ERAS+

Enhanced Recovery After Surgery+

Manual for Health Professionals

NHS

Executive Summary

Post-operative pulmonary complications (PPC) are common after major surgery with a reported incidence of 2%-40%. Serious problems that can occur include death, longer hospital stays and reduced long-term survival.

Enhanced recovery after surgery (ERAS) is now a standard of care for patients undergoing elective major surgery. Despite the high prevalence of PPC in these patients, few elements of enhanced recovery specifically address reducing these complications.

Recently the ERAS+ programme has been designed and implemented at a large teaching hospital in Greater Manchester (GM). More than 1,000 patients undergoing major surgery have so far benefited from this programme.

Results include

- ***A 50% reduction in PPC rates following surgery***
- ***An average reduction in length of stay of three days***
- ***Savings of at least £500,000 per year***

There are more than 250,000 major surgery procedures a year in the UK. ERAS+ could be quickly adopted by other centres around the UK, with a reduction in both short and long-term illness and death rates.

A 25-50% reduction in PPCs would enable medium to large hospitals to make savings of more than £300,000 a year.

ERAS+ has been selected by the NHS as one of only eight National Innovation Accelerator fellowships led by Sir Bruce Keogh to roll out across the NHS.

The implementation of ERAS+ across Greater Manchester and the UK focuses on 4 things:

- Improving health, wealth and wellbeing
- Increasing independence and reducing demand on public services
- Developing community services to keep people out of hospital
- Supporting people to return to work, enabling more families to be economically active

Sections

Contents:

1. Introduction

Background information

Patients having elective major surgery account for around 250,000 surgical episodes per year in England and Wales and have a risk of PPC of up to 30%. This is associated with short-term and long-term morbidity, with increased length of hospital stay of up to eight days and reduced life expectancy for up to three years after surgery. Prior to the ERAS+ programme there have been no UK-based resources aimed at reducing PPC for patients undergoing major surgery. ERAS+ is an evidence-based approach that helps people recover more quickly after major surgery. There are several established ERAS programmes in use within the NHS with proven benefits.

The ERAS+ programme is supported by Surgery School education tools, videos, booklets, multi-professional education and involvement, recognising that the existing ERAS+ system will benefit from further innovation. Currently patients follow similar programmes regardless of their condition or ability, and there is no method for a clinician to check whether patients are following the exercises or to remind them to stick with the programme. To address this, the ERAS+ team has secured funding to develop an electronic app-based version of ERAS+. This will enable patients to engage with the system much more easily, while clinicians can tailor programmes to patient specific needs while monitoring their engagement.

Launched in 2014, the major elements of ERAS+ include:

- Respiratory bundle to reduce PPC - ICOUGH
- Support surgery preparation and recovery over at least a three-month process with focus on cardiovascular activity, muscle strengthening, nutritional support and lifestyle advice
- Building on the success of ERAS stepped recovery programme
- Partnership with patient/family

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Vision

The vision is for ERAS+ to assist patients in recovering as quickly as possible after surgery. Our aim is for ERAS+ to deliver state-of-the-art personalised care at every step of a patient's surgical journey:

- The holistic approach will focus not only on the individual experience and outcomes from pre-surgery to post surgery, but also the support provided to family and carers
- Developing a platform for effective pathways for surgical patients will require support from health and social care providers as well as commissioners. The pathways recognise the importance of easy access to experts in providing care and need to be timely, responsive and appropriate
- Patients of ERAS+ can expect the same standard of care regardless of where they live
- We will work with patients and utilise their data to help us improve care both now and in the future
- Through monitoring the service, quality and effectiveness will be ensured

ERAS+ 6 Must Dos

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2: Overview of ERAS+ patient pathway for major surgery

ERAS+ Process Map

Major Elective Surgery Pathway

STEP 1

Patient requires major surgery, comes into hospital and meets the pre-op **surgery** team. If present, Anaemia managed.

ERAS+ training in preparation for major surgery

STEP 2

STEP 3

Surgery and in-hospital recovery

ERAS+ recovery after surgery

STEP 4

STEP 5

Record patient outcomes and follow-up patients

Step 1

Once patients are identified as needing major surgery they are reviewed by the hospital peri-op surgery team. They are made aware of ERAS+ including training for surgery, smoking cessation advice, local services that will be available to them, Surgery School and anaemia management.

