

# Enhanced Recovery After Surgery (ERAS) in Transplantation

Carrie Scuffell

SME for ERAS in transplantation OTDT, NHSBT

ERAS

OUTPAT

ESIT

# Deceased donors, transplants and transplant waiting list

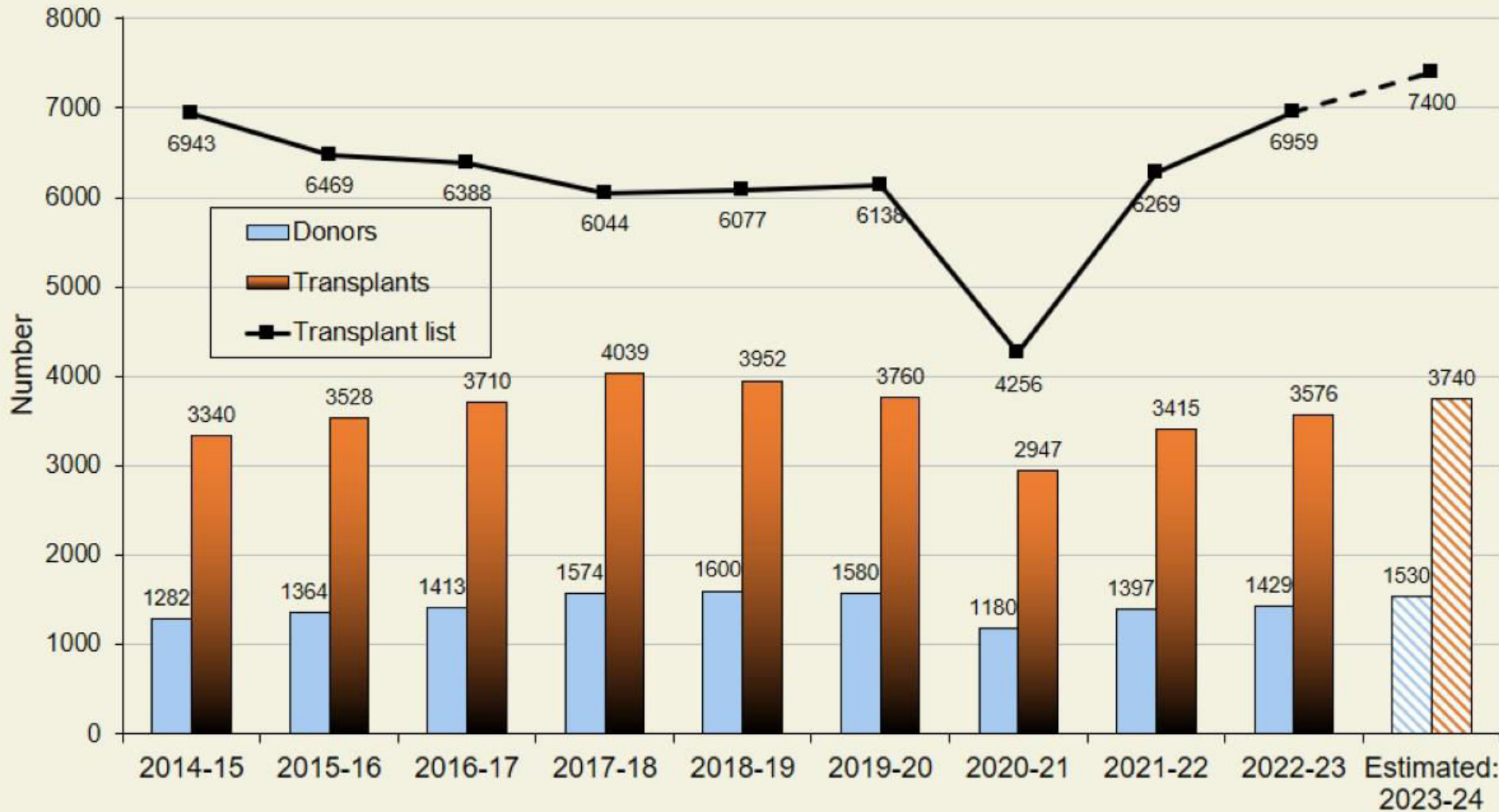


Blood and Transplant

Over the last year

Highest number of patients awaiting an organ transplant in last ten years

Increase in donors and transplants to those seen pre-pandemic



# OUDT origins



Blood and Transplant

The screenshot shows the GOV.UK website header with the text 'GOV.UK' and a search icon. Below the header is a breadcrumb trail: 'Home > Health and social care > Public health > Honouring the gift of donation: utilising organs for transplant'. The main content area features a large blue banner with the text 'Independent report Honouring the gift of donation: utilising organs for transplant - summary report of the Organ Utilisation Group' and 'Published 21 February 2023'. A large blue 'X' is overlaid on the page, and the text 'Organ Utilisation Programme' is written in blue to the left of the banner.

## Organ Utilisation Programme

### Social Care

intended to address how the barriers to organ transplantation could be overcome so that the UK was able to continue as a world-leader in innovation in the field of transplantation and no opportunity for a successful transplant operation was missed.

[View the Terms of Reference for the Organ Utilisation Group \(PDF 120KB\)](#)

Caring Expert Quality

# Introducing....

# rgan tilisation evelopment eam

- Strategy planning
- Clinical Leads for Utilisation
  - Lead and local CLU feedback
  - CLU community calls
  - National conference (NOUC) and CTU course
- Organ Utilisation (decline) meetings
- Offer review scheme

**Liz Armstrong**  
Head of Transplant Development  
**Laura Barton**  
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Get in touch



[OrganUtilisationDevelopmentTeam@nhsbt.nhs.uk](mailto:OrganUtilisationDevelopmentTeam@nhsbt.nhs.uk)

ERAS

OUTPAT

ESIT

