

# General Surgery Research Review™

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Issue 2 - 2017

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### Abbreviations used in this issue

- aOR** = adjusted odds ratio  
**CRP** = C-reactive protein  
**CT** = computed tomography  
**ERAS** = enhanced recovery after surgery  
**ERP** = enhanced recovery pathway  
**IQR** = interquartile range  
**LOS** = length of hospital stay  
**NS** = not significant  
**OR** = odds ratio  
**RCT** = randomised controlled trial  
**RR** = relative risk  
**SAP** = surgical antibiotic prophylaxis  
**SSI** = surgical site infection  
**TAP** = transversus abdominis plane  
**TAPP** = transabdominal pre-peritoneal  
**TEP** = totally extraperitoneal repair  
**UTI** = urinary tract infection

## Welcome to the second issue of General Surgery Research Review.

This review is a unique New Zealand publication providing topical, relevant and accessible information on general surgery. The review brings you up-to-date studies on surgical interventions, techniques and outcomes.

We hope you find our selection for General Surgery Research Review stimulating reading and we welcome your feedback. Furthermore, if you have discovered or been involved with what you think is significant global research in this area, please let us know and we will consider it for inclusion next time.

Best regards,

**Professor Andrew Hill**

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## Impact of complications on length of stay in elective laparoscopic colectomies

**Authors:** Mrdutt MM et al.

**Summary:** The contribution of specific complications towards length of hospital stay (LOS), an indirect measure of surgical quality and a surrogate for cost, was evaluated in 42,365 elective laparoscopic partial colectomy patients with primary anastomosis, identified from the American College of Surgeons' National Surgical Quality Improvement Program database between 2011 and 2014. The overall median LOS was 4 days (IQR 3.0-5.0). Negative binomial regression adjusting for demographic variables and complications revealed that unplanned reoperation and pneumonia both increased LOS by 50%, while at least a 25% increase was observed with superficial surgical site infections (SSIs), organ space sepsis, UTI, ventilation >48 h, pulmonary embolism, and myocardial infarction ( $p < 0.0001$ ). When accounting for rate of complications and additional LOS, unplanned reoperation, superficial SSIs and bleeding requiring transfusion within 72 hours were the highest impact complications.

**Comment:** This paper is built, it seems, on the premise that perioperative care is a set of 'bundles' that are put into place, each designed to prevent some complication or other and that surgeons should put these in place perhaps iteratively. Thus, to improve postoperative outcomes, one might put in place a sepsis bundle or a UTI bundle or a pneumonia bundle. However, except in the purist quality improvement environment, we don't think like that. We don't want our patients just to have great wound outcomes or great lung outcomes, we want it all. And that is the promise of modern perioperative care programmes (such as ERAS or ERP or fast-track, for instance). The patient is a whole and the intervention is a whole. With ERAS programmes, cardiorespiratory complications are halved, UTIs are decreased by about 75%, and readmissions are decreased.

**Reference:** *J Surg Res.* 2017;219:180-87

[Abstract](#)

### Independent commentary by Professor Andrew Hill

Professor Andrew Hill completed his general surgical training in 1997 and worked in Kenya as a medical missionary and head of surgery at Kijabe Hospital for four years. Following this he returned to Middlemore Hospital where he now practices as a colorectal surgeon.

His research interests are improving outcomes from major abdominal surgery and medical education and he has published over 230 peer-reviewed papers in these areas. Andrew leads the Auckland Enhanced Recovery After Surgery (AERAS) research group, aiming to improve patient outcomes after major surgery. He is also a councillor for the Royal Australasian College of Surgeons and is President of the International Surgical Society.





