PQIP

Perioperative Quality Improvement Programme

ANNUAL REPORT 2017-18

RCoA Royal College of Anaesthetists

NIAA National Institute of Academic Anaesthesia

HSRC Health Services Research Centre

The Health Foundation Inspiring Improvement

PQIP Perioperative Quality Improvement Programme

Contents

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PQIP Perioperative Quality Improvement Programme

Welcome to the first ever PQIP Annual Report

PQIP has been running for just over a year, and we are well on the way to being the largest research study evaluating and improving the quality of perioperative care in the history of the NHS. The main aim of PQIP is to improve outcomes for patients having major surgery — in particular complications, patient satisfaction, disability free survival and health-related quality of life. To do this, we are likely to need to improve both structures (how hospitals are set up to deliver care) and processes (the care provided to individual patients). And to do this, we need to support clinicians to use their own data about the quality of care, in order to facilitate change where required.

A key part of PQIP's philosophy is to focus on the approach to change known as "positive deviance". This celebrates the successes of the best performing hospitals in a number of key perioperative processes and describes how communities create their own sustainable solutions to problems, using their own collective intelligence. We look forward to hospitals sharing ideas and learning from each other in order to bring about positive change, as a community of healthcare professionals focused on improving patient outcomes.

None of this would be possible without the efforts of the local collaborators who are collecting and acting on this data. It is wonderful to list the names of around 500 individuals who have made PQIP possible in Year 1. We look forward to even more names being on that list next year. I would also like to thank the whole PQIP Project Team and Clinical Reference Group, and in particular James Bedford, Arun Sahni, James Goodwin, Dorian Martinez and our amazing study coordinator Alexandra Brent, who have worked incredibly hard to bring this report to you.

Next Steps

Next year, we have a lot to look forward to. We are expanding our inclusion criteria to include complex orthopaedics and plastics and we will welcome our first hospitals in Scotland and Wales. We will also welcome three new national surgical leads to the project team and see the launch of two exciting embedded research projects which will involve around 20 hospitals: the ERAS+ programme from Manchester will evaluate the impact of a bundle of care aimed at reducing postoperative pulmonary complications; and the POM-VLAD project will evaluate the impact of a novel data-display method packaged with an ER-based bundle on patient processes and outcomes.

These are both examples of how PQIP can be used to support even more research and improvement – so if you have ideas you would like to discuss with us, just get in touch. But most importantly, we hope that the coming year will lead to great improvements in perioperative patient care. Thank you all for your hard work and engagement.

Ramani Moonesinghe
Chief Investigator
Perioperative Quality Improvement Programme

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Using evidence and data to improve the care of surgical patients

PQIP's Top 5 National Improvement Opportunities for 2018-19

1 Anaemia & Diabetes

Anaemia and poorly controlled diabetes both lead to postoperative complications.

Both are modifiable through best patient care

Avoiding transfusion and hyperglyacaemia are key goals

Aim Hb>13 for all elective major surgery and HbA1C<8.5% or <69mmol/mol for all diabetics

2 Individualised Risk Assessment

Individualised risk assessment is important for shared decision making and is a legal requirement

A combination of objective evaluation and clinical judgement is recommended

Scores (e.g. P-POSSUM or SORT), frailty evaluation or CPET are all valid ways to assess risk

Aim to build individualised risk assessment into your patient pathway

3 Enhanced Recovery

Enhanced recovery pathways (ERPs) provide individualised, protocolised care to reduce complications, which can prolong length of stay

ERPs generally include carbohydrate loading, minimally invasive surgery, avoidance of fluid overload, tubes and drains, and early nutrition and mobilisation

Sharing pathways between hospitals may aid knowledge dissemination

4 Individualised Pain Management

Severe perioperative pain is common and impacts on patient experience and recovery

Good pain management begins with preoperative assessment and planning

A regular pain service led by appropriately trained clinicians is recommended for best patient care

Use multimodal approaches, including L.A. blocks, and ideally minimise use of opioids

5 Drinking, Eating, Mobilising (DrEaMing)

Aiming to return patients to DrEaMing within 24hrs of the end of surgery is a key goal of enhanced recovery

Taking down IV fluids as early as possible supports return to usual homeostasis.

Early mobilisation reduces the risk of thromboembolic events.