# ESIT

## Environmental Sustainability in Transplantation

The screenshot shows the NHS Blood and Transplant website. At the top, there is a navigation bar with the NHS logo and links for 'Who we are', 'What we do', 'How we help', 'How you can help', 'Careers', and 'News'. Below this is a search bar and the text 'ODT CLINICAL'. A blue navigation menu contains links for 'Home', 'Deceased donation', 'Living donation', 'Retrieval', 'Transplantation', 'Statistics and reports', 'Information for patients', and 'ODT structure & standards'. The main content area shows the breadcrumb 'Home / Transplantation / Making transplantation green' and the title 'Making transplantation green'. Below the title is a section 'About the working group' with text describing the group's formation and purpose. At the bottom, there is a link to download a PDF of sustainability tips.

- Matt Wellbury-Smith (Project lead)
- Strategy planning
- Time frames



[ESIT@nhsbt.nhs.uk](mailto:ESIT@nhsbt.nhs.uk)

# Enhanced Recovery After Surgery (ERAS) in Transplantation

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- Background – What, where and why
- NHSBT UK project – Where we are and where we are going
- Is your centre an ERAS centre? How to get involved

# Background



**Professor Henrik Kehlet**

## Fast track programme 1997

- Shifted focus from individual changes in perioperative practice to combining multiple changes to improve outcomes.
- Combined interventions directly targeted at reducing surgical stress.
- Demonstrated reductions in length of hospital stay, fatigue and morbidity

# Background



Blood and Transplant

## 2001

Enhanced Recovery After Surgery (ERAS) Study Group.  
Group of six surgeons assembled by Professors Ken Fearon and Ollie Ljungqvist.



## 2010

The ERAS Study Group registered as a new non-profit organization in Sweden under the title 'the ERAS Society', including Professor Kehlet,

# ERAS<sup>®</sup> Society



**Caring Expert Quality**

- **Multimodal, pathway to help improve recovery**
  - Reduce surgical stress
  - Patient centred - encourages patient engagement and autonomy
  - Reduces the risk of complications
  - Better use of resources
  - Reduced Length of Stay (LOS)
  - Well established in many surgical specialties