ERAS+ Mission

Personalised Major Surgery Care

YOUR SURGERY

We want to help you prepare and recover well

HOME
Preparation at home before surgery and recovery after surgery

GREAT SUPPORT
We will link you to local services to support your preparation and recovery

SATISFACTION
We will ask you how we can make our care better

OUTCOMES
We will record how you recover and what happens to you after surgery

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Step 2

ERAS+ training in preparation for major surgery

Patients now identified as needing major surgery will receive information and education as preparation for training, along with family members. This is supported by the ERAS+ website, patient information leaflets and Surgery School. High risk patients may be offered specialised prehab resources if available at a local hospital or regional centre.

Elements of preparation for major surgery:

- Physical activity, muscle strengthening
- Chest training
- Nutritional preparation
- Well-being – smoking cessation and reducing alcohol consumption
- Surgery School - education tools and forum for patients and family members

ERAS+ Training for Surgery

FOR YOUR SURGERY

We want to you to be at your best

PHYSICAL ACTIVITY
Before your operation being more active and strengthening muscles makes you recover better

SURGERY SCHOOL
Patient and family education tool teaches you what you need to know

CHEST TRAINING
Learn how to keep your lungs 'big' after surgery to prevent problems

NUTRITIONAL
We need you to eat a healthy and balanced diet in preparation for your surgery

Step 3

Surgery and in-hospital stepped recovery after surgery

Patients are given advice about what their surgery involves, how long they are expected to remain in hospital after surgery and what to expect on each day of their in-hospital recovery.

ERAS+ In-Hospital Recovery

YOUR SURGERY

We want you to know the steps of recovery

AFTER SURGERY
Know how many days you will be in hospital and what you need to achieve each day

MOBILISE SOON
Sitting up in a chair on day 1 and mobile by day 3

CHEST EXERCISES
Keep your lungs 'big' after surgery to prevent problems

NUTRITIONAL
Take drips down and drink soon after surgery. Start eating soon

Step 4

ERAS+ recovery after major surgery

After an in-hospital stay, patients and their families are advised about the best way for patients to recover at home. This recovery package will initially focus on adapting to returning home and what to expect. There will then be a strong focus on returning to normal activities alongside establishing a good level of exercise, and maintaining a good level of nutrition in the post-hospital period.

ERAS+ Recovering After Surgery

AFTER YOUR SURGERY

We want you to recover as quickly as possible

PHYSICAL ACTIVITY
After your operation, being more active will help you returning to where you were before your operation

GREAT SUPPORT
Family and friends are crucial in your recovery. We will link you to local services to support your recovery

NUTRITIONAL
We need you to continue eating a healthy and balanced diet to aid your recovery from surgery

Step 5

Record patient **outcomes** after surgery **and** determine **satisfaction with the pathway**

3. Preparation for surgery

Physical activity and training in preparation for surgery

With the concept of training in preparation for surgery now explained to patients and families, we begin to walk them through how they may achieve this. This will be supported by the physiotherapist.

This includes:

- Patients and families are advised that they should aim for 20-30 minutes of activity five times per week if they have a reasonable level of fitness
- For patients who have lower starting levels of fitness, and may struggle to undertake more than a few minutes of additional activity, they are advised to begin with three to five minutes of activity at one time, aiming to increase this over a few days
- To help guide patients, they are advised that they should be able to hold a conversation whilst walking and ordinarily may experience some breathlessness at the end of activity
- Patients are advised that, for the vast majority, additional activity is very safe and extremely helpful in the preparation for surgery. However, they are told that should they feel unwell, experience severe breathlessness or dizziness then they should refrain from further increased activity and consult their GP or hospital team

Undertaking physical activity and muscle strengthening

We know that a patient's physical fitness has a major influence on their ability to recover from a major event such as surgery. Those patients with the lowest physical fitness tend to be older and have associated frailty. They are often described as the 20% who consume the 80% of healthcare resources following a major healthcare event. Some of these patients may in fact be so 'unfit' that surgery is not in their interest, and dynamic testing of patients undergoing major surgery such as cardiopulmonary exercise testing is very useful in identifying this very high-risk patient group.

