# Enhanced Recovery Canada
# What is Enhanced Recovery after surgery?

**Chiara Singh**
**(chiara.singh@fraserhealth.ca)**

Enhanced RECOVERY Canada

Putting patients first, improving patient safety.

# Objectives

Attendees will:

1. Be able to define Enhanced Recovery after surgery and the role that physiotherapy plays in Enhanced Recovery
2. Have a greater understanding of the national project: *Enhanced Recovery Canada*

# Background

## State of Surgical Care

- Discrepancy between best practice cited in literature and clinical practice[1,2]
- Takes average of 17 years for research evidence to reach clinical pratice[1]
- Significant work to translate findings from human medical research into valid and effective clinical practice[1]

# State of Surgical Care in Canada

Aging population + high rate of comorbidities[3]

results in

Increased surgical demand[4]

but

Access to surgery is not improving[4]

due to

Limited resources[5]:

- Financial
- Personnel
- Time

therefore

***We need to optimize resource utilization!***

# Background of ERAS®

**Traditional care:**

- Provider-focused
- High variability
- Physician driven[5]

**VS.**

**ERAS® care:**

- Patient-focused
- Standardized
- Evidence-based
- Interdisciplinary[2]

# What is ERAS®

- Enhanced Recovery After Surgery (ERAS®) is a program highlighting surgical best practices.

https://youtu.be/j55al6_zhv0?list=PLIWeobiw8PTEObsfjZ8qv9wWPsK9hhOoz

https://www.youtube.com/watch?v=O3J01xJdyLw

# Background of ERAS®

- Enhanced Recovery After Surgery (ERAS®) is the implementation of **patient-focused, standardized, evidence-based, interdisciplinary** perioperative guidelines[2]

- Guidelines integrate preoperative, intraoperative and postoperative care[2]

- Implementation of Enhanced Recovery Programs reduces postoperative complications, reduces length of hospital stay, with no increase in hospital readmissions[6]

# ERAS® Society Growth in Sept 2016

## 100+ units in 20+ countries


Slide shared courtesy of Dr. Olle Ljungqvist

# Presence of Enhanced Recovery Programs in Dec 2017

# CPSI and *Enhanced Recovery Canada*

- Canadian Patient Safety Institute (CPSI) with 24 partner organizations founded *Enhanced Recovery Canada*

- *Enhanced Recovery Canada* will:
  - Bundle evidence-informed guidelines to create *Enhanced Recovery Canada* Clinical Pathways
  - Facilitate the dissemination of Clinical Pathways across the country
  - Create networks and tools to support implementation of Clinical Pathways

# CPSI and *Enhanced Recovery Canada*
# *Partner organizations*





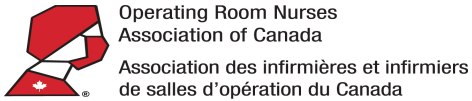
















# Clinical Pathway Development Based on 6 Core Principles Applicable to all Surgeries

Patient Engagement


Mobility



# Patient Engagement

- Preoperative education has been shown to:
  - Decrease patients' anxiety and fears about surgery[7]
  - Reduce postoperative complications[8]
  - Lessen use of postoperative analgesia[9]
  - Shorten hospital stay[10]
- Patient engagement is integral to success of Enhanced Recovery Programs
  - Many Enhanced Recovery guidelines are reliant on patient adherence

# Nutrition


- Prolonged fast is inappropriate in preparing patients for the stress of surgery[12]
- *Canadian Anesthesiologists' Society* Preoperative Fasting Guidelines[11]:
  - Fast from intake of a light meal or nonhuman milk 6 hours before elective procedures
  - Patients should be encouraged to drink clear fluids up to 2 hours before anesthesia administration

# Nutrition


- Carbohydrate loading before surgery:
  - Cochrane Review found that intake of a carbohydrate beverage prior to surgery may lead to small reduction in length of hospital admission in non-diabetic patients[13]
  - It is *safe* for diabetic patients to drink carbohydrate-rich drinks up to 2 hours before surgery[12]
  - Limited evidence to *recommend* carbohydrate loading in diabetic patients[14]

# Nutrition


- Up to 45% of surgery patients were at risk for malnutrition or were malnourished and these patients had a higher likelihood of longer length of stay and mortality[15]
- The Canadian Malnutrition Task Force[16]:
  - Nutrition risk *screening* should be undertaken in all hospitalized patients with a validated nutrition screening tool
  - Nutrition *assessment* should be undertaken in those screened at risk

