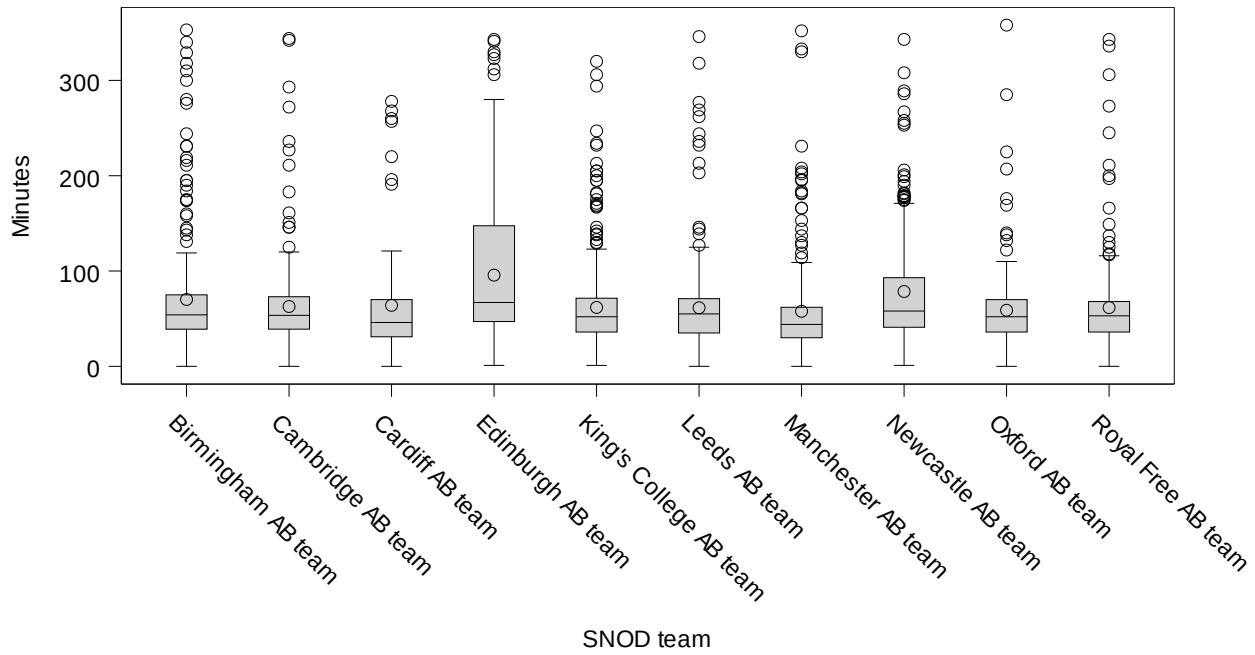


NORS team:

Table 3 Median time from SNOD kidney anatomy call to kidney dispatch, by abdominal NORS team, 1 October 2020 – 30 September 2022

Abdominal NORS team	Number of cases	Reported cases	Median (IQR) in mins
Birmingham AB team	381	272	54 (39-75)
Cambridge AB team	301	222	54 (39-73)
Cardiff AB team	101	73	46 (31-70)
Edinburgh AB team	281	244	67 (47-148)
King's College AB team	466	344	52 (36-72)
Leeds AB team	354	238	55 (35-71)
Manchester AB team	299	223	44 (30-62)
Newcastle AB team	285	218	58 (41-93)
Oxford AB team	246	171	52 (36-70)
Royal Free AB team	268	199	53 (36-68)
Total	**2982**	**2204**	**54 (37-74)**

Figure 3: Boxplot of time from SNOD kidney anatomy call to kidney dispatch, by Abdominal NORS team, 1 October 2020 – 30 September 2022



ODT Hub reviewed all anatomy given over a one-month period, they grouped the anatomy as either 'standard' – as no damage, no comments and no findings in theatres and 'non-standard' if damage was reported, there was any additional comments or findings in theatres.

	Anatomy outcomes	Declined followng anatomy call to centre	Declined on arrival at tx centre
Standard anatomy	39	5	0
non-standard anatomy	63	4	15

Of the 102 episodes with anatomy calls reviewed there were a total of 9 cases that were declined on anatomy – 5 which were defined as 'normal' and 4 where there was 'non standard anatomy'. There was a further 15 declines on inspection at the transplant centre.

NORS teams will only be aware of very gross anatomical issues as the organs are not fully 'benched' by retrieval teams. Definitive information on details such as number of blood vessels may not be available to NORS teams and any such information passed on to SNOD (and then on to hub and accepting teams) is not conclusive. The approx. 60min delay in dispatching the kidney results in CIT accrual not only for the kidney but also for associated organs eg: SPK.
Finally, no other organ offer/acceptance process (including liver and pancreas) has an 'anatomy call' built in with clinical teams receiving the organs as retrieved with a conversation between retrieval and accepting teams only if a gross abnormality is evident at retrieval.

Options for consideration

Option 1 – do nothing

- Pros – no changes for transplant centre or Hub operations
- Cons – avoidable CIT accumulation for the kidney +/- pancreas, continued risks of mis-communication with multiple verbal handovers, avoidable delays for NORs teams persist, continue to have separate process of kidneys vs other organs.

Option 2 – Stop all anatomy calls

- Pros – reduced CIT, allow NORs teams to leave donor hospital at the earliest opportunity, removes risk associated with multiple verbal handovers, same process as other organs
- Cons – risk of prolonged CIT in a small number of cases if a centre would have declined based on 'anatomy call' before dispatch.

Option 3 – expedite moving kidneys with 'normal' anatomy without calls to centres – if non-standard anatomy NORs surgeon to have a direct call with accepting centre.

- Pros – reduced CIT for majority of organs, encourages any 'non-standard' anatomy situations to have a clinical conversation, reduces avoidable delays to NORs teams.
- Cons – requires a clear definition of normal anatomy that can be easily operationally implemented by SNOD, NORs and Hub operations. Persistent risk of multiple episodes of verbal information handover for subset of offers.

Option 4 – agreed pathway dependent on anatomy and damage

A. **Normal anatomy, no damage**. No phone calls. Kidney dispatched without delay.
B. **Aberrant anatomy, no damage**. Images sent to recipient centre via Hub showing vessels and patch ostia and a scale, with SNOD phone number. No phone calls. Kidney dispatched without delay. Recipient surgeon can call SNOD to discuss with retrieval surgeon if required.
C. **Any anatomy, with damage**. Images provided as above plus other views as appropriate, along with a call from donor surgeon to recipient surgeon. Kidney can be dispatched anyway, or goes with NORS team, rather than waiting for outcome of re-offering.
    - **Pros -** reduced CIT, encourages kidney to be dispatched promptly on all occasions whilst providing a clear operational pathway for surgeons to contact SNOD / donor surgeon. Further encourages the use of imagining in support of retrieval and transplantation.
    - **Cons –** requires a clear definition of normal anatomy that can be easily operationally implemented by SNOD, NORs and Hub operations. May result in a late decline of a

kidney with aberrant anatomy, no damage or any anatomy, with damage requiring transport arrangements to change.

Recommendation:

The authors recommend option 4 which enables a reduction in CIT, proactive use of imaging where anatomy is not classified as normal or there is organ damage whilst further strengthening the benefit of direct clinical conversation when kidney damage has been identified. NHSBT Operational team will be responsible for operationalising.

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