Increasing a patient's fitness through cardiovascular activity and muscle strengthening should improve physiological reserve and reduce risk from surgery. Furthermore, there is gathering evidence that increased activity and exercise will improve long-term life expectancy for patients with cancer and improve response to non-surgical treatments such as chemotherapy.

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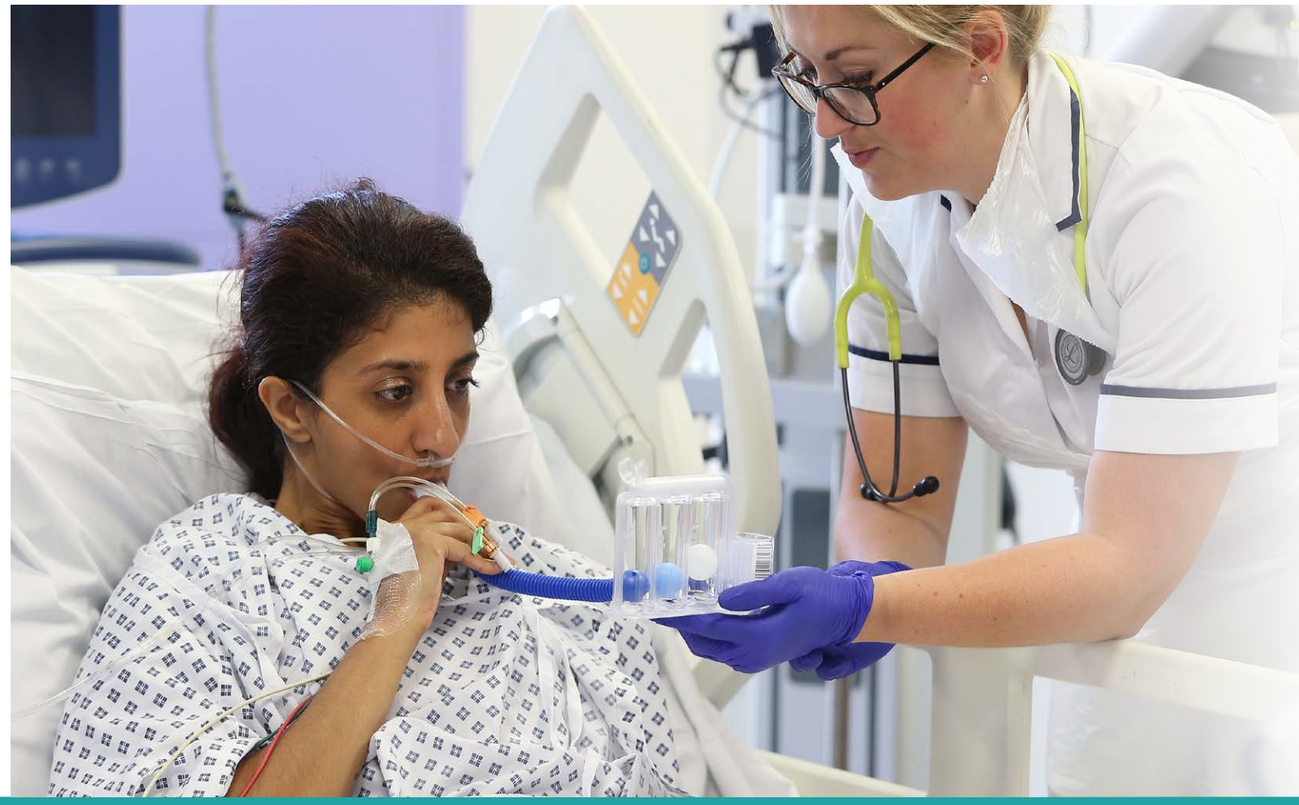
To improve measurable fitness, it will generally take four to six weeks to see genuine benefit from training, and there may only be a limited period from a diagnosis such as cancer to patients undergoing surgery. As such, patients need to be advised as soon as possible to increase their activity and muscle strengthening in preparation for their surgery. The lower a patient's starting point in terms of activity and physiological reserve the more they will benefit. Any increase in activity for this patient group is likely to prove helpful.