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## Transversus abdominis plane block using a short-acting local anesthetic for postoperative pain after laparoscopic colorectal surgery: a systematic review and meta-analysis

**Authors:** Oh TK et al.

**Summary:** This systematic review and meta-analysis involving six studies (n = 452 including 228 controls) aimed to determine whether transversus abdominis plane (TAP) block using a short-acting anaesthetic has a positive postoperative analgesic outcome in patients who have undergone laparoscopic colorectal surgery. There was a significant difference in early and late (24-hr postoperative) pain scores (numeric rating scale) at movement between TAP recipients and controls (placebo or no treatment); standardised mean difference: -0.695 (p < 0.0001) for early pain and -0.242 (p = 0.029) for late pain. However, no significant difference was observed between the TAP block and control groups in early pain at rest 0-2 hrs postoperatively (p = 0.475), late pain at rest 24 hrs postoperatively (p = 0.826), and postoperative opioid consumption up to 24 hrs postoperatively (p = 0.257).

**Comment:** The emperor has no clothes – good to see that I was right all along. When laparoscopic surgery (minimal access – not minimally invasive) came along we ditched the epidural, which was a great way to deliver pain relief after abdominal surgery. This was counter to Henrik Kehlet's original paper that showed the results that could be achieved with laparoscopic surgery, early rehabilitation and feeding, and an epidural. The new approach was some kind of regional or local block and yet none of them, including this one, can provide adequate pain relief, without opiates, for the 48 to 72 hours required after even a laparoscopic operation. As a result we have increased the use of opioids. Opioids lead to ileus and ileus leads to increased time in hospital (and aspiration). As a result no one has even got close to consistently achieving Kehlet's results.

**Reference:** *Surg Endosc.* 2017;Oct 26 [Epub ahead of print]  
[Abstract](#)



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**Research Review publications are intended for New Zealand health professionals.**

## Outcomes following polypectomy for malignant colorectal polyps are similar to those following surgery in the general population

**Authors:** Lopez A et al.

**Summary:** These authors aimed to describe time trends in the incidence of colorectal malignant polyps and their outcomes after endoscopic or surgical resection before and after the introduction of a colorectal mass-screening programme in 2003. A total of 411 patients diagnosed with malignant polyps between 1982 and 2011 were included in the analysis. There was a doubling in the age-standardised incidence of malignant polyps in 50-74-year-olds from 5.4/100,000 in 1982-2002 to 10.9/100,000 in 2003-2011. Sessile malignant polyps were resected endoscopically less often than pedunculated malignant polyps; 19.1% vs 38.2% ( $p < 0.001$ ). The 5-year cumulative recurrence rate did not differ significantly between surgical and endoscopic resection of pedunculated malignant polyps with a pathological margin  $\geq 1$  mm (8.2% vs 2.4%), however, it did differ in sessile malignant polyps (3.0% after first-line or second-line surgical resection, 8.6% after endoscopic resection and 17.9% after transanal resection;  $p = 0.016$ ). A dramatic decrease in the recurrence rate of sessile malignant polyps was observed from 11.3% in 1982-2002, to 1.2% in 2003-2009 ( $p = 0.010$ ), but the recurrence rate of pedunculated malignant polyps remained stable at 4.6% in 1982-2002 and 6.7% in 2003-2009. When pathological margins were  $< 1$  mm, the 5-year net survival was 81.0%, and when they were  $\geq 1$  mm the 5-year net survival was 95.6% ( $p = 0.024$ ). The authors concluded that endoscopic resection needs to be completed by surgery if pathological margins are  $< 1$  mm. Outcomes following polypectomy in patients with a pathological margin  $\geq 1$  mm were found to be similar to those following surgery in the general population.

**Comment:** Hard to know what to make of this retrospective study. It's in Gut so it must be good is my first thought. However, it is one of those studies that everyone is fascinated by nowadays, especially in North America – an outcomes study. Just because there are a lot of polyps in the study it is still a retrospective study and in my opinion does not add a lot to what we already know. It's extremely hard to know how to advise patients with malignant polyps. I'm not sure that this study helps. I guess that now I can say, with no less conviction than I did before, that if the margins are close, surgery is a good option. Does that really add to what we already knew (or didn't know)?