Empower patients to DrEaM through high quality preoperative preparation and use of patient diaries

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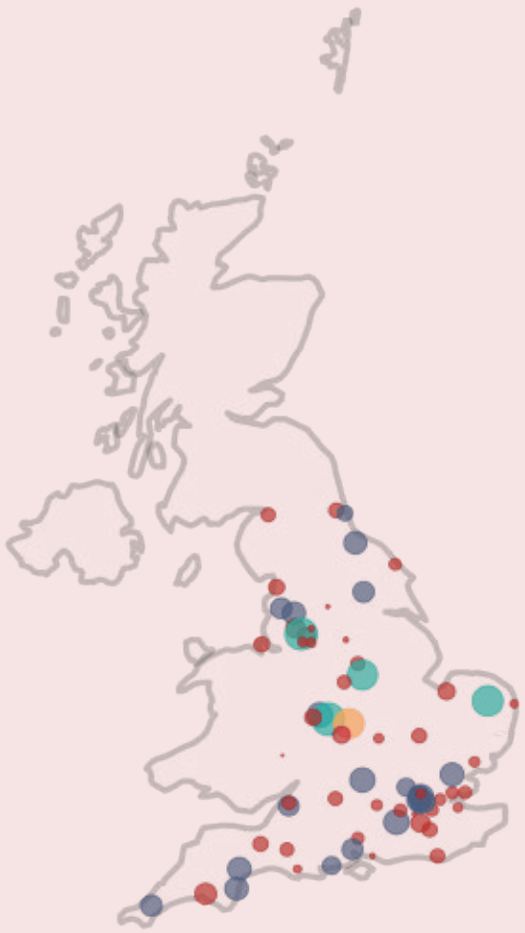
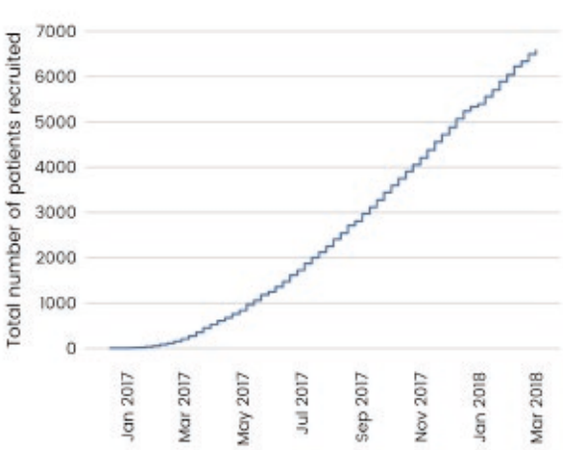
Recruiting sites in PQIP

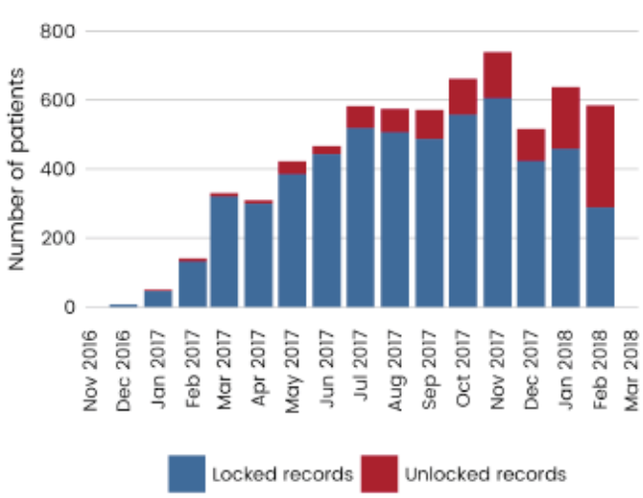
PQIP is recruiting patients in 79 hospitals across England; our first sites in Scotland and Wales are due to start soon.

Up to 28 February 2018 there were 6596 patients recruited to PQIP. Of those, there were 5486 locked records (83.2%).



As more hospitals come on board, our recruitment rate is steadily increasing. We know that there is enthusiasm to recruit more patients at many centres and we are working with the NIHR to bring more research nurse support to you. Data quality is high and data entry is timely. We are really grateful to all investigators for supporting timely data entry. Please keep it up to maximise your opportunity to use your data for improvement.





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What do PQIP patients look like?

Age

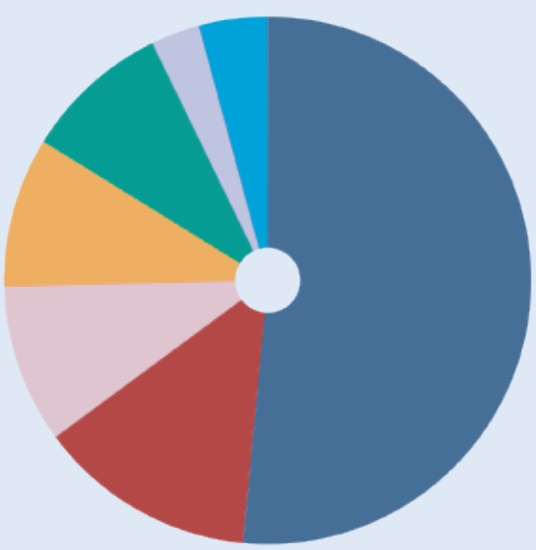
The median age was 67.