# Nutrition


- Postoperative feeding[17,18,19,20]:
  - Introduction of fluids/solids on POD 0/1 results in small decrease in length of stay compared to traditional method of “nil per os” until bowel function resumes
  - Does not increase the rate of wound infection, infectious complications or anastomosis dehiscence
  - Ileus prevention and multimodal anti-emetic approach facilitate adequate intake
  - Oral nutrition supplements POD 0 is encouraged to reduce time to tolerating meals[36]

# Perioperative Fluid Management


- Hypovolemia must be avoided because it may lead to adverse events (minor organ dysfunction, multi-organ failure, death)[25]
- Liberal administration of fluid may impair pulmonary, cardiac and gastrointestinal function and lead to postoperative complications and prolonged recovery[24,25]
- Goal-directed fluid therapy (GDFT) should be utilized on selected patients to optimize cardiac performance or stroke volume[26,27]
  - GDFT reduces postoperative morbidity for high risk patients

# Multimodal Pain Management

- Multimodal pain management is recommended for the treatment of postoperative pain[28]:
  - Use variety of analgesic medication to target different mechanisms of action in the peripheral and/or central nervous system
  - Avoid opioids when possible
  - Transition to oral medications as soon as possible

- Opioid sparing, multimodal pain management[5]:
  - Reduces stress
  - Reduces insulin resistance
  - Facilitates mobility

# Surgical Best Practices: Appropriate Use and Removal of Lines/Tubes

- NG Tubes:
  - Cochrane Review recommends to avoid prophylactic use of NG tubes for decompression after GI surgery[29]
- IV Fluids:
  - Removal of IV lines encourages increased m ambulation[5]

# Surgical Best Practices: Appropriate Use and Removal of Lines/Tubes


- Urinary Catheters[30, 31]:
  - UTIs are the most common type of hospital acquired infection
  - Biggest risk factor for developing a UTI is indwelling catheter
  - Urinary catheters should be avoided unless absolutely necessary
  - If used, urinary catheter should be removed within 24 hours (except if patient had rectal or urologic surgery)

# Surgical Best Practices:
# Surgical Site Infection Prevention & VTE Prophylaxis

- Surgical site infection prevention[33]:
  - Perioperative antimicrobial coverage
  - Appropriate hair removal
  - Perioperative normothermia
  - Maintenance of perioperative glucose control
  - Preoperative mechanical bowel preparation + oral antibiotics[34], etc.

- VTE prevention[33]:
  - Appropriate standardized screening for VTE prophylaxis
  - Implementation of standardized order sets for prophylaxis administration
  - Audit, etc.

# Mobility

- Postsurgical immobility promotes[21]:
  - Insulin resistance
  - Muscle atrophy
  - Poor functional capacity
- Stress of surgery can result in[22]:
  - Loss of lean body mass muscle mass
  - Fatigue
  - Delayed recovery of functional capacity

# Mobility

- Generalized mobility recommendations based on literature showing detrimental effects of bedrest after surgery
- Orthopedic literature found strong evidence to support mobilization within 24 hours of surgery[23]
- First mobilization on POD 0/1 after orthopedic surgery led to[23]:
  - Fewer complications (ie. DVT & PE)
  - Reduced hospital stay

# ERC Mobility and Physical Activity Pathway for Colorectal Surgery

- Working group made up of Physiotherapists, Kinesiologist, surgeons, anesthetists
- Tasked with coming up with a pathway
- Very little evidence, could not make recommendations based on literature alone
- Took on a Delphi to gain a consensus about postoperative mobilization and physical activity that enhance the recovery of colorectal patients in Canadian hospitals

# Consensus Research

- Definition: general agreement; the judgment arrived by a majority

  http://www.merriam-webster.com/dictionary/consensus

- Provides a way to organize subjective judgments and provide guidance to clinical decision-making when there is no existing research-based evidence

- Traditional methods of consensus have several limitations:

  (1)Discussion dominated by some individuals

  (2)Participants feel pressure to agree with the majority

  (3)Embarrassment to change personal views

  (4)High cost $$$

- Several 'modern' consensus methods have been described to overcome these limitations

Jones J, Hunter D. Consensus methods for medical and health services research. BMJ 1995; 311:376-380