Excellent  
safety profile  
and outcomes

- **‘Business as usual’ in other realms of surgery**



# ERAS<sup>®</sup> Society guidelines

## ERAS<sup>®</sup> Guidelines

Anaesthesia

Liver Transplant

Emergency Laparotomy

Orthopaedic

Bariatric

LMIC

Gastrectomy

Pancreatic

Breast

Lumbar Spinal Fusion

Gastrointestinal

Thoracic

Cardiac

Neonatal

Gynaecology

Urology

Colorectal

Obstetrics

Head & Neck

Vascular

Cytoreductive

Oesophagectomy

Liver

**in progress**

**Kidney Transplant**



## TRANSPLANT SURGERY

Ann R Coll Surg Engl 2022; 000: 1-7  
doi 10.1308/rcsann.2021.0365

### A national survey on enhanced recovery for renal transplant recipients: current practices and trends in the UK

A Amer, C Scuffell, F Downen, CH Wilson, DM Manas

Freeman Hospital, UK

#### ABSTRACT

**Introduction** Enhanced recovery after surgery (ERAS) is well established in many specialties but has not been widely adopted in renal transplantation. The aim of this survey was to understand current national practices and sentiment concerning ERAS for renal transplant recipients in the UK.

**Methodology** A national web-based survey was sent to consultant surgeons at all 23 UK adult renal transplant units. Completed questionnaires were collected between May and July 2020. Data were analysed according to individual responses and grouped according to the existence of formal ERAS pathways within units.

**Results** All transplant units were represented in this survey. Three units had a formal ERAS pathway for all recipients. Of the remaining units, 65.9% considered implementing an ERAS pathway in the near future. The most commonly perceived barrier to ERAS implementation was 'embedded culture within transplant units' (54.8% of respondents). A fifth of respondents insert surgical drains selectively and 11.7% routinely discontinue patient-controlled analgesia on postoperative day 1. Most respondents routinely remove urinary catheters on day 5 (70%) and ureteric stents 4-6 weeks post-transplantation (81.7%). Median length of stay for deceased donor kidney transplant recipients was lower in units with ERAS programmes (5-7 days versus 8-10 days, respectively). The main cited barriers for discharge were 'suboptimal fluid balance' and 'requirement of treatment for rejection'.

**Conclusions** Despite slow uptake of ERAS in kidney transplantation, appetite appears to be increasing, particularly in the post-COVID-19 era. The current practice and opinions of transplant specialists highlighted in this survey may help to establish nationally agreed ERAS guidelines in this field.

National web-based survey

Snapshot of current national practices  
across all 23 UK transplant centres

ERAS  
pathway in 6 of  
23 units

↓ LOS  
In units with ERAS  
programme

66%  
considering  
ERAS within 12  
months

# Evidence

> *Exp Clin Transplant*. 2018 Apr;16(2):127-132. doi: 10.6002/ect.2016.0304. Epub 2017 Aug 24.

## A Better Journey for Patients, a Better Deal for the NHS: The Successful Implementation of an Enhanced Recovery Program After Renal Transplant Surgery

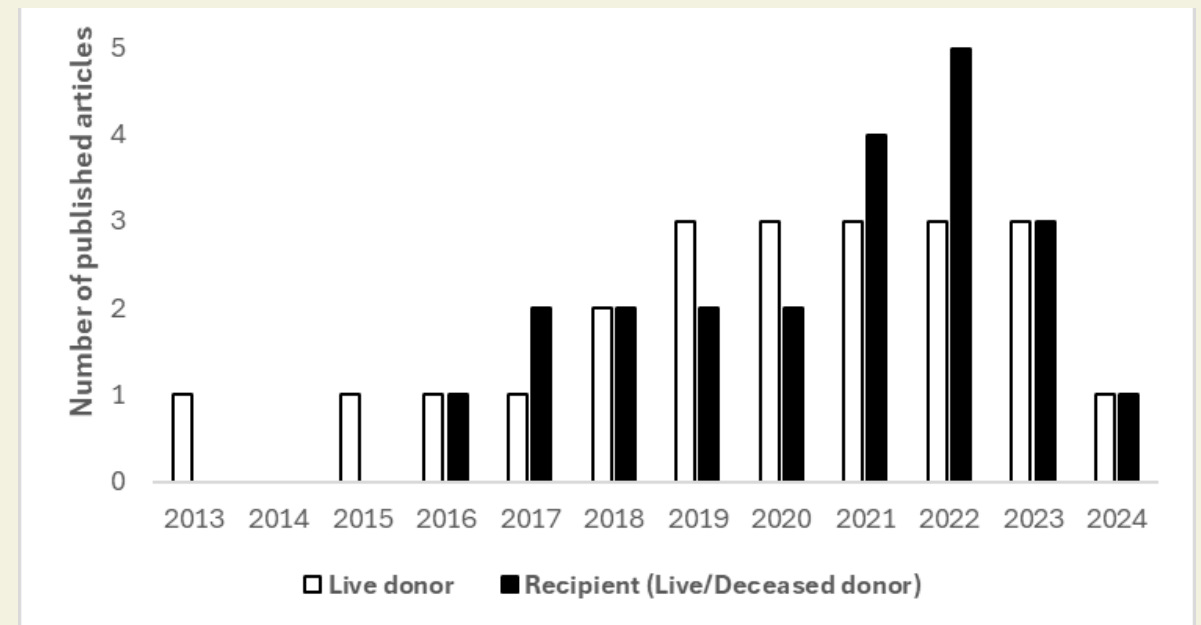
Ahmed Halawa<sup>1</sup>, Stephen Rowe, Fleur Roberts, Chidambaram Nathan, Ahmed Hassan, Avneesh Kumar, Branislav Suvakov, Ben Edwards, Cavin Gray