**Reference:** Gut 2017;Oct 26 [Epub ahead of print]

[Abstract](#)

## Effect of a modified hospital elder life program on delirium and length of hospital stay in patients undergoing abdominal surgery: A cluster randomized clinical trial

**Authors:** Chen CC et al.

**Summary:** This RCT was conducted to investigate whether a modified Hospital Elder Life Program (mHELP) reduces incident delirium and LOS in older patients undergoing abdominal surgery. A total of 377 patients aged  $\geq 65$  years who underwent elective gastrectomy, pancreaticoduodenectomy, or colectomy in Taipei, Taiwan between August 2009 and October 2012, and who had an expected LOS of  $> 6$  days were enrolled. Patients were cluster randomised by room to receive usual care plus mHELP (implemented by an mHELP nurse;  $n = 197$ ; mean age 74.3 years) or usual care alone (control group;  $n = 180$ ; mean age 74.8 years); both interventions were delivered as soon as patients arrived in the inpatient ward and continued until hospital discharge. Three mHELP protocols were administered daily for a median of 7 days (IQR 6-10 days) comprising orientating communication, oral and nutritional assistance and early mobilisation. Delirium was assessed using the Confusion Assessment Method by two trained nurses masked to the intervention. Significantly fewer mHELP recipients than controls developed postoperative delirium 13/196 (6.6%) vs 27/179 (15.1%); RR 0.44 (95% CI 0.23-0.83;  $p = 0.008$ ). mHELP recipients also exhibited significantly shorter median LOS than controls (12 vs 14 days;  $p = 0.04$ ).


**Comment:** Great to see an RCT in surgery. We need more of them. This study further supports the benefits of optimised modern perioperative care in elderly patients. There are some obvious problems with the study such as the long day stay, the variable implementation and the difficulty in blinding in this sort of study. Even so, the benefits of early mobilisation, early and optimal nutrition and specific communication were confirmed. Adding the other components of an optimised care programme is likely to show further benefits for this high-risk group of patients.

**Reference:** JAMA Surg. 2017;152(9):852-59

[Abstract](#)

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**References.**  
1. Clexane® and Clexane® Forte Approved Data Sheet June 2017

VTE Venous Thromboembolism, which is a combination of Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE)  
UA Unstable Angina  
STEMI ST Elevation Myocardial Infarction



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## Wireless monitoring program of patient-centered outcomes and recovery before and after major abdominal cancer surgery

**Authors:** Sun V et al.

**Summary:** This US single centre proof-of-concept pilot study involving 20 patients (median age 55.5 years; 75% female) investigated the use of a wireless, patient-centred outcomes monitoring program before and after major abdominal cancer surgery (curative resection for hepatobiliary and gastrointestinal cancers). Wristband pedometers were worn by the patients and patient-completed outcomes surveys (quality of life and symptoms) were undertaken 3 to 7 days before surgery, during hospitalisation, and up to 2 weeks post discharge. Adherence to wearing the pedometer was 88% prior to surgery versus 83% after discharge and was higher than adherence to the surveys (65% vs 75%, respectively). Patients took a median of 1689 steps at day 7, which was 19% of the baseline number of daily steps; this correlated with the Comprehensive Complication Index, for which the median was 15 of 100 ( $r = -0.64$ ,  $p < 0.05$ ). Both overall symptom severity post discharge and symptom interference with activities were mild (2.3 and 3.5 out of 10, respectively), while pain (4.4 of 10), fatigue (4.7 of 10) and appetite loss (4.0 of 10) were moderate post surgery. Being at their lowest at discharge, quality-of-life scores improved at postoperative week 2 (66.6 vs 73.9 of 100, respectively).

