Enhanced Recovery After Surgery

www.1000livesplus.wales.nhs.uk
Acknowledgements

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- Members of the All Wales Enhanced Recovery After Surgery (ERAS) Committee (full list of members in Appendix G).
- Teams from healthcare organisations across Wales for their work in developing the care pathways to make this work a success.
- Dr Stephen Hunter and Dr Chris Jones for their support and championing of the ERAS programme.
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- The Department of Health Partnership programme for sharing their experiences.

Date of publication

This guide was published in 2010 and will be reviewed in 2012. The latest version will always be available online at www.1000livesplus.wales.nhs.uk

The purpose of this guide

This guide has been produced to enable healthcare organisations and their teams to successfully implement a series of interventions to improve the safety and quality of care that their patients receive.

This ‘How to Guide’ must be read in conjunction with the following:

- Leading the Way to Safety and Quality Improvement
- How to Improve

Further guides are also available to support you in your improvement work:

- How to Use the Extranet
- A Guide to Measuring Mortality
- Improving Clinical Communication using SBAR
- Learning to use Patient Stories
- Using Trigger Tools
- Reducing Patient Identification Errors

These are available from the 1000 Lives Plus office, or online at www.1000livesplus.wales.nhs.uk

We are grateful to The Health Foundation for their support in the production of this guide.
Improving care, delivering quality

The 1000 Lives Campaign has shown what is possible when we are united in the pursuit of a single aim: the avoidance of unnecessary harm for the patients we serve. The enthusiasm, energy and commitment of teams to improve patient safety by following a systematic, evidence-based approach has resulted in many examples of demonstrable safety improvement.

However, as we move forward with 1000 Lives Plus, we know that harm and error continue to be a fact of life and that this applies to health systems across the world. We know that much of this harm is avoidable and that we can make changes that reduce the risk of harm occurring. Safety problems can’t be solved by using the same kind of thinking that created them in the first place. To make the changes we need, we must build on our learning and make the following commitments:

■ Acknowledge the scope of the problem and make a clear commitment to change systems.
■ Recognise that most harm is caused by bad systems and not bad people.
■ Acknowledge that improving patient safety requires everyone on the care team to work in partnership with one another and with patients and families.

The national vision for NHS Wales is to create a world class health service by 2015: one which minimises avoidable death, pain, delays, helplessness and waste. This guide will help you to take a systematic approach and implement practical interventions that can bring that about.

The guide is grounded in practical experience and builds on learning from organisations across Wales during the 1000 Lives Campaign and also on the experience of other campaigns and improvement work supported by the Institute for Healthcare Improvement (IHI).
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Foreword

When it comes to improving the care we offer patients, a good starting point for all of us should be to think ‘If I was the patient now, what would I want to happen?’

If I were in the community I might want to get a specialist opinion quickly. If I were acutely ill I would want to be correctly diagnosed and started on the right treatment without delay. And if I was in hospital for an operation, I would want to go home as soon as possible.

The principles underlying Enhanced Recovery After Surgery are about putting patients at the centre and making sure they receive optimal care. It means reducing waste in the form of cancelled operations, reducing harm by reducing length of stay in hospitals, and reducing variation by making sure that all surgical patients everywhere receive the same high level of care and make faster recoveries as a result.

In healthcare, many things have been done in certain ways for years. And yet, there is much evidence that there are better ways of working for patients. In this ‘How to’ Guide, the evidence is convincing and clear - we can improve surgical outcomes for patients with minimal upfront cost.

As we move forward in NHS Wales, we will need to think differently and creatively so we meet the needs of patients. ERAS is one way in which we can put patients at the centre, meet their needs speedily and sensibly, and help them return to health rapidly.

This is the kind of patient experience we would all want for ourselves. I believe ERAS can help us deliver it.

I have been hugely impressed by the enthusiasm and commitment of clinical staff that are eager to optimise the services they deliver with the principles of ERAS, and I look forward to working with teams to see the benefits realised for patients.

Dr Chris Jones
Medical Director for Wales
Chair of the All Wales Enhanced Recovery After Surgery Committee
Enhanced Recovery After Surgery (ERAS) is a patient-centred method of optimising surgical outcome by improving both patient experience and clinical outcomes. The ERAS programme was first described by Professor Henri Kehlet in 2000.1

ERAS aims to improve the quality of care provided to patients who undergo major surgery. By improving the quality in care, and reducing harm it is also assumed that hospital stay will become more efficient, thereby allowing hospital services to realise the benefits of the programme, through savings in bed days.

Approximately 3 million surgical operations are performed in the UK each year, with an average hospital mortality of 0.8-1%. This equates to over 2,000 patients a year who die following surgery.2 In Wales, it is reported that 1 in 10 people admitted to hospital are harmed unintentionally during their stay; and there is a 1 in 300 chance of dying as a result.3

In their editorial in the British Medical Journal, Urbach and Baxter suggested that “the immediate challenge to improving the quality of surgical care is not discovering new knowledge, but rather how to integrate what we already know into practice.”4 In today’s NHS, effective, efficient and safe healthcare provision has never been more important.

Additionally, while public spending is limited, public expectation is increasing, and so is litigation. It is self-evident that any healthcare management plan that is proven to deliver effective and efficient patient care should be adopted and incorporated into the routine care of patients.

ERAS, sometimes referred to as ‘fast track’ or ‘accelerated’ surgery, is transforming elective surgical patient outcomes across the UK and Europe. Its efficacy is supported by a growing base of clinical and research evidence. Some of the principles of ERAS have already been implemented in sites across England and Wales5 and it is hoped that the benefits to patients and hospital services associated with this programme can be introduced across all healthcare organisations in Wales in the coming months as part of 1000 Lives Plus.

The effectiveness of ERAS to improve outcomes is dependent on the engagement, commitment and involvement of all members of the multi-disciplinary team at all stages of the patient’s journey, starting from the General Practice surgery, continuing through the hospital stay and during recuperation in the patient’s own home.

This guide has been developed from clinical evidence and is supported by consensus opinion from colleagues’ experiences in the delivery of ERAS in Wales and elsewhere. The aim of this guide is to disseminate the knowledge gained from experience with ERAS thus far and to provide a primary resource to support the implementation of ERAS across Wales.

Although experience with ERAS to date has largely centred on colorectal surgery, it is anticipated that patients across Wales who are undergoing other types of elective and semi-elective surgery will too be able realise the benefits of this programme.
The 1000 Lives Plus mini-collaborative which is studying the scope and use of ERAS has suggested that it would benefit patients undergoing major oesophago-gastric, musculoskeletal, urological, gynaecological, vascular, or cardio-thoracic surgery.

This guide contains:

■ An overview of ERAS
■ Key elements of the ERAS pathway
■ Key stages to be addressed in preparation for the implementation of ERAS
■ Programme Measures and Outcomes

ERAS is a series of guidelines leading to standardised care, but each patient must still be treated as an individual and their individual needs taken into account. Patients that are older, or significantly less well, may need more recuperative time. It is worth noting that some elderly patients can be very enthusiastic and push themselves too hard, so care must be taken that they do not over-exert themselves.
References


2 Modernising Care for Patients undergoing Major Surgery: www.reducinglengthofstay.org.


What is Enhanced Recovery After Surgery?