What training activities should patients undertake?

Macmillan patient groups advise describing prehabilitation in terms of increasing daily activity, as some patients with low functional baseline - particularly in the context of cancer - may feel excluded and unable to 'exercise'. The intervention consists of cardiovascular activity, muscle strengthening and nutritional advice.

Activities are advised with the intention that they should be 'user friendly' and something involving family support at relative low cost such as walking, swimming, gardening or cycling. Patients were asked to combine this with stretching exercises and for muscle strengthening advised to use common household items to help build strength. Thirty minutes of activity per day was recommended aiming for 150 minutes per week. Patients were advised to start slowly with five to ten-minute intervals depending on baseline fitness, progressing towards the day of surgery whilst setting themselves realistic targets. Patients were encouraged to keep diaries of exercise and to try and 'train' with the support of family members.



CHEST TRAINING

I – Incentive spirometry

C – Coughing with good pain control

O – Oral healthcare

U – Understanding ICOUGH

G – Getting out of bed & mobilisation after surgery

H – Head of bed elevated to improve breathing technique

Chest bundle to reduce respiratory complications

Patients are advised of the increased risk of respiratory complications with major surgery. The basic effect of surgery and anaesthetic on patients' lungs is explained to patients and their families and they are then walked through the elements of the respiratory bundle (ICOUGH) which aims to minimise these effects and, in turn, reduce respiratory complications.

Chest training using incentive spirometry

Patients now understand the increased risk of respiratory complications with major surgery. The respiratory bundle uses basic incentive spirometry to help teach patients before surgery how they can take deeper breaths with the three balls within the spirometer providing visual feedback. The physiotherapist will generally demonstrate the use of the incentive spirometer to patients and families, with practice and technique adjustment at the end of the session. The ICOUGH incentive spirometry video provides an educational resource for patients once they have gone home and also supports healthcare professionals looking after patients after major surgery, so they can instruct patients who may not have attended Surgery School.

Most patients will make an excellent recovery after major surgery, but chest problems which can affect 1 in 10 to 1 in 5 people after major surgery will mean that they have a longer recovery in hospital and at home before they feel back to normal.

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Nutritional support

Nutrition and metabolic interventions aim to maintain or improve food intake. A healthy diet can improve metabolic derangements, maintain skeletal muscle mass & physical performance and reduce the risk of reductions or interruptions of scheduled anticancer treatments. All of these factors contribute to improving quality of life.

Nutrition risk screening aims to increase awareness and allow early recognition and treatment. To be efficient, screening should be brief, inexpensive, highly sensitive and specific to the patient. For this purpose BMI (body mass index), weight loss, and an index of food intake may be obtained directly, or via validated nutrition screening tools.

An insufficient diet leads to chronic malnutrition. To maintain a stable nutritional state, the diet has to meet the patient's energy requirements.

Surgery School

What is the need for a Surgery School?

It is fundamental that patients and their relatives are viewed as partners in their recovery from surgery. As part of the development of a new pathway to improve recovery after major surgery, patients who had previously undergone such surgery were asked what might have helped them better prepare. They reported that a pathway walking them through the pre-hospital, in-hospital, recovery and post-surgery milestones would have given them insight into what to expect and how to prepare. This led to the creation of Surgery School as one of the main patient education tools to support the ERAS+ pathway.

Surgery School builds on the tradition of information tools for patients established some years ago in cardiac surgery and later in orthopaedic surgery. During these sessions, patients are instructed in what to expect after surgery with daily tasks of recovery and shown where they will be looked after following their surgery. There is good evidence that with this approach there is a reduction in anxiety and patients have reduced length of stay in hospital with a clear footprint of what to expect. Also, patients appear to benefit from meeting other patients before surgery and the notion of group mentality provides psychological support.

Surgery School, however, is the first pre-op education tool for non-cardiac major general surgery, and by the nature of this surgical group there a strong emphasis on those patients managing with cancer. We have also lifted the pre-hospital element of training and post-op recovery at home to provide a wraparound approach alongside the in-hospital-based peri-operative care.