Gender

61% were men,
39% were women.

BMI

The average (median) Body Mass Index was 27. But almost 30% of patients had a BMI of over 30, and 2% had a BMI under 20.



As you can see, patients undergoing lower GI surgery make up more than half of our cohort. However, we are rapidly building up numbers in all types of surgery, which will enable us to do some specialty-specific research and improvement work in the near future.

DATA QUALITY TIP!

Please check the PQIP definitions used for individualised risk assessment. This means that the patient has had a documented assessment of their individual risk of poor outcomes after surgery. This might include quantitative assessment (e.g. a cardiopulmonary exercise test which reports peak VO2 and anaerobic threshold, or a percentage estimate of risk of death provided by an online/app risk calculator), qualitative assessment (patient estimated to be low, medium or high risk, for example), or include both.

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Individualised Risk Assessment

Nationally, 67% of PQIP patients had an individualised risk assessment in Year 1. **Let's work together to push this towards 100% in Year 2!**

Montgomery ruling

Since 2015, doctors must warn patients of material risks. "Material" = those risks that "a reasonable person in the patient's position would be likely to attach significance to..." or that "the doctor is or should reasonably be aware that the particular patient would be likely to attach significance to it."

Shared decision making

SDM principles suggest patients should ask these 3 questions in relation to their treatment plans:

1. What are my options?
2. What at the pros and cons of each option for me?
3. How do I get support to help me make a decision which is right for me?

Risk calculators

Several risk calculators exist which can be used to help predict patient risk of poor outcomes. These include the SORT (www.sortsurgery.com), the NSQIP calculator (https://riskcalculator.facs.org/RiskCalculator/) and the P-POSSUM and various surgery-specific tools (www.riskprediction.org.uk).

Functional capacity assessment

Evaluation of functional capacity is a key part of risk assessment. This can be done using cardiopulmonary exercise testing, scores such as the Duke Activity Status Index or frailty scores, or more detailed evaluations such as through Comprehensive Geriatric Assessment.

Clinical judgement

All objective systems should be used in conjunction with clinical judgement - details such as whether the surgery is likely to be particularly technically challenging or the impact of rarer diseases are unlikely to be fully considered by scores or exercise testing alone.

New data coming soon

Both the METS study and the SNAP2-EPICCS study will provide more information about the comparative accuracy of scores, exercise testing and clinical judgement.

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Preoperative Assessment

98% of PQIP patients had a face-to-face preoperative assessment before their admission for surgery.

DATA QUALITY TIP!

Please check the definitions used by PQIP for preoperative assessment. This question refers to outpatient evaluation before admission to hospital for surgery.

Cardiopulmonary Exercise Testing (CPET)

21% of patients underwent Cardiopulmonary Exercise Testing before surgery. Just over half of PQIP sites offer CPET evaluation. This map shows the geographic distribution of hospitals offering CPET testing.

If your hospital doesn't, and you would be interested in finding out more about which hospitals near you do offer the service, please get in touch with us.

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Improvement Opportunity! Perioperative Anaemia

New guidelines say that both women and men should be considered anaemic if Hb<13g/dl.

Preoperative anaemia is associated with higher morbidity, length of stay and mortality after major non-cardiac surgery

2210 (41%) PQIP patients were anaemic at the time of surgery

Most (88%) of these were having elective (rather than expedited) surgery, so should have had time for anaemia management

Treating pre-op anaemia should maximise iron stores, improve Hb concentration and avoid the need for blood transfusion in the perioperative period

It is recommended that units carrying out major surgery should have a preoperative anaemia pathway that identifies, investigates and treats anaemia

Anaemia treatment may involve oral or intravenous (IV) iron, folic acid and vitamin B12.

The main change in practice is the increased use of IV iron

Check out the 2017 consensus statement here, and adapt to your local context: https://onlinelibrary.wiley.com/doi/epdf/10.1111/anae.13773

They recommend IV iron should be used as front-line therapy in iron deficient patients who do not respond to oral iron or are not able to tolerate it, or if surgery is planned for <6 weeks after diagnosis of iron deficiency (with or without anaemia)

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Improvement Opportunity! Diabetes

13 Percentage of PQIP patients who are diabetic. This is higher than the estimated prevalence in the general adult population (9%).