Enhanced Recovery After Surgery (ERAS) is a multi-modality, evidence-based approach to improving the quality of patient care after major surgery, with a selected number of individual interventions which, when implemented as a group, demonstrate a greater impact on outcomes than when implemented as individual interventions. Success requires a multi-disciplinary approach.

The basic principles include:

- Ensuring the patient is in the best possible condition for surgery
- Ensuring the patient has the best possible management during and after his/her operation
- Ensuring the patient experiences the best possible rehabilitation, enabling early recovery and discharge from hospital allowing them to return to their normal activities quicker.

The ERAS pathway promotes and incorporates best practice recommendation and can instil a greater confidence in patients of their healthcare organisations. By improving the quality in care, and reducing harm it is assumed that hospital stay will become more efficient, and hospital services can realise the benefits, such as saving bed days.

The 1000 Lives Plus ERAS mini-collaborative will adopt a “Care Bundle” approach. The key drivers or interventions, which have been clinically proven to have the highest impact on outcome following surgery, will be grouped together so that they are performed in the same timeframe by a particular group of clinicians. To comply with a particular bundle, all the interventions within the bundle must be performed. Delivering the group of interventions together is proven to result in a better outcome for the patient.

By monitoring how the care bundles are delivered, clinical and managerial teams gain a better understanding of what improvements they need to make and what impact any changes to the organisation of the services has on the patients using them.

It is envisaged that the process of implementing care bundles will encourage individuals to re-evaluate their professional roles within clinical teams, optimising interdisciplinary team working. This should be underpinned by core competencies and training programmes to ensure staff have the appropriate skills for the specific tasks needed to be carried out. This work will involve working with academic institutions to ensure the key principles of ERAS are incorporated into all healthcare graduate curriculums.

For the All Wales ERAS Collaborative the drivers and interventions are grouped into the following bundles:

- Assessment Care Bundle
- Immediate Care Bundle
- Intra-operative Bundle
- Post-op Bundle
- Discharge and follow-up Bundle
Releasing Bed Capacity

In Wales, the first phase of the 1000 Lives Plus mini-collaborative started in Autumn 2010. If enhanced recovery was implemented across Wales in all major colorectal patients this would result in an estimated bed day saving of 8,395 bed days across Wales per annum.

The potential impact is based on improvement in elective length of stays across all Health Boards in Wales to a hospital stay already achieved by many Trusts in England and certain centres across Europe.

Subsequent roll out across gynaecology, urology and musculoskeletal surgical specialties will have a radical affect on the way services can be delivered, improving quality whilst maximising efficiency and adding value for money.
Enhanced Recovery After Surgery
Driver Diagram (abdominal surgery)

**Content Area**

- Improve outcomes for people undergoing major surgery

**Drivers**

1. Assessment Care Bundle - maximising physical and functional status
2. Immediate Care Bundle - Maximising physical and functional status whilst preparing patient for surgery
3. Intra-operative Bundle - Reducing the stress response to surgery and promoting homeostasis
4. Post-op Bundle - Patient centred and goal orientated specialist care following surgery
5. Discharge and follow-up Bundle - Timely discharge planning that supports the patient in a safe discharge and monitors care post-operatively to detect potential complications

**Interventions**

- Nutritional screening
- Optimisation of nutritional status
- Monitoring and optimisation of Haemoglobin
- Management and optimisation of Pre-existing co-morbidities
- Physiotherapy assessment
- MDT assessments/referrals
- MDT ERAS care pathway commenced
- Patient education
- Anaesthetic assessment; CPx testing
- Nausea and vomiting prophylaxis
- Optimal analgesia and anaesthetic (limit/avoid opioid usage)
- Limit usage of drains, NG Tubes and catheters. Promote Laparascopic approach
- Goal directed fluid therapy
- Carbohydrate loading pre-operation
- Avoid bowel preparation (where appropriate)
- Encourage post-operation nutrition
- Mobilisation within 6hrs post operatively if practical
- Optimise gut function
- Appropriate analgesia, aim for oral analgesia for discharge home
- Optimal fluid balance and daily weights
- Early enteral or oral nutrition within 12 hours of surgery
- Predicted Date of Discharge achieved by the patient
- Discharge needs confirmed with family/social services following surgical intervention
- Patient follow up post discharge
- Appropriate MDT follow up post discharge
Getting Started

Have you set up your team?
You need to consider three different dimensions:
- Organisational level leadership
- Clinical or technical expertise
- Frontline leadership and team membership
See the ‘Leading the Way to Safety and Quality Improvement’ How to Guide; and Appendix C for further information.

Do you know how you will measure outcomes?
To ascertain the effectiveness of ERAS, you should use the following outcome measures:
- Scoring on Lee’s Revised Cardiac Risk Index (see Appendix B)
- Improved Post-operative Morbidity Score (POMS)
- Reduced Length of Stay:
  - In Hospital
  - Until medically fit for discharge (POMs score =0*)
  - In Critical Care
  - Prior to surgery
- Reduced percentage of patients readmitted within 28 days
- Reduced episodes of harm and surgical complications

Do you and your team understand how to apply the Model for Improvement?
The Model for Improvement is a fundamental building block for change and you need to understand how to use it to test, implement and spread the interventions in this guide.
See the ‘How to Improve’ Tools for Improvement guide and Appendix D for further information.

How are you going to measure process reliability?
In order to improve outcomes for your patients you need to demonstrate you are using these interventions reliably. This means that all the elements of the interventions are performed correctly on 95% or more of the occasions when they are appropriate. You need to do this by using the process measures in this guide.
See the ‘How to Improve’ Tools for Improvement guide and Appendix B for a summary of all process measures.

How will you share your learning?
Contact 1000 Lives Plus for details of mini-collaboratives and other ways to share your learning and to learn about the progress of other teams.
Enhanced Recovery After Surgery

Drivers and Interventions

This section details the interventions highlighted in the driver diagram which evidence has shown to be effective in this content area. You should use the Model for Improvement to test, implement and spread each intervention, using the listed process to monitor progress.

Driver: Assessment Care Bundle

For patients to achieve the best results post-operatively, it is vital that assessment and preparation of the patient referred for possible elective surgery starts in Primary Care. This maximises the time that the intervention can benefit post-operative outcome.¹

The General Practitioner and Practice Nurse play a fundamental role in optimising patients for surgery. By performing a ‘fit for list’ health screening as an adjunct to referral this should identify risks that may increase morbidity. This screen should include assessment of nutritional status, glycaemic control, blood pressure, renal function, body mass index, current lifestyle and current levels of physical fitness.

Checking for signs and symptoms of anaemias with confirmation by blood test will allow the correction of haematological status prior to surgery. It is proposed that interventions are instigated by GPs to start the process of optimising the patient’s condition prior to surgery.

This ‘optimisation’ continues in Secondary Care and therefore needs to be in partnership with the Anaesthetist and Surgeon. It is recommended that GPs receive timely communication from pre-operative assessment in secondary care to inform them of the patient’s progress and proposed surgical intervention. This will ensure that GPs are integral to the decision making process as patients often wish to discuss the proposed surgery with their own GP.

Summary

What are we trying to accomplish in Primary Care?