Clinical Trial > *ANZ J Surg*. 2019 Oct;89(10):1319-1323. doi: 10.1111/ans.15461. Epub 2019 Oct 1.

## Development and implementation of an enhanced recovery after surgery protocol for renal transplantation

Brendan H Dias<sup>1</sup>, Abdul Ahad Muhammad Rana<sup>1</sup>, Santosh A Olakkengil<sup>1</sup>, Christine H Russell<sup>1</sup>, Patrick T H Coates<sup>1</sup>, Philip A Clayton<sup>1</sup>, Shantanu Bhattacharjya<sup>1</sup>





**Clinical TRANSPLANTATION**  
The Journal of Clinical and Translational Research

ORIGINAL ARTICLE

**Enhanced recovery after surgery programs improve short-term outcomes after liver transplantation—A systematic review and meta-analysis**

Pascale Tinguely, Nolitha Morare, Alejandro Ramirez-Del Val, Marina Berenguer, Claus U. Niemann, Joerg M. Pollok, Dimitri A. Raptis, Michael Spiro

First published: 11 August 2021 | <https://doi.org/10.1111/ctr>

**Enhanced recovery for liver transplantation: recommendations from the 2022 International Liver Transplantation Society consensus conference**

Joerg M Pollok\*, Pascale Tinguely\*, Marina Berenguer, Claus U Niemann, Dimitri A Raptis, Michael Spiro, on behalf of the ERAS4OLT.org collaborative†

*Lancet Gastroenterol Hepatol* 2023; 8: 521-94

This online publication has been corrected. The corrected version first appeared at [thelancet.com/gastrohep](https://www.thelancet.com/gastrohep) on Jan 5, 2023

\*Joint first authors  
†Joint last authors  
‡Members are listed in appendix p 13

Clinical Service of HPB Surgery and Liver Transplantation (Prof J M Pollok PhD MD, P Tinguely MD, D A Raptis PhD MD), Department of Anaesthesia and Intensive Care Medicine (M Spiro MD), and The Royal Free Perioperative Research Group (M Spiro), Royal Free

There is much controversy regarding enhanced recovery for recipients of liver transplants from deceased and living donors. The objectives of this Review were to summarise current knowledge on individual enhanced recovery elements on short-term outcomes, identify key components for comprehensive pathways, and create internationally accepted guidelines on enhanced recovery for liver-transplant recipients. The ERAS4OLT.org collaborative partnered by the International Liver Transplantation Society performed systematic literature reviews on the effect of 32 relevant enhanced perioperative recovery elements on short-term outcomes, and global specialists prepared expert statements on deceased and living donor liver transplantation. The Grading Recommendations, Assessment, Development and Evaluations approach was used for rating of quality of evidence and grading of recommendations. A virtual international consensus conference was held in January, 2022, in which results were presented, voted on by the audience, and discussed by an independent international jury of eight members, applying the Danish model of consensus. 273 liver transplantation specialists from 30 countries prepared expert statements on elements of enhanced recovery for liver transplantation based on the systematic literature reviews. The consensus conference yielded 80 final recommendations, covering aspects of enhanced recovery for preoperative assessment and optimisation, intraoperative surgical and anaesthetic conduct, and postoperative management for the recipients of liver transplants from both deceased and living donors, and for the living donor. The recommendations represent a comprehensive overview of the relevant elements and areas of enhanced recovery for liver transplantation. These internationally established guidelines could direct the development of enhanced recovery programmes worldwide, allowing adjustments according to local resources and practices.