# The Delphi technique

- Method of systematically surveying experts to reach consensus
- Completion of a series of questionnaires
- Experts anonymous to one another
- Provides several advantages:

  (1)No influence of personal status in the discussion

  (2)No pressure to agree with the majority

  (3)Allows alteration of views without embarrassment

  (4)Combine the opinion of experts geographically dispersed (Lower $$$)

# Delphi Process

**Round 1**
3 open ended questions sent to a group of 47 experts

Thematic analysis done on the 26 responses and a series of definitions and statements developed

**Round 2**
Experts rated agreement on the definitions and statement using a 5-point Likert scale

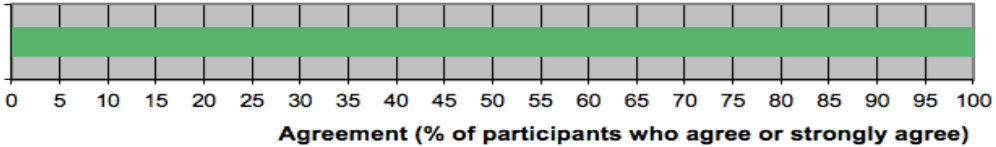
Summary of 30 group responses incorporated into the questionnaire

**Round 3**
Experts viewed the group results and could change their ranks in light of colleagues' responses

Consensus defined when criteria and endpoints rated as agree or strongly agree by at least **75% of the experts in Round 3**

# Delphi Sample

h) Family members should be educated about how they can facilitate and encourage early mobilization.




**Agreement**: 100%
**Mean Likert scale score:** 3.7 (Strongly Agree)
**Range of Likert scale scores:** 3 - 4 (Agree - Strongly Agree)

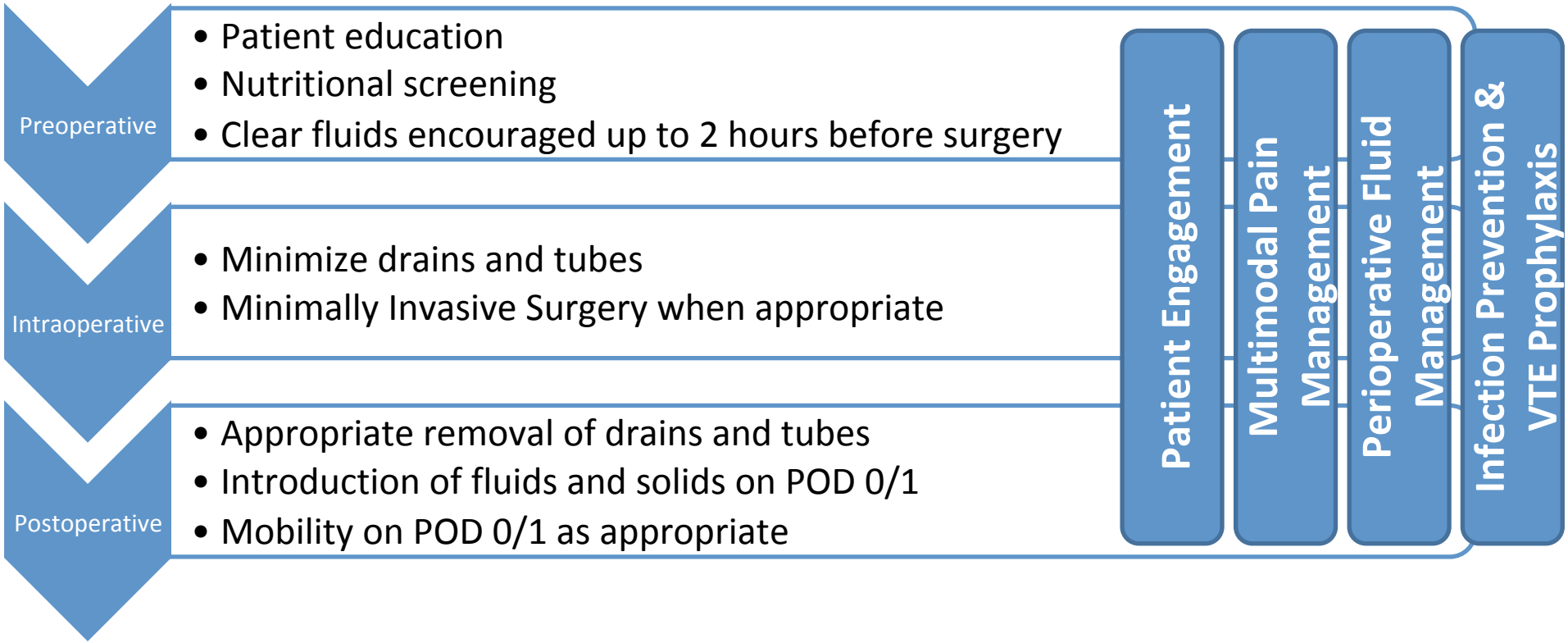
Consensus statements used to draft the ERC mobility pathway