69 Percentage of diabetic patients who had an HbA1C recorded.
National guidelines state that all diabetic patients should have an HbA1C measurement before major elective surgery.

8.5 Recommended upper threshold in % of preoperative HbA1C (equivalent to 69mmol/mol if using IFCC units). If higher than this, consideration should be given to postponing surgery if possible.

20 Percentage of patients whose HbA1C was greater than the recommended upper threshold for planned surgery, therefore putting them at increased risk of postoperative complications.

90 Percentage of these patients with poor glycaemic control who were undergoing elective surgery (rather than expedited) - so could therefore have had time for optimisation.

6-12 Surgery may upset normally good blood glucose control. Guidelines recommend maintaining capillary blood glucose levels of 6-12mmol/l and using variable rate insulin infusions if required.

- Look at the 2017 guidelines here: http://www.diabetologists-abcd.org.uk/JBDS/Surgical_guidelines_2015_full_FINAL_amended_Mar_2016.pdf
- Use these to develop your own pathway

- Measure HbA1C on all diabetics
- Consider postponing non-urgent surgery if HbA1C>8.5%.
- Measure blood glucose regularly and treat if >12mmol/l

Postoperative critical care

National guidelines state that patients with a 30-day mortality risk of ≥ 5% should be admitted to a Level 2 or 3 facility after surgery. 330 patients (6.4%) were predicted as having a 30-day mortality risk of ≥ 5% using the Surgical Outcome Risk Tool (SORT). Of those 330 patients, 192 (58.2%) were admitted to Level 2/3 care directly after surgery. This compares to 46% of patients with a risk of death <5% being admitted to Level 2/3 care. So – how to interpret this? It appears that lots of hospitals prioritise some patients for critical care admission irrespective of their predicted risk of death. However, there is still some work to do in terms of ensuring that all high-risk patients are admitted to critical care.

Build risk-based critical care referral into perioperative pathways.

While risk assessment should ideally be done at the time of outpatient preoperative assessment, even on the morning of surgery, it may not be too late to refer a high risk patient to critical care.

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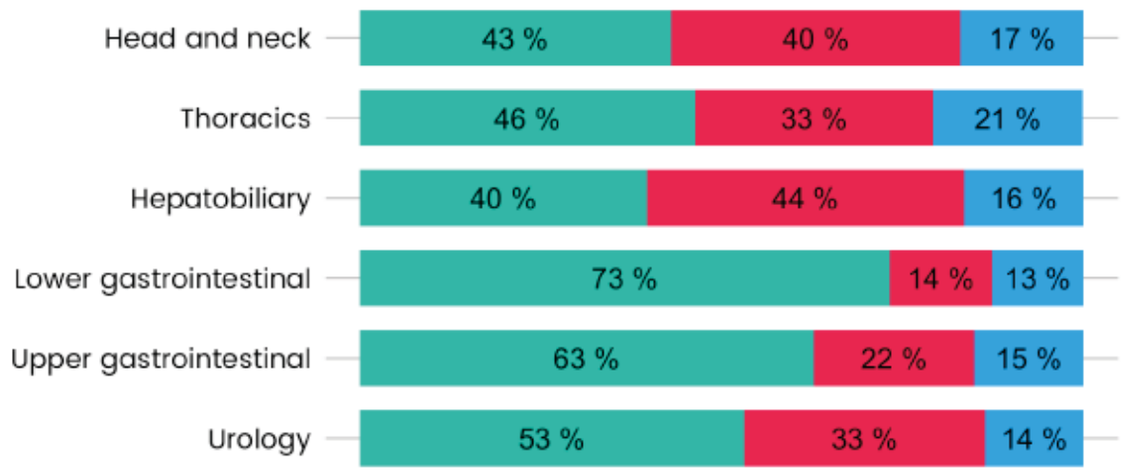
Enhanced Recovery

Enhanced recovery (ER) is an approach to perioperative care which aims to reduce complications and length of hospital stay, thereby improving patient experience and outcome. The main principles include establishing a partnership to inform decision making between patients and clinicians, and optimization of in-hospital care to keep patients mobile, comfortable, hydrated and well-nourished.



Green = *Patients on an ER pathway*
Red = *Patients not on an ER pathway*
Blue = *Not known*

There is a lot of variation between specialties and hospitals in terms of Enhanced Recovery adoption and compliance. Nationally, 61.4% of PQIP patients were enrolled on an ERAS pathway. Four hospitals reported that none of their patients were on ER pathways, while five hospitals reported every patient was on an ER pathway.