**ERAS<sup>®</sup> Society**  
guidelines

**Transplantation**

Articles & Issues | Editor's Picks | Collections | Social Media | For Authors | Journal Info

ORIGINAL CLINICAL SCIENCE—LIVER

**Guidelines for Perioperative Care for Liver Transplantation: Enhanced Recovery After Surgery (ERAS) Recommendations**

Brustia, Raffaele MD<sup>1,2</sup>; Monseil, Antoine MD, PhD<sup>3,4,5</sup>; Skurzak, Stefano MD<sup>6</sup>; Schiffer, Eduardo MD<sup>7</sup>; Carrier, François Martin MD, PhD<sup>8,9,10</sup>; Patrono, Damiano MD, PhD<sup>11</sup>; Kaba, Abdourahmane MD, PhD<sup>12</sup>; Detry, Olivier MD, PhD<sup>13</sup>; Matbouisson, Luiz MD<sup>14</sup>; Andraus, Wellington MD, PhD<sup>15</sup>; Vandenbroucke-Menu, Franck MD<sup>16</sup>; Biancofiore, Gianni MD, PhD<sup>17</sup>; Kaido, Toshimi MD, PhD<sup>18</sup>; Compagnon, Philippe MD, PhD<sup>19</sup>; Uemoto, Shinji MD<sup>18</sup>; Rodriguez Laiz, Gonzalo MD, PhD<sup>20</sup>; De Boer, Marieke MD, PhD<sup>21</sup>; Orloff, Susan MD, PhD<sup>22</sup>; Melgar, Paola MD, PhD<sup>20</sup>; Buis, Carlijn MD, PhD<sup>21</sup>; Zeillemaker-Hoekstra, Miriam MD, PhD<sup>23</sup>; Usher, Helen MD<sup>24</sup>; Reyntjens, Koen MD<sup>25</sup>; Baird, Emily MD, PhD<sup>26</sup>; Demartines, Nicolas MD<sup>27</sup>; Wigmore, Stephen MD<sup>28</sup>; Scatton, Olivier MD, PhD<sup>29</sup>

Author Information@

*Transplantation* 106(3):p 552-561, March 2022. | DOI: 10.1097/TP.0000000000003808

FREE SDC

Metrics



## To facilitate a UK-wide roll out of ERAS in Transplantation by\*

- Drawing from existing best practice
- Providing a repository of evidence-based resources to support adoption of ERAS in centres
- Started with adult kidney transplant recipients
- Scope to include other organs and living donors

Key deliverable for the Implementation and Steering  
Organ Utilisation (ISOU) Group<sup>1</sup>