# ERC Mobility Pathway

- Pathway has been submitted for graphical representation
- One more round of review post graphics
- Will be presented at the ERC forum November 17:

http://www.patientsafetyinstitute.ca/en/toolsResources/Enhanced-Recovery-after-Surgery/ERAS-Forum-2018/Pages/default.aspx

# Enhanced Recovery Flowchart



# Economic Benefit

- Alberta Health Services conducted economic analysis for Enhanced Recovery Pathway in elective colorectal surgery. Demonstrated reductions in[32]:
  - Emergency department visits
  - General Practitioner visits
  - Length of stay (statistically significant)

- Return on Investment:
  - Every $1 invested in ERAS® would bring $3.8 in return (range $2.4-$5.1)

# Economic Benefit

- McGill University Health Centre conducted economic analysis comparing Enhanced Recovery Program vs. conventional management for elective colorecta' surgery[35]
- Enhanced Recovery Program demonstrated:
  - Shorter hospitalization
  - Decreased resource utilization
  - Lower societal costs (productivity losses, caregiver burden)

# Enhanced Recovery Programs Require an Interdisciplinary Approach

5 Tasks for Everyone

# Patients

1. Smoking cessation
2. Reduce alcohol consumption
3. Increase physical activity
4. Follow preoperative instructions, including current fasting guidelines
5. Participate in postoperative recovery

# Preoperative Staff

1. Increase patients' awareness of Enhanced Recovery Programs and the importance of patients' participation
2. Educate patients on current fasting, nutrition and preoperative guidelines
3. Nutrition screening/assessment
4. Functional status assessment
5. Set patient expectations around length of stay and discuss a discharge plan

# Anesthesiologist

1. No preoperative long-active sedatives
2. Opioid-sparing, multimodal pain management (Regional anesthesia, NSAIDs, Lidocaine, Ketamine, etc.)
3. Appropriate prophylactic antibiotherapy
4. Maintain normothermia
5. Perioperative fluid management to avoid sodium/fluid overload

# Surgeon

1. Mechanical bowel preparation + oral antibiotics
2. Avoid routine insertion of tubes and drains
3. Use long acting local anesthetics
4. Minimally invasive surgical technique
5. Initiate diet POD 0/1, as tolerated by patient; include routine postoperative nausea and vomiting prophylaxis

# Nursing and Allied Health

1. Reduce IV fluid administration, encourage oral fluids
2. Encourage oral nutrition and gum chewing
3. Mobilize patient POD 0 and consistently throughout admission
4. Administer and monitor use of opioid-sparing, multimodal pain medications
5. Clinically appropriate insertion and timely removal of urinary catheters

# Implementation of Enhanced Recovery Programs

**Plan**

- Identify champions (Front-line staff, physicians, administrators)
- Assess current care practices and address readiness for change
- Create multidisciplinary team
- Plan roll-out

**Implement**

- Create/integrate standardized content into clinical practice documents (Education resources, order sets, clinical pathways, forms, etc.)
- Implement Enhanced Recovery Pathways
- Utilize project management and change management principles

**Sustain**

- Audit/reporting
- Gather/provide feedback to staff, clinicians, patients and leaders
- Revise pathways and facilitate continuous quality improvement

# Summary

- Enhanced Recovery After Surgery (ERAS®) is the implementation of **patient-focused, standardized, evidence-based, interdisciplinary** perioperative guidelines[2]
- Implementation of Enhanced Recovery Programs reduces postoperative complications and reduces length of hospital stay, with no increase in hospital readmissions[6]
- Economic impact assessments recognize investments in Enhanced Recovery Programs provide strong financial return[32,35]
- Success and sustainability requires:
  - Champions
  - Front-line engagement
  - Audit of clinical practice
  - Regular reporting and continuous improvements