Being mindful that patients report information overload at times, Surgery School focuses on selected areas we believe have the greatest impact on patient recovery and those that have been highlighted by previous patients as important to them. A multi-disciplinary team approach is used with medical, physiotherapy and nurse colleagues giving short presentations with a focus on the following key elements of ERAS+:

- Pre-operative training with increased cardiovascular activity and muscle strengthening training
- Chest training to reduce the risk of chest complications
- ICOUGH education and instruction in incentive spirometry
- What to expect after surgery and what patients will be asked to do
- Pain management after surgery
- Recovery in hospital
- Recovery at home and training into a good recovery

These areas are presented alongside general patient preparation before surgery, peri-operative surgical care and recovery at home. There is also a question and answer session at the end of Surgery School where patients are given an opportunity to ask questions.

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Areas covered during Surgery School

	Preparation at Home	Postoperative Critical Care	Postoperative Surgical Ward	Recovery at Home
Nutrition	Eat 'healthily' e.g. green leafy vegetables. Do not try to lose weight	Early oral nutrition plus supplements/ enteral feed. Manage nausea and vomiting	Oral intake including snacks 'little and often' plus supplements	Oral intake including snacks 'little and often'
Breathing	Deep breathing exercises. Train with incentive spirometers 8 hourly	Breathing and coughing with physiotherapist. Incentive spirometry 4 hourly	Breathing and coughing exercises. Incentive spirometry 4-8 hourly	Breathing and coughing exercises. Incentive spirometry 8 hourly
Activity	Advised to increase usual physical activity by at least 50%	Mobilise bed to chair twice daily	Mobilise around ward at least 20m twice daily	Increase activity until previous baseline achieved
Oral Health	Brush teeth twice daily and use chlorhexidine mouthwash. Visit dentist if no recent appointments	Brush teeth twice daily and use chlorhexidine mouthwash	Brush teeth twice daily and use chlorhexidine mouthwash	Brush teeth twice daily and use chlorhexidine mouthwash
Psychological Support	Links to Macmillan resources. Tour of critical care areas	Healthcare professionals will support patients	Healthcare professionals will support patients	Links to Macmillan resources and ERAS+ website
General Health	Smoking cessation advice. Alcohol reduction	Smoking cessation advice. Alcohol reduction	Healthcare professionals will support patients	Healthcare professionals will support patients
Family Support	Encouraged to involve families including attendance at Surgery School	Visiting hours and telephone contacts given in advance of surgery	Visiting hours and telephone contacts given to relatives	Links to Macmillan resources and ERAS+ website

Visit of the critical care/ward area

At the end of Surgery School patients and their family members are invited to walk around the critical care/ward areas where they will be looked after. Supported by critical care/ward nurses, they are shown around and can view patients recovering after similar surgeries to those that they will undergo. Patients and their families report this to be extremely helpful.

Patients who have visited before their surgery report that the familiarity in having seen the critical care and ward areas helped reduce anxiety and facilitate postoperative orientation after their surgery. Relatives visiting pre-operatively also appear to benefit from visiting the environment in which their relative will be looked after.

Who should attend Surgery School

- All patients due to have major surgery in your hospital should be invited to attend
- There may be a smaller group of patients having lower risk surgery but who are thought to be higher risk through their co-morbidities and functional status. They are a group that potentially can be made 'fitter' for planned surgery and Surgery School could be one of the elements in their preparation for surgery. They should, where possible, also be offered a personal programme to help them prepare for surgery.
- Family and friends of patients attending Surgery School should also be invited to attend. They will be a key element of a patient's support in undertaking increased activity and the other aspects of ERAS+ in preparation for surgery.