- Detection of anaemia and prompt treatment if required
- Detection of new co-morbidities or maximising the treatment of pre-existing co-morbidities to improve physical and functional status.
- Nutritional screening using MUST or local validated risk assessment tool (e.g. WAASP)
- Healthy Living advice if required
- Timely and effective communication between Primary Care and Secondary Care interfaces.
**How will we know if a change is an improvement?**

By collecting the following data points for every patient:

- Date of onset of symptoms that may require surgical intervention
- Date of first contact by GP
- Date of nutritional screening and any actions required
- Date of biochemical and haematological assays (and date of actions if needed)
- Date of discussion regarding healthy living advice
- Date of review of co-morbidities and interventions made
- Date of referral and communication from GP to secondary care
- Date of communication from secondary care to GP to inform GP of outcome after diagnosis and pre-operative assessment.

**Summary of Interventions:**

<table>
<thead>
<tr>
<th>Required Intervention</th>
<th>Completed Yes</th>
<th>Completed No</th>
<th>Reason for non-compliance</th>
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<tbody>
<tr>
<td>Patient assessed at referral for anaemia²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient assessed for hypertension¹</td>
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<td></td>
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<tr>
<td>Patient given health improvement advice</td>
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<td></td>
</tr>
<tr>
<td>Nutritional screen completed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment of patients existing co-morbidities completed</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Patient weighed</td>
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</table>
Evidence for the effectiveness of Primary Care Interventions

Anaemia

Anaemia is a common condition in surgical patients and is independently associated with increased mortality. Anaemia carries increased mortality risk, and additionally is associated with increased requirement for transfusion, which is also associated with increased mortality. Treatment of preoperative anaemia should be the focus of investigations for the reduction of perioperative risk.1

It is now recognised that correcting even minor degrees of anaemia significantly reduces the need for transfusion and the resultant increase in morbidity and mortality following major surgery.

The thresholds are:

- Females = Hb <12g/l
- Males = Hb <13g/l

It is essential that the clinical team (primary and secondary care) are aware of these thresholds and treat accordingly.2

Hypertension

Pre-existing hypertension is common in patients undergoing surgery; approximately 30% of adults and 60% of those with known coronary heart disease (CHD) report a preoperative diagnosis of hypertension.3

In a case-control study of 76 patients who died of a cardiovascular cause within 30 days of elective surgery, a preoperative history of hypertension was four times more likely than among 76 matched controls.4

Pre-existing co-morbidities

Patients who have diabetes are a high-risk group for surgery with the likelihood of increased late cancellation at pre-operative assessment or upon admission as well as increased length of stay, morbidity, mortality, use of HDU/ITU, and re-admissions.5

Reducing these risks by improving control of diabetes,4 and blood pressure and cholesterol,7,8 is known to improve outcomes and help to ensure diabetic patients can benefit from enhanced recovery pathways.

Healthy Living advice

Healthy Living advice is vital to support the patient in recovery post-operatively. Patients who smoke are more likely to:

- Have pulmonary, circulatory and infectious complications
- Experience reduced bone fusion and impaired wound healing
- Be re-admitted to an ICU
- Face increased risk of in-hospital mortality
Due to this increase in risks, smokers are more likely to stay in hospital longer. It is recommended that patients cease smoking at least 8 weeks prior to surgical intervention for the risk of complications to return to similar levels of non-smokers.\(^6\)

Screening patients as to their alcohol consumption will provide sufficient time to surgery for successful intervention.\(^7\) The role of the referring General Practitioner and providing advice and support is recommended, but does require evaluation as to its efficacy.

**Nutritional Status**

Nutritional screening is now mandatory for all patients admitted to hospital in Wales.\(^11\) By promoting nutritional screening in primary care, this would allow patients who are either malnourished or at risk of malnutrition to be started on the appropriate nutritional intervention before being referred into secondary care. This may allow adequate time for promotion of nutritional status and well-being before the patient undergoes surgery.

### References

3. [www.transfusionguidelines.org.uk/](http://www.transfusionguidelines.org.uk/)
4. [www.nhs.uk/Conditions/Anaemia-iron-deficiency-/Pages/MapofMedicinepage.aspx](http://www.nhs.uk/Conditions/Anaemia-iron-deficiency-/Pages/MapofMedicinepage.aspx)
5. UKPDS UK prospective diabetes study, DCCT (Diabetes Control and Complications Trial)
Driver: Immediate Care Bundle

All patients undergoing elective surgery should undergo pre-operative assessment. Ideally, this should be carried out on the same day the decision for surgery is made and a date for admission agreed with the patient. The optimal time is considered to be 2-3 weeks between pre-operative assessment and day of surgery. This allows adequate time to maximise the benefit of the interventions required.

A coherent pre-operative service is fundamental to delivery of ERAS. The patient’s pre-operative assessment appointment plays an essential role in how the patient understands, considers and ultimately participates in the ERAS pathway. The structure for the pre-operative assessment service should be designed to provide both a generic and procedure-specific service. Ideally, the location and physical place of pre-operative assessment will be convenient for the patient and will appropriately accommodate all relevant assessments and services.

What are we trying to accomplish at Pre-operative Assessment and Pre-habilitation?

The pre-operative assessment appointment should:

- Ensure every patient is fully informed about their proposed procedure and the interventions that will need to be undertaken
- Estimate the level of risk for every patient
- Ensure every patient understands their own individual risk so that they can make an informed decision about whether to proceed to surgery
- Identify co-existing medical illnesses and optimally prepare patients whilst taking into account the urgency of the operation
- Identify patients with a high risk of complications in the peri-operative period and define the appropriate post-operative level of care (day stay, inpatient, ward, HDU, critical care)
- Discuss and plan discharge dates and needs
- Nutritional assessment and treatment
- Referrals made to appropriate members of the MDT as needed for the patient
- Proactive training in stoma care is required to facilitate early discharge with confidence
**How will we know if a change is an improvement?**

Collecting the compliance to the following data points for every patient will show improvements.

<table>
<thead>
<tr>
<th>Required Intervention</th>
<th>Completed</th>
<th>Completed Reason for non-compliance</th>
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</thead>
<tbody>
<tr>
<td>Nutritional tool completed</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Patient weighed</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Thromboprophylaxis screening tool completed</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Discharge plans assessed and referrals made</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Co-morbidities assessed before surgery</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Enhanced recovery care explained to patient</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Health and risk assessment completed</td>
<td>Yes</td>
<td></td>
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<tr>
<td>ERAS pathway commenced</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Referrals made to MDT as appropriate</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Predicted date of discharge given to patient</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Patient referred for appropriate investigations/tests</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Patient information booklets given</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Patient given Pre-op Carbohydrate loading drinks and advised when to drink them</td>
<td>Yes</td>
<td></td>
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</tbody>
</table>
The Evidence Supporting the Interventions Required

Preoperative assessment clinics should be nurse delivered, anaesthetic lead and patient-centred. Anaesthetists should assume a central role in the organisation of pre-operative services that encompass much more than preparing the delivery of anaesthesia.

Pre-operative anaesthetic assessment should minimise risk for all patients as well as identify patients at particularly high risk. The Association of Anaesthetists of Great Britain and Ireland, outlined several recommendations in their paper, “Preoperative Assessment and Patient Preparation - the role of the Anaesthetist”. These recommendations are adopted in ERAS.