**Comment:** Not sure what to take home from this study. Those in favour of prehabilitation are big fans of preoperative exercise. Putting a pedometer on to measure how much exercise patients are doing, in this context, seems like a great thing to do. However, improving exercise capacity preoperatively has not been shown to make much difference to things that surgeons care about. Turning it around and asking if it makes any difference to what patients care about is another approach. EuroQOL is not exactly the gold standard for postoperative recovery assessment either. Where better measures have been used they have shown that patients take 1 to 3 months to recover from major abdominal surgery. I guess that they say it is a pilot study but I'm not sure where one would take it next.

**Reference:** *JAMA Surg.* 2017;152(9):852-59

[Abstract](#)

## Surgeon variation in complications with minimally invasive and open colectomy: Results from the Michigan Surgical Quality Collaborative

**Authors:** Healy MA et al.

**Summary:** This retrospective case review of 5196 patients (mean age 62.9 years; 54.7% female; 85.2% white) who underwent minimally invasive colectomy (MIC;  $n = 3118$ ) or open colectomy (OC;  $n = 2078$ ) performed by 97 surgeons in the Michigan Surgical Quality Collaborative, was conducted to determine rates of complications. Overall, (22.1%) 1149 patients experienced complications; 702 (33.8%) OC versus 447 (14.3%) MIC ( $p < 0.001$ ). The rate of MIC complications varied between surgeons from 8.8% to 25.9%, while for OC the rate varied less (1.7-fold) between surgeons (25.9% to 43.8%). The mean change between OC and MIC in surgeon rank by complication rate was 25 positions. The top 10 surgeons ranged in rank from 6 for OC to 89 for MIC.

**Comment:** You may have worked out that I'm cynical about outcomes research, but when it comes from the group at Michigan I take it pretty seriously. What to take from this interesting paper? Some people aren't very good at minimal access surgery. This is concerning as there is a huge push at every conference I go to, to push laparoscopic surgery. In fact, one conference has a debate about whether or not open surgery is obsolete and should be ditched (or that is the implication). One could conclude from this study that surgeons should do what they do well and not bother about which technique to utilise. That has historically been the case for much of what we do in surgery. Another approach is to improve the training as suggested in this paper. A third approach is to have some surgeons in the unit who are good with laparoscopy to do the cases that would benefit from this approach and to have others who are good at open do that for the cases that would benefit. We've all got something to offer and this third approach may take advantage of the skills that each unit has.

**Reference:** *JAMA Surg.* 2017;152(9):860-67

[Abstract](#)

## National surgical mortality audit may be associated with reduced mortality after emergency admission

**Authors:** Kiermeier A et al.

**Summary:** This analysis of procedure and outcome data from the Australian Institute of Health and Welfare (AIHW; 2005/2006 to 2012/2013) was conducted to determine the effect on overall mortality across Australia of an audit of surgical mortality (ASM) for all surgical admissions established by the Royal Australasian College of Surgeons. Overall, surgical admissions increased by 23%, and mortality decreased by 18% so that the rate of mortality per admission fell by 33% ( $p < 0.0001$ ). A similar decrease was observed across all regions. The reduction in mortality was overwhelmingly observed in emergency admissions of elderly patients.

**Comment:** ASM's in Australia and the Perioperative Mortality Review Committee (POMRC) in New Zealand are major steps forward in improving outcomes from surgery. This study confirms this in Australia. It's the old story, audit and feedback to hospitals and surgeons are absolutely critical to improving outcomes.