Medical background and overview

Consultant or senior medical trainee explains about the impact of major surgery, potential complications and interventions that help improve patient recovery and reduce risk:

- There is a discussion about the demands of surgery and the main complications (cardiovascular, respiratory, wound, infections) which may occur after surgery, and the effect this may have on a patient's recovery.
- There is an explanation of major elective surgery as a planned 'stressor'. This gives the opportunity for patients and their families to understand how they can prepare for this planned event.
- This leads into the concept of training in preparation for surgery, like the way an athlete trains for a major sporting event such as a marathon, and how this may help reduce and minimise the impact of peri-operative complications.
- The concept of patients being dynamic, 'taking control' and positive in their own preparation and recovery is emphasised as being very important, both from a physical perspective but also from a psychological perspective.
- The key support of family and friends in a patient's preparation for surgery is very much emphasised and is one of the main reasons for inviting them to Surgery School. Family and friends are advised about how they may adopt a supporting 'coaching role' for their relative or friend. They can offer encouragement and may decide to undertake similar training activity to the patient as a 'training buddy'.
- Patients and families are asked to record physical activity alongside nutritional intake and chest training.

4: Implementing ERAS+ into hospital setting

Clinical model overview

ERAS+ will support people who are expecting high risk general surgery to achieve their optimal potential through enhanced recovery and will promote self-management with a focus on achieving sustainable change.

Stage 1: Baseline PPC prevalence

Evaluate the rate of PPC in patients admitted to critical care over a minimum of six-week period following major elective colorectal, gynaecology, head and neck, hepatobiliary, upper gastrointestinal, urology and major vascular surgery. A trained data collector to screen patients on days three, five, seven and fifteen after surgery and an ERAS+ consultant team member to then review clinical cases to confirm the diagnosis of PPC.

Stage 2: ERAS+ team and pathway development

Creation of a multidisciplinary ERAS+ team with medical, nursing and allied health professionals (physiotherapy, dietetics and pharmacy) to build on the existing ERAS pathways. This team will be led by a GM ERAS+ steering group which will meet monthly to develop the pathway, support training and identify resources as well as individual trust implementation groups. Cancer specialist nurses should support patient and family listening sessions before and after surgery to discuss ERAS+.

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Stage 3: Repeat prevalence audit and initial implementation of ERAS+ incorporating ICOUGH

With ERAS+ resources in place, a pre-implementation audit will be undertaken over a six-week period. Critical care, surgical and anaesthetic staff will be trained in ERAS+ principles supported by ICOUGHUK TV, brochures and posters. The ERAS+ team should attend both surgical and anaesthetic department audit and clinical effectiveness meetings to introduce the initiative.

Pre-operative assessment nurses and cancer nurse specialists will also attend ERAS+ training sessions to support pre-operative patient education in ICOUGH and ERAS+. For critical care nursing and medical staff, the ERAS+ team will deliver on-going weekly multidisciplinary teaching and an ERAS+ support programme over the following months, concentrating on the bundle's role in reducing PPC. All frontline critical care staff should be trained with a focus placed on key elements identified in the gap analysis.

To measure compliance, all elective surgery patients will be assessed for all six elements of ICOUGH by the ERAS+ team during their critical care stay. Bundle compliance will determine three to four times per week during implementation, with results summated to give weekly compliance rates which will be fed back using weekly ward implementation run charts.

Stage 4: Full implementation of ERAS+

Surgical teams to agree that all elective major surgery patients with a planned critical care stay should receive ERAS+ interventions which can then be incorporated into surgery pathways. Patients should then be invited to attend Surgery School, instructed on the principles of ERAS+ by pre-operative and specialist nurses and counselled by their surgeons.

Stage 5: Repeat prevalence at one year following ERAS+ implementation

Repeat PPC screening will be carried out. To promote sustainability, compliance audits for the ICOUGH bundle will be embedded in the weekly reporting structure. The population who will be studied will be elective surgical patients admitted to critical care who are at intermediate or high risk of developing PPC.

Key outcome data will be analysed, with data handled in terms of three groups: pre-implementation, implementation, and post-implementation.

5: Recovery after surgery

As part of the ERAS+ programme, patients go through the same key steps in their preparation for, and recovery from, major surgery. During the rehab stage, patients will complete physical activity, chest training and other steps explained in Section 3.

6: Additional resources

To support patients and their families through the ERAS+ programme, a pack will be given to patients with the key steps in the programme. Further information and useful resources (including videos of some of the exercises and ICOUGH) are available on the ERAS+ website:

www.erasplus.co.uk

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