Objective assessment of functional capacity using cardiopulmonary exercise testing (CPX) is increasingly being used to assess peri-operative risk. The most experience is in the area of major intra-abdominal surgery. Cardio-pulmonary testing is an important screening test for major surgery to determine peri-operative risk. It is also used to determine the most appropriate level of post-operative care. The CPX test is also useful in peri-operative anaesthetic management.

It is recommended that patients who are either malnourished or at risk of malnutrition are assessed by a qualified dietitian and nutritional intervention instigated to optimise the patient’s nutritional status. This can either be by recommending food fortification advice or prescribing oral sip feeds. In some cases it may be necessary to use artificial nutritional support.

Patients may also require physiotherapy and assessment pre-operatively. Providing strength and respiratory exercises may benefit post-operative recovery.

Timely involvement with Occupational therapist and social services should help to prevent any delays in discharge for patients. Engagement with both of these services is vital to enable timely discharge back into Primary Care.

All Wales Standards for perioperative patient assessment have been agreed and can be accessed at http://nliah.com/preop

References

2 www.bmj.com/content/308/6923/235.full or http://web.jbjs.org.uk/cgi/reprint/86-B/6/788.pdf
4 UKPDS UK prospective diabetes study, DCCT (Diabetes Control and Complications Trial)
5 www.dtu.ox.ac.uk/index.php?maindoc=/ukpds_trial/faq.php
6 www.dh.gov.uk/consent
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7 www.cochrane.org/reviews/en/ab001431.html


10 www.aagbi.org/publications/guidelines/docs/preop_2010.pdf

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**Driver: Intra-operative Bundle**

Optimum management pre- and intra-operatively has a dramatic impact on the post-operative recovery of patients. It is essential that all interventions are adopted to maximise benefit.

**What are we trying to accomplish 48 hours before surgery and immediately post-operative?**

- Oral sip feeds for 3-5 days pre-operatively (e.g. ensure plus, fortisip, frusubin)
- Carbohydrate Loading 12 hours and 2-4 hours pre-operatively
- Avoidance of bowel preparation where possible
- Day of surgery admission (DOSA)
- Optimal goal directed fluid management
- Daily weights recorded
- Promotion of minimally invasive surgical techniques
- Anaesthesia with quick onset and rapid recovery
- Opiate-sparing analgesia techniques
- Routine nausea and vomiting prophylaxis

**How will we know if a change is an improvement?**

Collecting the compliance to the following data points for every patient will show improvements.
<table>
<thead>
<tr>
<th>Required Intervention</th>
<th>Completed Yes</th>
<th>Completed No</th>
<th>Reason for non-compliance</th>
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<tbody>
<tr>
<td>Patient admitted on day of surgery¹</td>
<td></td>
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<tr>
<td>Patient weighed daily</td>
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<tr>
<td>Thromboprophylaxis screening tool reviewed and required treatment given²</td>
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<tr>
<td>Bowel Preparation avoided³</td>
<td></td>
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<td></td>
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<tr>
<td>Pre-medication sedatives avoided</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nutritional screen completed⁴</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbohydrate drinks given 12 hours pre-op⁵</td>
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<tr>
<td>Carbohydrate drinks given 4 hours pre-op</td>
<td></td>
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<td></td>
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<tr>
<td>Clear fluids received 2 hours pre-op⁶</td>
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<tr>
<td>Patient orientated to ward and pathway discussed with patient</td>
<td></td>
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<tr>
<td>Patient given goal directed fluid management during operation⁷</td>
<td></td>
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<td></td>
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<tr>
<td>Wound drain avoided⁸</td>
<td></td>
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<td></td>
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<tr>
<td>Normothermia maintained pre-operatively⁹</td>
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<tr>
<td>Normothermia maintained Intra-operatively⁹</td>
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What is the evidence?

**Nutrition**

Half of all patients admitted to hospital for surgery are suffering from malnutrition,\(^{10}\) with patients with a diagnosis of cancer having a higher risk.\(^ {11}\)

The consequences of malnutrition are diverse, affecting all organs in the body. Failure to provide adequate nutrition is both a cause and consequence of ill health, leading to immune dysfunction, disordered physiological function and delayed wound healing.\(^ {12}\) The deleterious effects of under-nutrition are apparent even in the early phase of starvation or reduced food intake and are noticeable within days.\(^ {13}\)

Studley first reported an association between losses of 10% or more of their body weight, poorer outcomes and increased mortality rate in 1936.\(^ {14}\) Since then, several studies have shown that when patients are malnourished their outcome after surgery is negatively affected.\(^ {15}\)

The ERAS programme advocates that nutritional management becomes an integral component for all patients undergoing major surgery.\(^ {16}\)

Nutritional sip feeds limit post-operative weight loss and improve recovery and therefore should be prescribed to all patients pre and post-operatively.\(^ {17}\)

If patients are unable to tolerate sip feeds or are severely malnourished, or at risk of malnutrition, artificial nutritional support (enteral tube feeding or parenteral nutrition) is recommended.

Optimising nutritional status may take many weeks or months, so delays should be avoided.

Carbohydrate loading 12 hours and 2-4 hours prior to surgery has also been shown to optimise surgical outcome; reducing patient anxiety, reducing pre-operative thirst, hunger, and postoperative insulin resistance. Carbohydrate loading promotes a more anabolic state leading to less post-operative nitrogen and protein losses as well as better-maintained lean body mass and muscle strength.\(^ {6,18}\)

Carbohydrate loading involves prescribing specially formulated oral carbohydrate fluids with the correct osmolarity that are rapidly emptied from the stomach. This differs from the conventional management which often relies on patients being fasted overnight with over-zealous use of bowel preparation that can cause both dehydration and fluid and electrolyte abnormalities.

Attention for a diabetic patient is required as these patients may have delayed gastric emptying, possibly increasing the risk of regurgitation and aspiration.\(^ {6}\) Monitoring blood glucose levels pre-operatively is paramount to ensure that any abnormalities in blood glucose is detected and managed appropriately. Clear liquids have been shown to be well tolerated and safe in patients up to two hours before anaesthesia.\(^ {6}\)
**Limiting bowel preparation**

Mechanical bowel preparation is associated with fluid and electrolyte abnormalities. There is less risk of dehydration in abdominal surgery when oral bowel preparation is not routinely used, as patients can maintain their nutrition up to six hours before the operation. There remains controversy in some areas, such as patients undergoing low anterior colorectal resection, where further studies may be required.

**Day of Surgery Admission (DOSA)**

Moving to same day admission has several benefits; namely reducing surgical site infections and reducing post-operative complications. This will have ramifications for improved patient experience with patients spending less time in hospital ultimately providing improved capacity within secondary care settings. DOSA is dependent on rigorous pre-operative assessment, and robust bed management processes.

**Peri-operative Fluid Management**

When intravenous fluid is given, the benefits of maintaining circulatory filling and organ perfusion must be weighed against the risk of excess fluid accumulation in the lungs causing hypoxia, and, in the gut, causing nausea and delayed return of gut motility.

Oesophageal doppler monitoring allows the direct measurement of blood flow velocity in the central circulation. This information is used to guide optimal fluid management during surgery. Fluid optimisation is achieved using an intervention algorithm providing proactive rather than reactive intervention to ensure optimal fluid management and adequate perfusion to the vital organs. By ensuring adequate blood perfusion is maintained to vital organs, intraoperative fluid management using Doppler monitoring reduces the risk of intraoperative and post-operative complications.