This table shows the national compliance with some key ER principles. This shows real opportunities for improvement. We have highlighted hospitals which are doing well in the 'Postive Deviance' section of this report (p.16). Perhaps consider getting in touch with centres doing well to find out their secrets!

Carbohydrate pre-loading	Individualised risk assessment	Warming devices used	CO monitoring used	No NGT in recovery *	No drains in recovery *	Drinking at 24h	Eating at 24h	Mobilising at 24h	DrEaMing
47 (64 if on ER pathway)	67	97	31	91	57	78	60	76	53

Red = *up to 60% compliant*
Amber = *60-80% compliant*
Green = *>80% compliant*

**Colorectal patients only*

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Prepare patients for surgery

- Individualised risk assessment
- Shared decision making
- Patient education and empowerment

Maintain homeostasis

- Day of surgery admission
- Maintain statins and beta-blockers
- Avoid excess starvation and catabolism
- Avoid hyperglycaemia by carbohydrate pre-loading if not diabetic
- Avoid fluid overload by using flow-directed fluid therapy

Reduce trauma and stress

- Minimally invasive surgery
- Maintain normothermia
- Monitor depth of anaesthesia if high risk of awareness or using TIVA
- Remove tubes and drains ASAP

Enhanced Recovery

5 steps to reduce complications and improve patient experience

Optimise pain management

- Preoperative assessment to evaluate risk of severe postoperative pain
- Include estimate of oral opioid equivalence as appropriate
- Multi-modal analgesia including paracetamol and local anaesthetic block as appropriate
- Adjuvants such as low-dose ketamine, clonidine and magnesium should be used where possible
- Avoid opioids where possible
- Regular review by inpatient pain team

Drink, Eat, Mobilise (DrEaM)

- Aim to DrEAM and discontinue maintenance IV fluid within 24hrs of end of surgery
- Oral fluids in recovery
- Mobilising on day of (or morning after) surgery
- Food within 24hrs

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Pain

5109 patients had a pain score recorded in recovery. Of those patients, 21% reported moderate pain, and 10.4% reported severe pain. 19% of patients reported severe pain within 24h of surgery, and 7.3% of patients were still requiring opioids on postoperative day 7. Pain management is a top priority for patients and hospitals and our ER infographic on the opposite page has some basic summary tips.

Highest recovery pain score	perc
MILD	25
MODERATE	21
SEVERE	10
NONE	44

Patient comfort and satisfaction

The Bauer patient satisfaction survey is completed within 24hrs of surgery and asks patients about common symptoms which are associated with surgery and anaesthesia (on a 3-point Likert scale of none, moderate, and severe), as well as their satisfaction with the care delivered to them. As with previous large studies, the most common type of severe discomfort is thirst, affecting 38% of patients (and another 40% reported moderate thirst). We don't know how much of this is preventable; however, local teams are encouraged to look at potential targets for improvement such as:

- Starvation times before surgery
- Provision of small aliquots of water (30ml per hour) up until the time of anaesthesia
- Fluid therapy in the operating theatre (only 31% of patients had any sort of flow-directed monitoring during surgery)
- Administration of 'comfort' fluid as soon as the patient wakes up (water soaked oral sponges)
- Early restoration of oral hydration.

While nausea and vomiting is much less common (occurring in 8% of patients) the incidence is still high, and we know that these symptoms have a big impact on patient experience. Local teams should consider auditing against general standards of enhanced recovery such as:

- use of regional and/or local anaesthesia
- avoidance of opioids where possible
- multi-modal analgesic techniques
- multi-modal antiemetic regimens.

Symptom	None	Moderate	Severe
DROWSINESS	27	51	22
PAIN AT SITE OF SURGERY	32	48	19
THIRST	22	40	38
NAUSEA OR VOMITING	62	30	8
CONFUSION	79	19	2