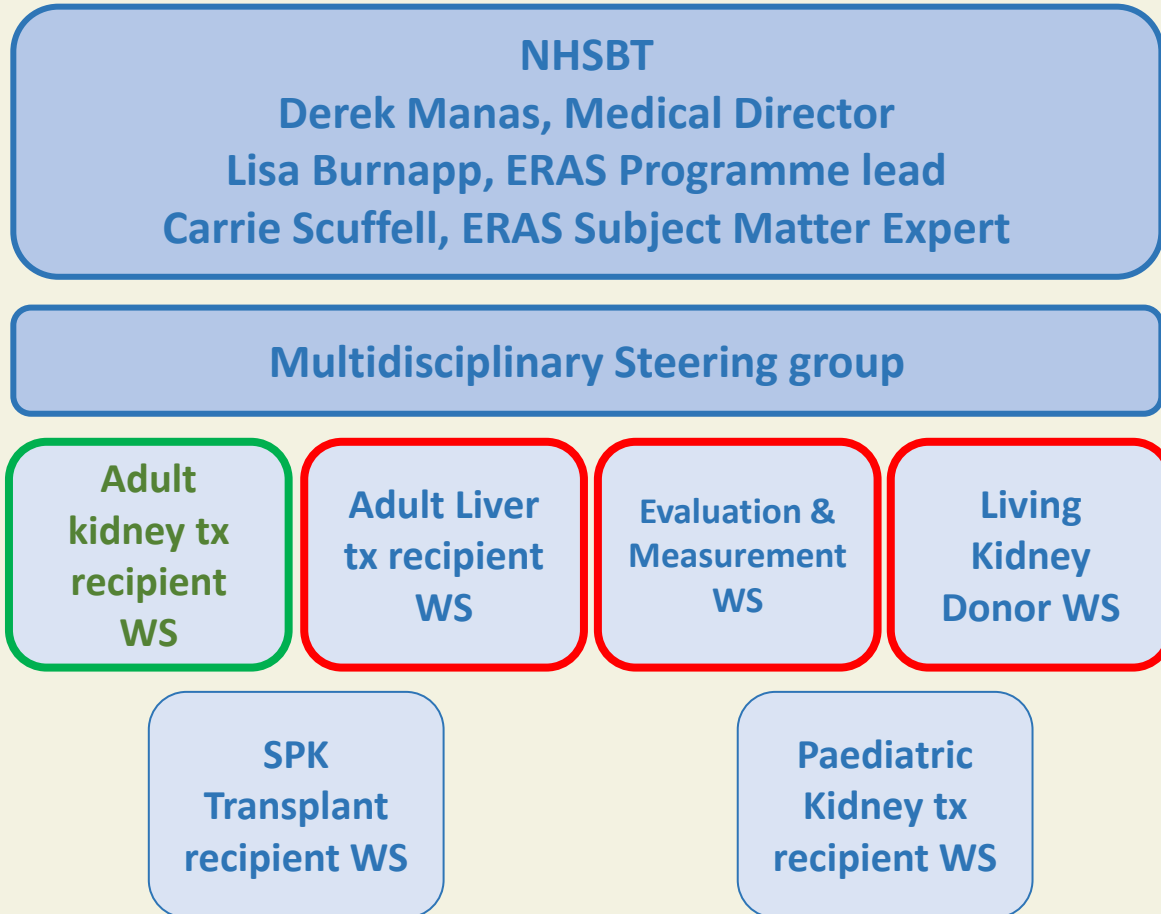


<sup>1</sup><https://www.gov.uk/government/publications/honouring-the-gift-of-donation-utilising-organs-for-transplant/honouring-the-gift-of-donation-utilising-organs-for-transplant-summary-report-of-the-organ-utilisation-group>

<sup>2</sup>[https://gettingitrightfirsttime.co.uk/medical\\_specialties/renal-medicine/](https://gettingitrightfirsttime.co.uk/medical_specialties/renal-medicine/)

\*ERAS Steering Group ToR, May 2023





## Multi-disciplinary inclusive workstreams

- Interested and participating centres
- Geographically diverse
- Variety of disciplines
- Co-production and patient engagement (expert panel model)
- Stage 1
  - core and desirable ERAS components with supporting evidence
  - Downloadable resources for centres
- Stage 2
  - Circulation and comms
  - Consider patient facing content

# KTR package

## Pre-operative

- Managing expectations
- ERAS principles
- Shared-care plan
- Optimisation of patients

- Pre-operative education and counselling
- Prehabilitation and patient optimisation

## Peri-operative

- Goal directed fluids
- Pain management
- Drain sparing surgery

Optimum hydration  
Opioid sparing analgesia  
Avoiding drains where possible

## Post-operative

- Earlier discontinuation of IVT, early oral diet and fluids
- Early and regular mobilisation
- Proactive drain and catheter removal
- Opioid sparing analgesia
- Structured education programme
- Follow up support including Rehabilitation

- Minimisation of IV fluids
- Mobilisation
- Catheter and drain removal
- Pain management
- Early discharge planning
- Post discharge considerations

# What is the Enhanced Recovery After Surgery (ERAS) programme?

Catheter and drain removal

Pain management

Early discharge planning

Post discharge considerations

### Additional documents

You can use the below downloadable resources to support your adult kidney transplant recipient ERAS programme.

- [ERAS general principles infographic \(PDF 253KB\)](#)
- [Daily mobility progress chart \(PDF 143KB\)](#)
- [Guidance for staff for pre and post rehabilitation \(PDF 189KB\)](#)
- [Patient preparedness document \(PDF 443KB\)](#)
- [Post transplant home exercise programme \(PDF 463KB\)](#)

### Centre evaluation document

This framework will support you in evaluating the implementation of your ERAS programme.