There are currently eight randomised controlled trials demonstrating that oesophageal doppler monitoring and haemodynamic optimisation alone and in combination with other evidence based interventions can significantly improve surgical outcomes by reducing both the rates of post-operative complications and mortality, as well as significantly reducing both the length of hospital stay and the overall number of ICU / HDU bed days used.

**Thermoregulation**

Hypothermia can be prevented by routinely monitoring the patient’s temperature in theatre and utilising an air-warming system, along with intravenous fluid warmers, as per NICE guidance.
**Enhanced Recovery After Surgery**

**Analgesia**

Analgesia must be effective to allow early mobilisation. Where possible, regional anaesthetic techniques or nerve blocks should be used and long-acting opiates should be avoided. Regular paracetamol and a non-steroidal anti-inflammatory agent (NSAID) will reduce opiate requirements.

In open abdominal surgery, epidural analgesia can provide optimal post-operative analgesia, providing there are no contraindications to it. Ideally, the epidural should be sited in the thoracic region of the spine maximising pain relief to the abdominal area. The use of Transversus Abdominus Plane (TAP) blocks is increasingly popular, particularly with laparoscopic surgery.

If regional analgesia cannot be instigated, the alternative of patient controlled analgesia (PCA) with a combination analgesia regime, for example paracetamol and ibuprofen (if not contraindicated), can be very effective and leads to less opiate usage than ‘as required’ opioids by other routes.²¹

**Minimising the risk of Post-operative Nausea and Vomiting (PONV)**

Patients often report that postoperative nausea and vomiting can be more stressful than pain.²¹

Appropriate first-line and ‘as required’ anti-emetics should be prescribed routinely, so they can be given at the first indication of symptoms.²¹

**Surgical techniques**

Surgery should be carried out using minimally invasive procedure with meticulous technique. This reduces the surgical trauma on the patients, thereby aiding a faster recovery. Transverse incisions are favoured by some surgeons, and in some conditions for those patients undergoing open surgery, as this approach causes less pain and also achieves a good cosmetic result.²¹ Patients undergoing laparoscopic surgery are known to develop fewer post-operative complications.²¹

Laparoscopic surgical techniques have developed and continue to advance in colorectal, urological and gynaecological surgery. This is particularly relevant in colorectal cancer surgery, with the drive by NICE in 2006 that recommends laparoscopic resections as an alternative to open resection for suitable individuals with colorectal cancer.²² To accelerate the adoption of this technique, The National Training Programme for Laparoscopic Colorectal Surgery in Wales has been developed.

To help prevent wound infection, antibiotics should be given 60 minutes or less before ‘knife to skin’ as per the WHO Safer Surgery checklist.²¹

Drains and devices can affect a patient’s ability to mobilise easily and can, therefore, raise a psychological barrier to patients’ active participation in their rehabilitation. Their use should be dictated by clinical need rather than as routine.²¹
Surgical drains have not been shown to reduce complications and can actually cause problems such as infection; consequently, many surgeons recommend minimising their use. Some surgeons believe that there may be occasional clinical indications for using drains, such as in colorectal surgery for a total mesorectal excision.

Specific urological operations may require the use of drains for example, cystectomy and prostatectomy; following cystectomy, these drains will be removed between 24 and 48 hours, or on day one following prostatectomy. Nasogastric tubes delay gastric emptying and trigger nausea and vomiting, thus should be removed at the end of surgery unless there is a specific reason to keep them in.

To assist mobilisation and help reduce the risk of a urinary tract infection, urinary catheters should be removed as soon as possible after surgery. This will vary dependent on patient need and the type of surgery carried out.
Enhanced Recovery After Surgery

References


2. www.bmj.com/content/308/6923/235.full
   or http://web.jbjs.org.uk/cgi/reprint/86-B/6/788.pdf


Enhanced Recovery After Surgery


Driver: Post-op Bundle

The aim of post-operative rehabilitation in ERAS is to ensure the recovery period is optimised and that the patient remains empowered to follow the care plan defined pre-operatively.

Interventions

*What are we trying to accomplish post-operatively?*

- Appropriate analgesia
- Early oral or enteral nutrition within 12 hours of leaving the operating theatre
- Optimal fluid balance
- Optimise Gut function
- Early mobilisation within 6 hours of leaving operating theatre if practical*
- Post Operative Morbidity scores (POMs) completed daily on each post-operative day

<table>
<thead>
<tr>
<th>Required Intervention</th>
<th>Completed Yes</th>
<th>Completed No</th>
<th>Reason for non-compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naso-gastric tube removed in recovery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient sat out in chair 6 hours post-operative on day 0 of surgery*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient sat out in chair daily for 6-8 hours from day 1 after surgery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient achieved 4 x 60 metre walks daily after surgery (or adapted goal for patients with pre-existing mobility problems)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-operative nausea monitored and treated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catheter removal achieved 24 hours post operation or if epidural insitu removed 24 hours after epidural removed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV fluids removed 24 hours post-operative as patient eating and drinking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-operative morbidity score completed daily whilst in hospital</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Evidence

Optimising Gut function

Patients after abdominal surgery often develop impaired intestinal function characterised by altered motility, this is termed post-operative ileus and is often characterised by increased patient suffering and more complications, ultimately prolonging the time spent in hospital.

Many factors influence the time to return to normal intestinal function, including type of surgery, extent of surgery, duration of surgery, peri-operative complications, anaesthesia and analgesia.

Opioids have an inhibitory affect on motility, as do post-operative fluid balance, disturbances in acid-base balance and altered blood glucose. Similarly, many factors have been proven to promote motility these include: enteral nutrition, prokinetic agents, chewing gum to name a few. Optimal intestinal function is essential to ensure the timely delivery of oral food and fluid and hence is a major determinant in post-operative recovery.

Optimal Fluid Balance

Fluid balance is central to the return of normal function post-operatively. It has been standard practice in recent years to infuse volumes of intravenous fluids substantially in excess of actual perioperative losses.

Traditional peri-operative intravenous fluid regimens in abdominal surgery can lead to patients receiving 3.5 litres to 7 litres of fluid on the day of surgery and more than 3 litres / day for the following 3 to 4 days, leading to a 3 to 6 kilogram weight gain. The types of fluids used are critical, as the choice of colloids or crystalloid can radically influence clinical outcome. Sub-optimal fluid balance can impair wound or anastomotic healing, affecting tissue oxygenation, leading to prolonged hospitalisation.

The best way to limit postoperative intravenous fluid administration is to stop intravenous infusions and return to enteral oral fluids early. The prescription of intravenous fluids tends to be the responsibility of junior doctors. The issues surrounding the challenges of post-operative fluid management were highlighted in a survey by Lobo (2002), which concluded that current peri-operative fluid and electrolyte management in the UK is sub-optimal. Only 16% of Consultants reported that they felt junior doctors had adequate knowledge in fluid management. As a consequence, only 30% of Consultants felt that post-operative patients received the appropriate amounts of water, sodium and potassium.