**Reference:** *ANZ J Surg.* 2017;87(10):830-36

[Abstract](#)

## Effect of robotic-assisted vs conventional laparoscopic surgery on risk of conversion to open laparotomy among patients undergoing resection for rectal cancer: The ROLARR randomized clinical trial

**Authors:** Jayne D et al.

**Summary:** This multinational, RCT involving 40 surgeons compared the risk of conversion to open laparotomy between robotic-assisted ( $n = 237$ ) versus conventional laparoscopic surgery ( $n = 234$ ) in patients with rectal adenocarcinoma undergoing curative resection for rectal cancer. Overall conversion rate was 10.1%; 8.1% with robotic-assisted laparoscopic surgery versus 12.2% with conventional laparoscopic surgery (difference 4.1%; 95% CI -1.4 to 9.6; aOR 0.61; 95% CI 0.31-1.21; NS) The overall circumferential resection margin positivity (CRM+) rate was 5.7%; robotic-assisted rate 6.3% versus conventional rate 5.1% (difference 1.1%; 95% CI -3.1 to 5.4; aOR 0.78; 95% CI 0.35-1.76; NS).

**Comment:** A couple of issues for me here. The first issue is whether we should be doing minimal access rectal excisions at all. Two major RCT's looking at this issue have failed to demonstrate that measures of quality in cancer excision are as good for laparoscopic surgery as they are for the open surgery. The second issue is the robot. Most surgeons who use the robot love it (maybe they are self-selected). It has made a very challenging operation easier. As you would expect it is very difficult to demonstrate improved outcomes. However, if the robot was as cheap as a diathermy machine, it is my contention that we would use it as much as possible.

**Reference:** *JAMA* 2017;318(16):1569-80

[Abstract](#)

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## Transabdominal pre-peritoneal versus open repair for primary unilateral inguinal hernia: A meta-analysis

**Authors:** Wu JJ et al.

**Summary:** This meta-analysis compared transabdominal pre-peritoneal (TAPP) laparoscopic repair versus open surgical repair for primary inguinal hernias. The authors identified 13 RCTs; 1310 TAPP versus 1331 open repair recipients. There was no between group difference in rates of haematoma (RR 0.92; 95% CI 0.49-1.71; NS), seroma (RR 1.90; 95% CI 0.87-4.14; NS), infection (RR 0.61; 95% CI 0.29-1.28; NS), hernia recurrence (RR 0.67; 95% CI 0.42-1.07; NS) or urinary retention (RR 0.99; 95% CI 0.36-2.76; NS). TAPP repair was found to have a lower rate of paraesthesia (RR 0.20; 95% CI 0.08-0.50;  $p = 0.0005$ ), shorter time to return to normal activities (9.5 vs 17.3 days;  $p < 0.00001$ ) and shorter bed stay (2.4 vs 3.1 days;  $p = 0.0006$ ).

**Comment:** So is there a place for an open hernia repair in 2017? Hard to know. What is clear from previous work is that an endoscopic repair (TEP or TAPP) is a good repair if done by surgeons who do a lot of them. The only real issue for me is recurrence rates and there is certainly nothing better than an open tension-free mesh repair. With all the debate about mesh how will this affect this discussion in the future?

**Reference:** *World J Surg.* 2017;Oct 11 [Epub ahead of print]  
[Abstract](#)

## The role of bowel preparation in colorectal surgery: Results of the 2012-2015 ACS-NSQIP data

**Authors:** Klinger AL et al.

**Summary:** Data from 27,804 patients undergoing elective colorectal resection in the 2012-15 American College of Surgeons National Surgical Quality Improvement Program cohorts were analysed to identify potential benefits in infectious complications comparing no preparation ( $n = 5471$ ), mechanical bowel preparation (MBP;  $n = 7617$ ), oral antibiotic bowel preparation (ABP; 1374) and dual MBP plus ABP ( $n = 8855$ ). Compared to no preparation, dual preparation led to fewer SSIs (OR 0.39;  $p < 0.001$ ), organ space infections (OR 0.56;  $p \leq 0.001$ ), anastomotic leaks (OR 0.53;  $p < 0.001$ ) and wound dehiscence (OR 0.43;  $p = 0.001$ ); ABP alone resulted in fewer SSIs (OR 0.63;  $p = 0.001$ ), organ space infections (OR 0.59;  $p = 0.005$ ), and anastomotic leaks (OR 0.53;  $p = 0.002$ ), but MBP alone exhibited no benefits.