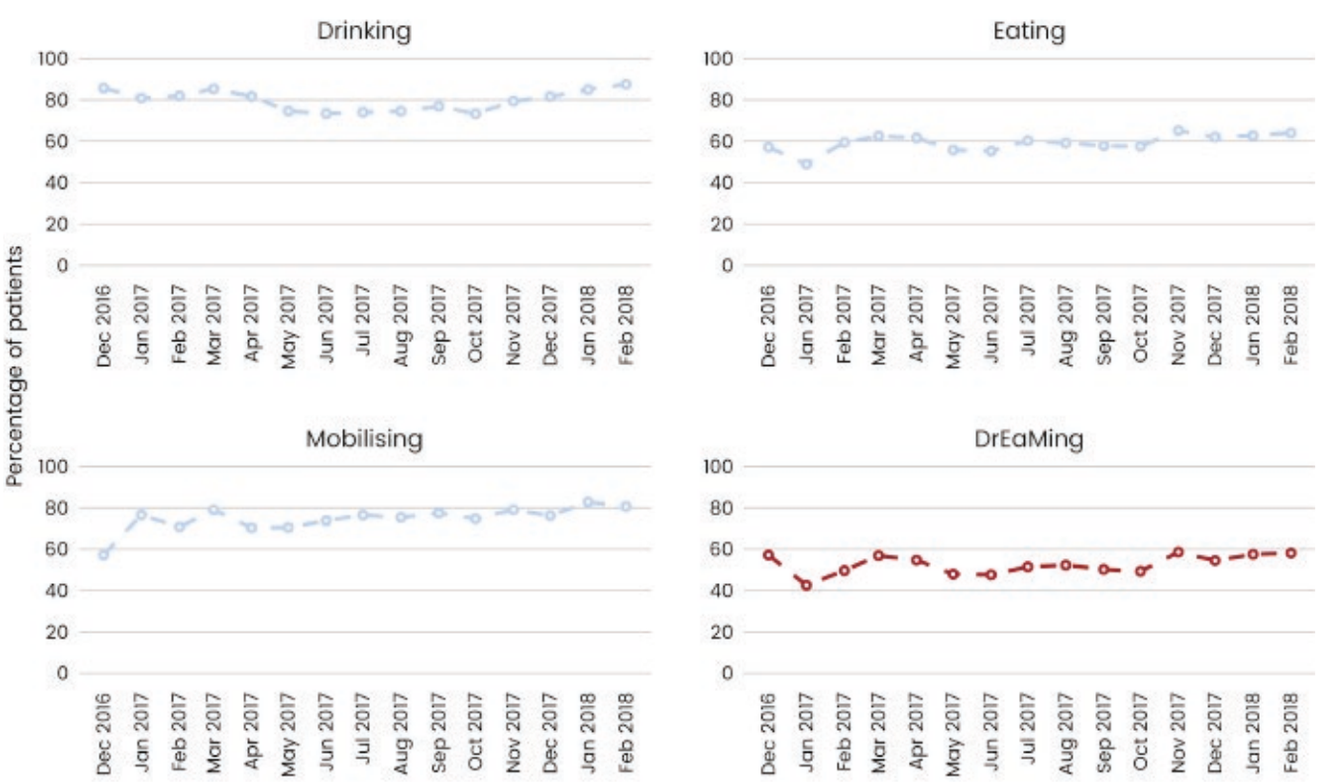
Patients are generally really happy with the care provided by anaesthesia teams. Over 99% reported being satisfied or very satisfied with their anaesthesia care. 4% reported dissatisfaction with their treatment for nausea and vomiting and 5% dissatisfied with their pain treatment within 24hrs of surgery. These and other potential improvement targets can be seen here, and by checking how your patients are doing on your local dashboards.

DrEaMing

Good pain management is critical for reaching the goal of DrEaMing (Drinking, Eating and Mobilising) on day 1 after surgery.

Surgical Specialty	Drinking %	Eating %	Mobilising %	DrEaMing %
UROLOGY	92	73.1	80.8	65.1
UPPER GASTROINTESTINAL	34.9	15.1	55.8	13.9
LOWER GASTROINTESTINAL	84.2	63.7	79.2	55.8
HEPATOBILIARY	70.7	46.5	66	38.1
THORACICS	92.5	91.7	88.2	82.9
HEAD AND NECK	52.6	42.2	74.8	40.4

The great news is that 78% of patients are drinking and 76% mobilizing within 24hrs of surgery; however, much fewer (60%) are eating and fewer still (53%) are DrEaMing. This may be down to local protocols, but equally if your rates of eating within 24h of surgery are lower than you expect, consider checking communication with ward nursing teams, optimization of anti-emesis and analgesic regimens.