The optimal prescription of fluids is dependent on a clear understanding of fluid balance by the prescribing doctor. Therefore, adequate training on fluid management for undergraduate and post-graduate doctors is essential. The GIFTASUP guidelines provide a consensus for the recommendations for peri-operative fluid management. These guidelines will be adopted as part of the ERAS programme in Wales.
**Early Enteral Nutrition**

A meta-analysis concluded that compared to nil by mouth there is no advantage of keeping patients fasted after elective gastrointestinal resection.\(^{11}\)

Early oral or enteral feeding is associated with an improved clinical outcome,\(^ {12}\) shorter hospital stay with no associated increased risk of anastomotic dehiscence. Oral and enteral feeding has been shown to be safe and well tolerated but is dependent on using appropriate anaesthesia and analgesia, nausea and vomiting prophylaxis and optimal fluid balance as already highlighted.\(^ {13}\)

For patients who are malnourished nutritional supplementation improved nutritional status and quality of life.\(^ {14}\) Benefits have also been documented in patients undergoing elective surgery who are not malnourished.\(^ {15}\)

In ERAS programs, oral nutritional supplements have been used successfully for at least the first 4 postoperative days to achieve recommended intakes of energy and protein.\(^ {15}\) When used in combination with preoperative oral carbohydrate loading, epidural analgesia, and early enteral nutrition have been shown to result in nitrogen equilibrium without elevating blood glucose levels.\(^ {16}\)

The delivery of oral or enteral nutrition has been demonstrated to be maximal if commenced immediately, within 12 hours after surgery.\(^ {17}\) In patients who are unable to achieve adequate nutrition post-operatively, artificial nutrition is recommended by the NICE guidelines on nutritional support.

**Early Rehabilitation**

Bed rest is not recommended post-operatively. Early mobilisation maintains muscle mass and promotes muscle strength, whilst maximising respiratory function.\(^ {18}\) Limited mobility is associated with increased risk of thromboembolism.

The plan for post-operative mobilisation will depend upon the nature of the surgery and the condition of the patient. All expectations should be discussed fully with the patient pre-operatively.

An example for early rehabilitation post operative in colorectal ERAS is as follows:

- on the day of surgery sit out six hours post-operatively
- sit out for 6-8 hours every subsequent day post-operatively
- mobilise at least 4 times 50-60 metres every day post-operatively
  (or adapted goal for patients with pre-existing mobility problems)

A qualified physiotherapist should assist with patients with incisional wounds within the first 24 hours, as this approach to mobilisation is earlier than occurs with traditional care. To enable mobilisation adequate analgesia and fluid management is essential.
References


Enhanced Recovery After Surgery

**Driver: Discharge and Follow-up Bundle**

The expected length of stay should have been discussed at the pre-operative assessment appointment with patients given the date of surgery and a planned discharge date. Therefore patients and their families and carers should be aware of the day for discharge if surgery was uncomplicated.

Referral to the occupational therapist and social services at pre-operative assessment should have allowed any specific needs to be proactively planned and managed, leading to the avoidance of unnecessary delays in discharge. The use of acute response teams and re-enablement teams may be required to facilitate discharge in patients requiring extra support and are medically fit for discharge from hospital.

Adherence to agreed patient-focused discharge criteria shared with the patient prior to surgery should facilitate discharge. It is essential that the patient shares in the decision for discharge and is only discharged when ready. Criteria may vary slightly between hospital sites but, in general, it is expected that patients would:

- tolerate diet and oral fluids
- be able to mobilise
- open bowels or pass flatus
- be confident and agree to go home

The Post-operative Morbidity Score (see appendix C) is a validated 18-item survey which addresses nine domains of postoperative morbidity. It aims to identify morbidity of a type and severity that could delay discharge from hospital. It is important to consider who needs to be informed prior to discharge including the GP, district and community nurses.

The primary care team (GP, district and community nurses) responsible for referring the patient for surgery should be informed of the discharge date and needs prior to discharge. This ensures primary care colleagues are aware of who to contact for advice and guidance to prevent the need for unnecessary readmission.

All patients should be telephoned 24 hours, 3 days and 7 days after discharge to offer support and reassurance. This should help maintain patient confidence and improve the patient experience.
<table>
<thead>
<tr>
<th>Required Intervention</th>
<th>Completed Yes</th>
<th>Completed No</th>
<th>Reason for non-compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDD achieved by patient</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TTO’s ordered and dispensed for patient, day before discharge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discharge needs confirmed with patient/carer/social services immediately post operation to finalise plans discussed in POAC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient contacted within 48 hours post discharge to check progress at home</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriate MDT referrals made for follow up after discharge</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

References

1. Grocott et al. The Postoperative Morbidity Survey was validated and used to describe morbidity after major surgery, Journal of Clinical Epidemiology 60 (2007) 919e928
## Appendix A - Reporting and Measures

<table>
<thead>
<tr>
<th>Process Measures</th>
<th>Outcome Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compliance with Assessment Care Bundle</td>
<td>Lee’s Revised Cardiac Risk Index (see Appendix B)</td>
</tr>
<tr>
<td>Compliance with Immediate Care Bundle</td>
<td>Post-operative Morbidity Score</td>
</tr>
<tr>
<td>Compliance with Intra-operative Bundle</td>
<td>Length of Stay:</td>
</tr>
<tr>
<td>Compliance with Post-op Bundle</td>
<td>• In Hospital</td>
</tr>
<tr>
<td>Compliance with Discharge and Follow-Up Bundle</td>
<td>• Until medically fit for discharge (POMs score =0*</td>
</tr>
<tr>
<td></td>
<td>• In Critical Care</td>
</tr>
<tr>
<td></td>
<td>• Prior to surgery</td>
</tr>
<tr>
<td></td>
<td>% of Patients Readmitted within 28 days</td>
</tr>
<tr>
<td></td>
<td>Episodes of Harm and surgical complications</td>
</tr>
<tr>
<td></td>
<td>Patient Reported Outcome EQ5D and SF12</td>
</tr>
</tbody>
</table>
Appendix B

Derivation and Prospective Validation of a Simple Index for Prediction of Cardiac Risk of Major Noncardiac Surgery

Criteria: Assign 1 point for each of the following, and total:

- High Risk Surgery: 1 Point
- Coronary Artery Failure: 1 Point
- Cerebrovascular disease: 1 Point
- Diabetes Mellitus on insulin: 1 Point
- Serum Creatinine >177μmol/L: 1 Point
- Congestive Heart Failure: 1 point

<table>
<thead>
<tr>
<th>Points</th>
<th>Risk of major Cardiac event</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Very Low (0.4% complications)</td>
</tr>
<tr>
<td>1</td>
<td>(0.9% complications)</td>
</tr>
<tr>
<td>2</td>
<td>(6.6% complications)</td>
</tr>
<tr>
<td>3</td>
<td>(&gt;11% complications)</td>
</tr>
</tbody>
</table>