**Comment:** I'm a bit over this subject, we need some activity here. The Europeans have adopted a true evidence-based approach to MBP. In general MBP, done the way we do it in Australasia, does not seem to improve outcomes and has a nasty side-effect profile in our elderly comorbid patients. The US approach is based on a much-cited paper from ancient history, a great deal of bluster and retrospective studies. As a result they love MBP and oral antibiotics. The study above is yet another outcomes study that superficially looks good, but is dogged by confounders, confirmation bias and lack of appropriate controls. Having said all that, the US approach may be correct, despite having taken the wrong approach to the issue. The only way to sort this out is for someone to look at all of this objectively, demonstrate that there is equipoise and do the RCT to answer the question or questions definitively. It will need to be multicentre and have a lot of patients, but it is worth doing if only to stop the poor literature that grows day by day and continues to bug me.

**Reference:** *Ann Surg.* 2017;Oct 23 [Epub ahead of print]  
[Abstract](#)

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## Antibiotic prescribing practices for prevention of surgical site infections in Australia: Increased uptake of national guidelines after surveillance and reporting and impact on infection rates

**Authors:** Bull AL et al.

**Summary:** This state wide, Victorian analysis of surgical antibiotic prophylaxis (SAP) data (2003-15;  $n = 144,075$ ) was conducted to determine changes in SSIs over time and whether improved compliance was associated with SSI risk reduction. Over the time period analysed, the OR for receiving SAP according to national guidelines increased by 13% per year, with the greatest improvement in colorectal procedures (19% per year) and the smallest for cholecystectomy and cardiac operations (9% per year). The OR for receiving an antibiotic at the recommended time increased by 12% per year and the OR for antibiotic agent being discontinued within 24 hours increased by 27% per year. Non-compliance was associated with an increased risk of SSI across all procedures (OR 1.33; 95% CI 1.24-1.43).

**Comment:** So we know what to do and yet we don't know it. In defence of us surgeons we often don't know that the things we asked to be done have not been done. The only way we can find out is by some sort of feedback loop. It's fairly simple and it's a well-known quality improvement approach. Can this be utilised more widely? I think that all of us would like to know what's going on in our clinical practices that we don't know about.

**Reference:** *Surg Infect. (Larchmt)* 2017;18(7):834-40  
[Abstract](#)

## Review of appendectomies over a decade in a tertiary hospital in New Zealand

**Authors:** de Burlet KJ et al.

**Summary:** This NZ retrospective single centre review evaluated the use of pre-operative imaging and negative appendectomy rates in the 2004 ( $n = 227$ ), 2009 ( $n = 308$ ) and 2014 ( $n = 339$ ). Negative appendectomy rates were 29.1%, 20.1% and 19.5% ( $p = 0.014$ ), respectively. Negative appendectomies were more common in women ( $p \leq 0.001$ ), individuals with low inflammatory markers (median white cell count  $< 10.2 \times 10^9$  cells/L, CRP  $< 8$  mg/L;  $p \leq 0.001$ ) and patients aged 16-30 years ( $p \leq 0.001$ ). CT scanning rates prior to operation increased between 2009 and 2014 (11.0% vs 18.9%;  $p \leq 0.001$ ).

**Comment:** Nothing too much here of surprise. The reality is that the CT scan should only be used in times of diagnostic uncertainty and the way that you get to be diagnostically uncertain is to use an appropriate objective scoring system. These place patients in a low probability group (and you either discharge or admit overnight and watch carefully), an intermediate probability group (use a CT or an ultrasound to help) or a high probability group who go to theatre and have an appendectomy. In this way negative appendectomies are decreased. It doesn't happen by chance.

**Reference:** *ANZ J Surg.* 2017;Oct 9 [Epub ahead of print]  
[Abstract](#)



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