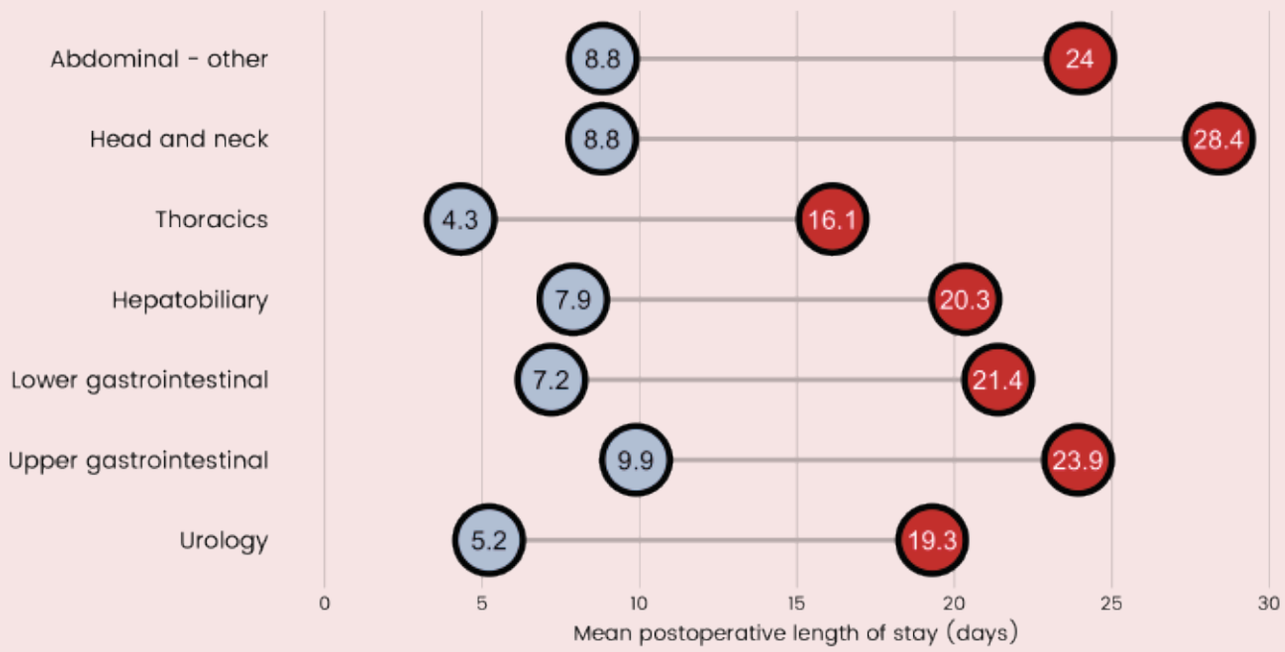


Complications and length of stay

11% of PQIP patients developed a serious complication (Clavien-Dindo grade 3 or above). Upper GI surgery patients incur the highest proportion of serious complications. They also have the highest incidence of pulmonary, infectious, gastrointestinal, renal, cardiovascular, neurological and pain morbidity at Day 7 according to the Post-Operative Morbidity Survey. Haematological and wound morbidity at Day 7 were most common in head and neck surgery.

Surgical Specialty	%	Surgical Specialty	%
UPPER GASTROINTESTINAL	21	ABDOMINAL – Other	7.8
HEAD AND NECK	16.5	UROLOGY	6.4
HEPATOBILIARY	14.6	THORACICS	5.3
LOWER GASTROINTESTINAL	10		

List of Surgical Specialties and Percentage of patients with at least one serious complication (Clavien-Dindo ≥ III)



Length of stay (of patients who survived hospital admission) according to Clavien-Dindo complications scoring

You can see that serious complications mean a substantial increase in length of hospital stay for all specialties. Focusing on improving processes such as anaemia and diabetes management, risk-based critical care referral and compliance with enhanced recovery, should all help reduce complications in your patients.

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Celebrating success — the positive deviance!

Hospitals with more than 50 locked records who have achieved high compliance with particular processes or otherwise great results are listed here. You will see that there is no consistent pattern – lots of different places are really good at lots of different things.

In publishing this information we aim to celebrate success and congratulate the sites who are doing well. We also want to inspire you to get in touch with places who are doing well to find out what their secrets might be – sharing of pathways is likely to support hospitals with getting going on positive change. Finally, we hope to inspire everyone to try to get onto these lists for next year. We would like to get all sites to at least 80% compliant with key processes within the next year. For some measures, we want to go higher. Here are how PQIP hospitals are doing right now, and where we want to be next year….

Anaemia management

National target: >80% of patients having elective surgery with Hb>13

2017-18: No hospitals who had locked more than 50 records reached this target. Our current top 5 sites are: Birmingham Heartlands, James Cook University Hospital, Papworth. St George's, Royal Sussex County Hospital.

Diabetes management

National target: 100% of diabetic patients should have HbA1C recorded

2017-18: 7 hospitals who had locked more than 50 records were 100% compliant. Arrowe Park, Bristol Royal Infirmary, Cumberland Infirmary, East Surrey, Royal Preston, Southmead, Warwick.