Reference

## Appendix C

### Postoperative Morbidity Survey (POMS) Day 1 postop

<table>
<thead>
<tr>
<th>Morbidity type</th>
<th>Criteria</th>
<th>Tick if present*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonary</td>
<td>Has the patient developed a <em>new</em> requirement for oxygen or respiratory support.</td>
<td></td>
</tr>
<tr>
<td>Infectious</td>
<td>Currently on antibiotics and/or has had a temperature of &gt;38°C in the last 24hr.</td>
<td></td>
</tr>
<tr>
<td>Renal</td>
<td>Presence of oliguria &lt;500 mL/24 hr; Increased serum creatinine (&gt;30% from preoperative level); Urinary catheter in situ.</td>
<td></td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>Unable to tolerate an oral diet for any reason including nausea, vomiting, and abdominal distension.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use of antiemetic.</td>
<td></td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>Diagnostic tests or therapy within the last 24 hr for any of the following: new myocardial infarction or ischemia, hypotension (requiring fluid therapy &gt;200 mL/hr or pharmacological therapy), atrial or ventricular arrhythmias, cardiogenic pulmonary oedema, thrombotic event (requiring anticoagulation).</td>
<td></td>
</tr>
<tr>
<td>Neurological</td>
<td>New focal neurological deficit, confusion, delirium, or coma.</td>
<td></td>
</tr>
<tr>
<td>Haematological</td>
<td>Requirement for any of the following within the last 24 hr: packed erythrocytes, platelets, fresh-frozen plasma, or cryoprecipitate.</td>
<td></td>
</tr>
<tr>
<td>Wound</td>
<td>Wound dehiscence requiring surgical exploration or drainage of pus from the operation wound with or without isolation of organisms.</td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>New postoperative pain significant enough to require IV or IM opioids or regional analgesia.</td>
<td></td>
</tr>
</tbody>
</table>

* If no scores above then please state reason why patient still in hospital

1. Grocott et al. The Postoperative Morbidity Survey was validated and used to describe morbidity after major surgery, *Journal of Clinical Epidemiology* 60 (2007) 919e928.
Appendix C

Definitions of Post-operative Complications

Postoperative complications

1. Acute Myocardial infarction- at least two of:
   • New onset or worsening of ischaemic symptoms (eg. Chest pain, shortness of breath) lasting longer than 20 minutes;
   • Changes on the electrocardiogram consistent with ischaemia, including:
     □ Acute ST elevation followed by the appearance of Q waves or loss of R waves
     □ New left bundle branch block
     □ New persistent T wave inversion for at least 24 hours
     □ New ST segment depression which persists for at least 24 hours
   • A raised Troponin level or a peak Creatinine Kinase MB fraction >4% of an elevated total Creatinine Kinase level, with characteristic rise and fall

2. Cardiac arrest- documented sudden cessation of Cardiac output maintaining effective circulation

3. Reintubation

4. Acute Pulmonary oedema- respiratory compromise with chest X-ray showing extravascular fluid in lung tissues and alveoli

5. Pulmonary embolus- high probability of embolus on V/Q scan or pulmonary angiogram

6. Stroke- confirmed by computerised tomography scan, and clinical symptoms such as paralysis, weakness or speech difficulties, first documented after operation

7. Sepsis (Systemic inflammatory response syndrome) - new finding of at least two of:
   □ Temperature, >38.3 degrees centigrade, or, <36 degrees centigrade
   □ White cell count, >12 x 109L
   □ Respiratory rate, >20 breaths/minute
   □ Heart rate, >90 beats/minute or
   □ A positive result of a blood culture alone

8. Wound infection- purulent discharge or redness, or serous discharge and positive result of a culture or having antibiotic treatment

9. Unplanned return to operating room- related to the surgery (eg, bleeding)

10. Acute renal impairment- increase in serum creatinine level >20% of preoperative value, or admission to intensive care unit for renal replacement therapy

11. Unplanned admission- to intensive care unit, coronary care unit or high dependency unit

12. Death

McNicol L et al. Postoperative complications and mortality in older patients having non-cardiac surgery at three Melbourne teaching hospitals MJA 2007; 186: 447-452
Appendix E - Setting up your team

Achieving improvements that reduce harm, waste and variation at a whole-organisation level needs a team approach: one person working alone, or groups of individuals working in an uncoordinated way will not achieve it and this applies equally at all organisational levels.

Whether your improvement priorities relate to 1000 Lives Plus content areas, national intelligent targets or other local priorities, you need to consider three different dimensions in putting your team together:

- Organisation level leadership.
- Clinical or technical expertise.
- Frontline leadership.

There may be one or more individuals on the team working in each dimension, and one individual may fill more than one role, but each component should be represented in order to achieve sustainable improvement.

**Organisation level leadership**

An Executive, or equivalent level Director, should always be given delegated accountability from the Chief Executive for a specific content area; and all staff working on the changes should know who this is. This individual needs sufficient influence and authority to allocate the time and resources necessary for the work to be undertaken. It is likely that accountability will be further delegated to Divisions, Clinical Programme Groups or Directorates and this can help to build ownership and engagement at a more local level. However, it is essential that the leader has full authority over the areas involved in achieving the improvement aim. As changes spread more widely, crossing organisational boundaries, appropriate levels of delegation will need to be reviewed.

When working with frontline teams, it is essential for organisational level leaders to have an understanding of the improvement methodology and to base conversations around the interpretation of improvement data. Reporting of progress to higher organisational levels should also use a consistent data format so that the Executive level leader can report to the Board on progress.

**Clinical/Technical Expertise**

A clinical or technical expert is someone who has a full professional understanding of the processes in the content area. It is critical to have at least one such champion on the team who is intimately familiar with the roles, functions, and operations of the content area. This person should have a good working relationship with colleagues and with the frontline leaders, and be interested in driving change in the system. It is important to look for clinicians or technical professionals who are opinion leaders in the organisation (individuals sought out for advice who are not afraid to try changes).
Patients can provide expert advice to the improvement team, based on their experience of the system and the needs and wishes of patients. A patient with an interest in the improvement of the system can be a useful member of the team. Additional technical expertise may be provided by an expert on improvement methodology, who can help the team to determine what to measure, assist in the design of simple, effective measurement tools, and provide guidance on the design of tests.

**Frontline leadership**

Frontline leaders will be the critical driving component of the team, assuring that changes are tested and overseeing data collection. It is important that this person understands not only the details of the system, but also the various effects of making changes in the system. They should have skills in improvement methods. This individual must also work effectively with the technical experts and system leader. They will be seen as a bridge between the organisation leadership and the day-to-day work.

Frontline leaders are likely to devote a significant amount of their time to the improvement work, ensuring accurate and timely data collection for process and outcome measures related to the frontline team.

**Characteristics of a good team member**

In selecting team members, you should always consider those who want to work on the project rather than trying to convince those that do not. Some useful questions to consider are the following:

- Is the person respected for their judgment by a range of staff?
- Do they enjoy a reputation as a team player?
- What is the person’s area of skill or technical proficiency?
- Are they an excellent listener?
- Is this person a good verbal communicator within and in front of groups?
- Is this person a problem-solver?
- Is this person disappointed with the current system and processes and passionately want to improve things?
- Is this person creative, innovative, and enthusiastic?
- Are they excited about change and new technology?
Appendix F - The Model for Improvement

Successful improvement initiatives don’t just happen - they need careful planning and execution. There are many things to consider and techniques to employ, which are captured in the driver diagram on page 42. The rest of this section explains the primary drivers and where to get more help in using them.

In any improvement initiative you need to succeed in three areas. You need to generate the Will to pursue the changes, despite difficulties and competing demands on time and resources. You need the good Ideas that will transform your service. Finally you need to Execute those ideas effectively to get the change required.

Will

The interventions you need to build Will are explained in the ‘Leading the Way to Safety and Quality Improvement’ and ‘How to Improve’ guides. They concentrate on raising the commitment levels for change and then providing the project structure to underpin improvement approaches. Spreading changes to achieve transformative change across the whole health system requires strong leadership. We need to create an environment where there is an unstoppable will for improvement and a commitment to challenge and support teams to remove any obstacles to progress.