[Download evaluation \(Word 34KB\)](#)

### Publications

View the publications relevant for the ERAS programme.

[View publications](#)

[Back to top](#)

https://www.odt

# Downloadable resources



## Blood and Transplant

**Mobility programme**

**Day 0**  
Breathing exercises  
Sitting out  
1 to 2 Walks (40m distance)

**Day 1**  
Breathing exercises  
Sitting out (3-4 hr per day)  
2 to 4 Walks (40m distance)

**Day 2**  
Breathing exercises  
Sitting out (4-6 hr per day)  
2 to 4 Walks (90m distance)

**Day 3**  
Breathing exercises  
Sitting out (4-6 hr per day)  
4 to 6 Walks (90m distance) +/- Exercise Programme

**Day 4**  
Breathing exercises  
Sitting out (4-8 hr per day)  
4 to 6 Walks (180-240m distance) +/- Exercise Programme

**Day 5**  
Breathing exercises  
Sitting out (4-8 hr per day)  
4 to 6 Walks (180-240m distance) +/- Exercise Programme

**Beyond**  
Increase daily distance >6 Walks  
Exercise Programme  
Keep active

**Enhanced recovery after surgery for renal transplant patients**  
**Daily mobility progress chart**

Bed: \_\_\_\_\_ Name: \_\_\_\_\_ Date of transplant: \_\_\_/\_\_\_/2021 Mobility programme: \_\_\_\_\_

| Post op Day | Sitting out in chair     |                          | Walks achieved           |                          |                          |                          |                          | Exercise Programme |
|-------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------|
|             | For meals                | Total time in chair      | 1                        | 2                        | 3                        | 4                        | extra                    |                    |
| 0           | <input type="checkbox"/> |                          |                          |                          |                          |                          |                          |                    |
| 1           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                          |                          |                          |                    |
| 2           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                    |
| 3           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                    |
| 4           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                    |
| 5           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                    |

**Warm Up exercises (10 minutes)**

Shoulder Shrugs: Lift your shoulders up towards your ears, release back down. Repeat.

Shoulder Rolls: Shrug and roll your shoulders forwards, then roll them back to the start.

Head Turns: Turn your head to look over one shoulder, then back to the middle. Repeat the other side.

Side Bends: Bring your hand down one leg, come back to the middle. Repeat the other side.

Trunk Twists: Hands across your chest. Move and look over one shoulder, back to middle. Repeat the other side.

High Knees: March on the spot, alternating legs. Aim to drive your knee high towards the sky.

Heel Digs: Dig one heel out in front of you, then back. Repeat the other side.

Side Steps: Tap one toe out to the side, then back to the middle. Repeat on the other side.

**Strengthening exercises (10 minutes)**

Upper Body: Add a weight in your hand, slowly lift your arm straight out to the side to shoulder height. Slowly bring arm back down.

Upright Row: Holding a weight in each hand, palms...

**Post-transplant home exercise programme**

As you continue to recover from your transplant, it is important to try to build up your strength and fitness levels. This will help to keep you and your new kidney working well for as long as possible. Having a transplant can be a great motivator to make changes to your lifestyle. This can include stopping smoking, eating a healthy diet and increasing your activity levels. Before starting any exercise programme, you should discuss this with your kidney transplant team.

The following guide provides you with some advice and tips on how to start exercising safely after a kidney transplant. It includes examples of simple exercises that are safe to do. It's best to start small and slowly increase your levels of activity as you are able. Ask your transplant team or GP about other services available in your area.

**Remember**

- It is important to complete a warm up and cool down with each session.
- Avoid abdominal exercises and heavy lifting for around 6 months post-transplant.
- Ensure you drink plenty of water before and after exercising.
- Eat lightly prior to exercise and wait for an hour after food before starting any activity.
- If anything changes with your health, discuss this with your transplant team.

**STOP exercise and seek medical attention if you experience any of the following:**

- Dizziness or nausea
- Feeling very cold and clammy
- Chest pain or chest tightness
- Wheeziness
- You feel excessively tired

**Measuring your level of intensity with exercise**

Exercise should make you feel breathless, this is good! You may feel slightly warmer, or that your heart rate has increased, this is normal.