Individualised risk assessmentt

National target: 80% of patients to have a documented individualised risk assessment

2017-18: Our top 5 hospitals for this measure were Papworth, Royal Lancaster, Broomfield, King's College Denmark Hill, and University Hospital Coventry. In addition, all the following sites were also >80% compliant: Royal Preston, Birmingham Heartlands, Torbay, Nottingham City, Southampton General, Royal Blackburn, Churchill, Norfolk and Norwich, Bristol Royal Infirmary and York Hospital.

Enhanced Recovery pathway enrolment

Lower GI surgery national target: >80% enrolment

2017-18: The top 5 sites for ER pathway enrolment were the Queen Elizabeth University Hospital (Gateshead), Royal Lancaster Infirmary, Watford General, Royal Sussex County Hospital and Torbay Hospital. All had >95% enrolment. A further twelve hospitals reached at least 80% compliance: Broomfield, Churchill (Oxford), Derriford, East Surrey, Kings Mill, Royal Blackburn, Royal Bolton, Royal Devon and Exeter, Royal Surrey, Southmead, Sunderland, Warwick and York.

Upper GI surgery national target: >80% enrolment

2017-18: Salford and the Royal Surrey had recruited at least 10 upper GI patients of whom >80% were on an ER pathway.

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Thoracic surgery national target: >80% enrolment

2017-18: Only the Bristol Royal Infirmary had enrolled more than 80% of their thoracic patients on ERPs (98%). Birmingham Heartlands were close behind on 75%.

Urology national target: >80% enrolment

2017-18: Four hospitals who had recruited more than 10 urology patients had >80% enrolment – the Royal Blackburn, Broomfield, Salford and the Royal Devon and Exeter.

Head and Neck surgery national target: >80% enrolment

2017-18: No hospitals had greater than 80% enrolment of head and neck surgery patients. The best performing hospitals nationally were the Queen Victoria in East Grinstead, Broomfield Hospital and UCH.

Carbohydrate loading

National target: 80% compliance

These hospitals all achieved >80% compliance with CHO loading in their enhanced recovery patients: Torbay, Arrowe Park, Royal Blackburn, East Surrey and Russells Hall.

Drinking, Eating and Mobilising:

Drinking National Target: >90%

The following hospitals have recruited at least 50 PQIP patients and of these, at least 90% were drinking within 24hrs of surgery: King's Mill, Sunderland, James Cook University Hospital, Southmead, Royal Bolton, Royal Surrey, Arrowe Park, Royal Cornwall, St George's. Additionally, the following hospitals were all achieving >80% of patients drinking within 24hrs: Musgrove Park, Sandwell, Queen's Hospital Burton, Royal Blackburn, Royal Lancaster, Birmingham Heartlands, York, Torbay, Russells Hall, East Surrey, Royal Preston Bristol Royal Infirmary, Cumberland Infirmary.

Eating: national target 80%

The following hospitals have recruited at least 50 PQIP patients and of these, at least 80% were eating within 24hrs of surgery: Royal Cornwall, Musgrove Park, Royal Bolton, St George's, King's Mill, Sandwell General.

Mobilising: national target: 85%

The following hospitals have recruited at least 50 PQIP patients and of these, at least 80% were mobilising within 24hrs of surgery: Musgrove Park, Sunderland Royal, Sandwell, Royal Bolton, Broomfield, Royal Cornwall, St George's, Cumberland Infirmary, Warwick, Royal Surrey County. In addition, the following hospitals had mobilized at least 80% of their patients within 24hrs: Royal Lancaster Infirmary, Russells Hall, Queen's Burton upon Trent, Bristol Royal, Arrowe Park.

DrEaMing

Three hospitals which had recruited more than 50 patients reported that >80% of their patients were DrEaMing at 24hrs – Musgrove Park, Royal Cornwall and Royal Bolton. Close behind with >75% of patients DrEaMing at 24hrs were St George's and Sandwell.

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Collaborators

A huge thank you and well done to all of our valued collaborators whose hard work makes both PQIP and this report possible.

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Nikki Collings
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Karen Connolly
Daniel Conway
Sarah Cooper
Karen Copeland
Zoe Copp
James Corcoran
Victoria Cordrey
Henry Corner
Darryl Cornish
James Coulston
Nicholas Courtenay-Evans
James Craig
Jayne Craig
Jason Cross
Janette Curtis
Claire Dalton
Diane Daniels
Roger Davies
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