Ideas

The interventions in this guide describe ideas which evidence shows to be effective for achieving changes that result in improvements. It gives examples from organisations that have achieved them and also advice based on their experience. Methods and techniques for generating new ideas or innovative ways to implement the evidence can be found in the ‘How to Improve’ guide and other improvement literature.

Execution

However, to bring these ideas into routine practice in your organisation, it is essential that you test the interventions and ensure that you have achieved a reliable change in your processes before attempting to spread the change more widely.

1000 Lives Plus uses the Model for Improvement (MFI) which is a proven methodology as the basis for all its improvement programmes. It requires you to address three key questions and then use Plan-Do-Study-Act (PDSA) cycles to test a change idea. By doing repeated small-scale tests, you will be able to adapt change ideas until they result in the reliable process improvement you require. Only then are you ready to implement and spread the change more widely.
Model for Improvement
Driver Diagram

Aim

Primary drivers

Secondary drivers

Interventions

To deliver patient safety and quality initiatives for Health Boards and Trusts

Will

Ideas
Evidence Base (The what to)

Use the relevant content area ‘How to Guide’ to assess the latest evidence of best practice

Use the relevant content area ‘How to Guide’ to assess the latest evidence of best practice

Execution
Improvement Methodology (The how to)

The Model for Improvement

What are you trying to accomplish?

How will you know that a change is an improvement?

What change can you make that will result in improvement?

Establish reliable process

Use reliability model

PDSA cycles:
Test - implement - spread - sustain

Set SMART aims

Communicate aims

Use project charter to provide structure

Understand what to measure

Use 7 step measurement process

Map the process

Use creative thinking

Engage senior Leadership

Make links to organisation goals

Form teams

Build skills

Raise awareness

Appoint clinical champions

Consult Faculty members to agree standards to be achieved

Use critical sub sets of key content areas to improve the outcome
Model for Improvement-PDSA Cycle

What are we trying to accomplish?
How will we know that a change is an improvement?
What change can we make that will result in improvement?

For more guidance on using the Model for Improvement, see the ‘How to Improve’ guide.

Seven Steps to Measurement

1 Decide aim
2 Choose measures
3 Define measures
6 Review measures
7 Repeat steps 4-6
4 Collect data
5 Analyse & present

Repeat steps 4-6
One area that bears extra attention is measurement because we have found that this is often the Achilles heel of improvement projects. When measuring your progress, follow the Seven Steps to Measurement shown on page 43 and covered in more detail in the ‘How to Improve’ Guide.

The key is to go round the Collect-Analyse-Review cycle frequently:

- **Collect** your data
- **Analyse** - turn it into something useful like a run chart
- **Review** - meet to decide what your data is telling you and then take action

Successful improvement projects all have clear aims, robust measurement and well-tested ideas. Use the ‘How to Improve’ guide to ensure your projects have all three.

**What are we trying to accomplish?**

You will need to set an aim that is Specific, Measurable, Achievable, Realistic and Time-bound (SMART). Everyone involved in the change needs to understand what this is and be able to communicate it to others.

**How will we know that change is an improvement?**

It is essential to identify what data you need to answer this question and how to interpret what the data is telling you. The improvement methodology ‘How to Guide’ provides detailed information on the tools, tips and information you need to achieve this, and includes the following advice:

<table>
<thead>
<tr>
<th><strong>Plot data over time</strong></th>
<th>Tracking a few key measures over time is the single most powerful tool a team can use.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Seek usefulness, not perfection.</strong></td>
<td>Remember, measurement is not the goal; improvement is the goal. In order to move forward to the next step, a team needs just enough data to know whether changes are leading to improvement.</td>
</tr>
<tr>
<td><strong>Use sampling.</strong></td>
<td>Sampling is a simple, efficient way to help a team understand how a system is performing.</td>
</tr>
<tr>
<td><strong>Integrate measurement into the daily routine.</strong></td>
<td>Useful data is often easy to obtain without relying on information systems.</td>
</tr>
<tr>
<td><strong>Use qualitative and quantitative data.</strong></td>
<td>In addition to collecting quantitative data, be sure to collect qualitative data, which is often easier to access and highly informative.</td>
</tr>
<tr>
<td><strong>Understand the variation that lives within your data.</strong></td>
<td>Don’t over-react to a special cause and don’t think that random movement of your data up and down is a signal of improvement.</td>
</tr>
</tbody>
</table>
What change can we make that will result in improvement?

The interventions in this guide describe a range of change ideas that are known to be effective. However, you need to think about your current local systems and processes and use the guide as a starting point to think creatively about ideas to test. The improvement methodology guide gives more advice to support you in generating ideas.

Spreading changes to achieve transformative change across the whole health system requires strong leadership. We need to create an environment where there is an unstoppable will for improvement and a commitment to challenge and support teams to remove any obstacles to progress. The guide on ‘Leading the Way to Safety and Quality Improvement’ gives detailed information on interventions that will support this. However, the Model for Improvement, PDSA cycles and process measurement lie at the heart of the transformative change we seek.
Appendix G

Members of the All Wales Enhanced Recovery after Surgery Committee

Dr Neil Agnew, Betsi Cadwaladr University Health Board
Mr Graham Alexander, Betsi Cadwaladr University Health Board
Mr Barry Appleton, Abertawe Bro Morgannwg University Health Board
Mrs Carole Berger, Aneurin Bevan Health Board
Ms Melissa Baker, Programme Manager, ERAS Collaborative
Dr Rachael Barlow, Joint Lead, All-Wales ERAS Collaborative
Mr Mark Davies, Abertawe Bro Morgannwg University Health Board
Dr Richard Davies, Cardiff and Vale University Health Board
Mrs Kavita Gnanaoliva, Cardiff and Vale University Health Board
Dr Emma Hosking, Betsi Cadwaladr University Health Board
Dr Chris Jones (Chair), Medical Director NHS Wales
Mr Umesh Khot, Abertawe Bro Morgannwg University Health Board
Mrs Collette Kiernan, Cwm Taf Health Board
Mr Wyn Lewis, Cardiff and Vale Health Board
Ms Rachel Lewis, Hywel Dda Health Board
Mr Stuart Moncur, Hywel Dda Health Board
Dr Susan Morgan, Cwm Taf Health Board
Ms Marilize Du Preez, Hywel Dda Health Board
Ms Helen Shannon, Aneurin Bevan Health Board
Dr Heather Slowey, Abertawe Bro Morgannwg University Health Board
Mr Neil Windsor, Betsi Cadwaladr University Health Board
Mr Gethin Williams, Aneurin Bevan Health Board
Ms Iris Williams, Hywel Dda Health Board
Mr Roy Williams, Cwm Taf Health Board
Dr Alan Willson, Joint Lead- All Wales ERAS Collaborative, NLIAH and Co-Director of 1000 Lives Plus
Mr Alan Woodward, Cwm Taf Health Board
Dr Brian Yate, Hywel Dda Health Board
Improving care, delivering quality

If we can improve care for one person, then we can do it for ten.

If we can do it for ten, then we can do it for a 100.

If we can do it for a 100, we can do it for a 1000.

And if we can do it for a 1000, we can do it for everyone in Wales.

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