**A simple guide to the level of intensity to aim for**

| Rating | Exertion Level   |
|--------|------------------|
| 6      |                  |
| 7      | Very, very light |
| 8      |                  |
| 9      | Very light       |
| 10     |                  |
| 11     |                  |
| 12     |                  |
| 13     | Fairly hard      |
| 14     |                  |
| 15     | Hard             |
| 16     |                  |
| 17     | Very hard        |
| 18     |                  |
| 19     |                  |
| 20     | Maximal effort   |

**INCREASE LEVEL**  
You are able to talk, freely and easily in full sentences.

**AIM HERE**  
You can still talk but this may be paused once or twice.

**SLOW DOWN**  
You are unable to say more than one word without catching your breath.

**Aerobic Exercises**

Remember to think about your level of moderate level (slightly breathless). You could always time yourself and aim repeating it two or three times. As you feel fitter and less breathless you number of times you repeat the exercise.

Home options include:

- Marching on the spot
- High knees
- Star jacks/ star jumps
- Side stepping
- Heel and toe taps
- Step ups on a bottom step

**Cool Down (10 minutes)**

Knee Raises: Slowly lift your knee up to the sky and back down. Repeat the other side.

Heel Digs: Dig one heel out in front of you, then back. Repeat the other side.

Side Steps: Tap one toe out to the side, then back to the middle. Repeat on the other side.

Back Stretch: Clasp your hands together, reach your arms forward arching your back. You should feel a slight stretch in the muscles between your shoulder blades.

Chest Stretch: Clasp your hands behind your back. Pull your shoulders back and your elbows together.

with a good posture, bend at the waist and move your upper body slightly forwards. Swap legs around and repeat.

**Further Resources:**

**Kidney Beam**  
<https://www.kidney.gov.uk/kidney-beam>

**NHS resources:**

Active 10: walking programme  
<https://www.nhs.uk/active-10/exercise/walking-for-health/>

Couch to 5K  
<https://www.nhs.uk/active-10/exercise/get-running-with-couch-to-5k/>

How to: strength and flexibility exercises  
<https://www.nhs.uk/active-10/exercise/strength-and-flex-exercise-plan-how-to-video/>

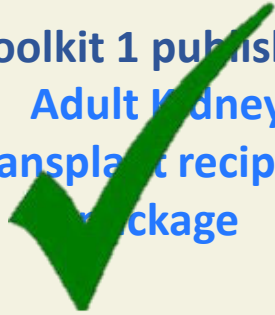
**GP Exercise Referrals:**  
You can ask the GP to refer you to your local 'Exercise on Referral' service if this is available in your local area. This will give you access to a supportive programme to induct you into your local gym and provide you with tailored support.

**Local Groups:**  
Look out for exercise and walking groups in your local area.



# Webpage now live

Toolkit 1 published  
Adult kidney  
transplant recipient  
package



Work in progress  
Adult liver transplant  
recipient package

Evaluation WS

Future workstreams  
Adult living kidney donor  
Paediatric kidney transplant  
Pancreas transplant  
Heart and Lung transplant  
Adult living liver donor

➤ Does your unit have an ERAS programme?

YES    NO    SORT-OF

➤ Where to start?

➤ Go to OTD [www.odt.nhs.uk/transplantation/enhanced-recovery-after-surgery/](http://www.odt.nhs.uk/transplantation/enhanced-recovery-after-surgery/)

➤ Contact us [ERASforTransplant@nhsbt.nhs.uk](mailto:ERASforTransplant@nhsbt.nhs.uk)

➤ Talk to your CLU, department leads, surgeons, physicians, anaesthetists, nurses....

➤ Consider talking to patient groups.....

**With recognition and thanks to:**

- **Derek Manas Medical Director, OTDT NHSBT**
- **Lisa Burnapp, Associate medical director, OTDT NHSBT**
- **NHSBT ERAS Steering group and workstream members**
- **Patient organisations**
  - **Kidney Care UK, Kidney Research UK, National Kidney Federation**
- **NHSBT colleagues**
  - **Marketing and Communications**
  - **Branding**
  - **Digital**
  - **Thumb design**



**[ERASforTransplant@nhsbt.nhs.uk](mailto:ERASforTransplant@nhsbt.nhs.uk)**

**Thank  
you!**