# Resources

## Canadian Patient Safety Institute

http://www.patientsafetyinstitute.ca/en/toolsresources/enhanced-recovery-after-surgery/pages/default.aspx

## Enhanced Recovery BC

http://enhancedrecoverybc.ca/

## McGill University Health Center Patient Education Office

http://www.muhcpatienteducation.ca/surgery-guides/surgery-patient-guides.html?sectionID=31

## Best Practices in Surgery (University of Toronto Hospitals)

http://bestpracticeinsurgery.ca/

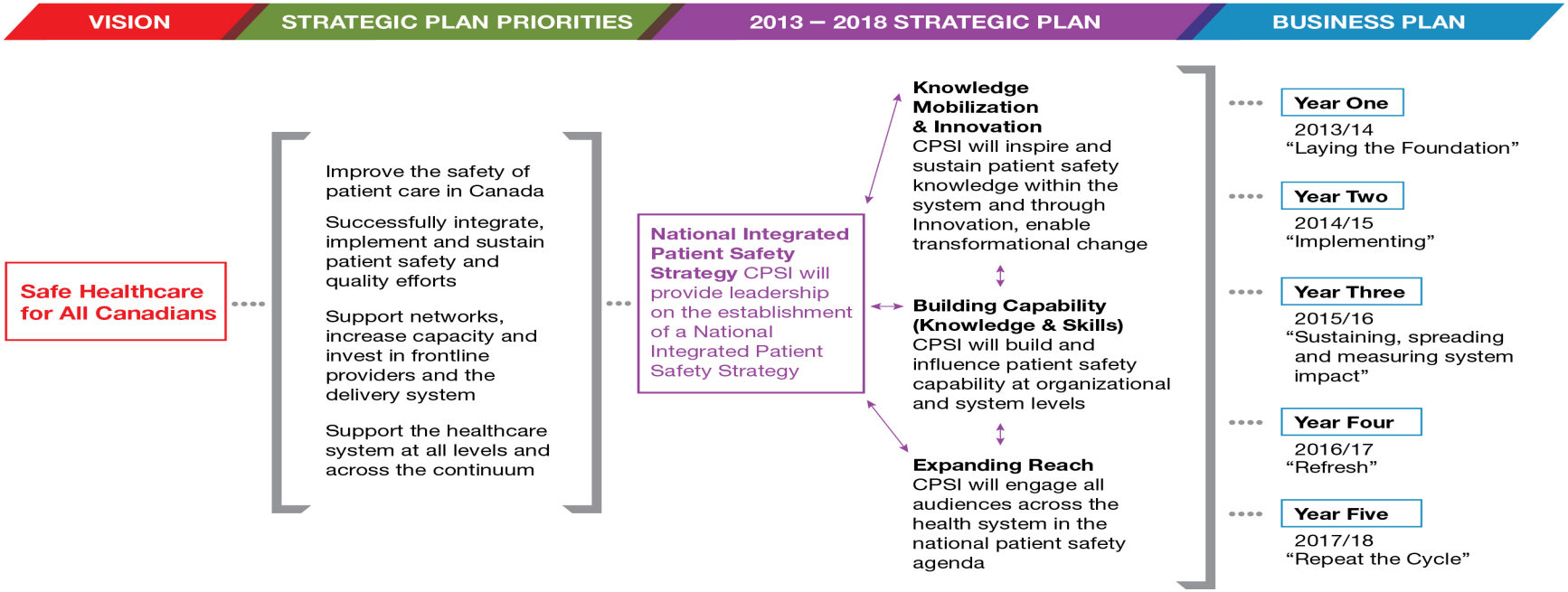
## ERAS® Society

http://erassociety.org/

# QUESTIONS?

## 2013 – 2018 STRATEGIC GOALS

CPSI will build upon our strengths, evaluate our processes, and refine our organization to focus efforts on four stretegic goals, as summarized in the figure below and in Appendix 1:



# THANK YOU TO OUR SPONSORS

**Gold**

3M

**Silver**

Medtronic

FRESENIUS KABI caring for life

Shire

Nestlé HealthScience

Edwards

**Bronze**

Abbott

MERCK INVENTING FOR LIFE

HOW HEALTH OUTCOMES WORLDWIDE

SeamlessMD

Baxter

ConMed

EMN

# References


1. Westfall, J.M., Mold, J., Fagnan, L. (2007). Practice-based research – "Blue Highways" on the NIH roadmap. *JAMA, 297*(4):403-406.
2. Ljungqvist, O., Scott, M., Fearon, K.C. Enhanced recovery after surgery: A review. *JAMA Surgery, 152*(3), 292-298.
3. Health Canada (2012). Canada's health care system. Retrieved from: http://www.hc-sc.gc.ca/hcs-sss/pubs/system-regime/2011-hcs-sss/index-eng.php
4. Statistics Canada (2016). An aging population. Retrieved from: http://www.statcan.gc.ca/pub/11-402-x/2010000/chap/pop/pop02-eng.htm
5. Canadian Institute of Health Information (2016). Wait times for priority procedures in Canada, 2016. Retrieved from: https://secure.cihi.ca/free_products/wait_time_report2016_en.pdf
6. ERAS Compliance Group (2015). The impact of enhanced recovery protocol compliance on elective colorectal cancer resection: Results from an international registry. *Annals of Surgery, 261*(6), 1153-1159.
7. Lassen, K., Soop, M., Nygren, J., Cox, P.B., Hendry, P.O., Spies, C., von Meyenfeldt, M.F., Fearon, K.C., Revhaug, A., Norderval, S., Ljungqvist, O., Lobo, D.N., Dejong, C.H.; Enhanced Recovery After Surgery (ERAS) Group. (2009). Consensus review of optimal perioperative care in colorectal surgery: Enhanced Recovery After Surgery (ERAS) Group recommendations. *Archives of Surgery, 144*(10), 961-969.
8. Zargar-Shoshtari, K., Hill, A.G. (2008). Optimization of perioperative care for colonic surgery: a review of the evidence. *ANZ Journal of Surgery,* 78(1-2), 13-23.
9. Kiecolt-Glaser, J.K., Page, G.G., Marucha, P.T., MacCallum, R.C., Glaser, R. (1998). Psychological influences on surgical recovery: perspectives from psychoneuroimmunology. *American Psychologist,* 53(11), 1209-1218.
10. Devine, E.C. (1992). Effects of psychoeducational care for adult surgical patients: a meta-analysis of 191 studies. *Patient education and counseling,* 19(2), 129-142.
11. Merchant, R., Chartrand, D., Dain, S., Dobson, G., Kurrek, M.M., Lagacé, A., Stacey, S., Thiessen, B.; Canadian Anesthesiologists' Society. (2015). Guidelines to the practice of anesthesia--revised edition 2015. *Canadian Journal of Anaesthesia,* 62(1), 54-67.
12. Smith, I., Kranke, P., Murat, I., Smith, A., O'Sullivan, G., Søreide, E., Spies, C., in't Veld B; European Society of Anaesthesiology. (2011). Perioperative fasting in adults and children: guidelines from the European Society of Anaesthesiology. *European Journal of Anaesthesiologists,* 28(8), 556-569.

# References

13. Smith, M.D., McCall, J., Plank, L., Herbison, G.P., Soop, M., Nygren, J. Preoperative carbohydrate treatment for enhancing recovery after elective surgery. (2014). *Cochrane Database Systematic Review*. Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD009161.pub2/abstract;jsessionid=8DF90735FD033506B75C87B35F0526B3.f03t04
14. Gustafsson UO, Nygren J, Thorell A, Soop M, Hellström PM, Ljungqvist O, Hagström-Toft E. Pre-operative carbohydrate loading may be used in type 2 diabetes patients. Acta Anaesthesiol Scand. 2008 Aug;52(7):946-51
15. Allard JP, Keller H, Jeejeebhoy KN, Laporte M, Duerksen DR, Gramlich L, Payette H, Bernier P, Vesnaver E, Davidson B, Teterina A, Lou W. (2016). Malnutrition at Hospital Admission-Contributors and Effect on Length of Stay: A Prospective Cohort Study From the Canadian Malnutrition Task Force. JPEN J Parenterenteral Nutr. 2016 May;40(4):487-97. doi: 10.1177/0148607114567902. Epub 2015 Jan 26.
16. Keller H., McCullough J., Davidson B., Vesnaver E., Laporte M., Gramlich L., Allard J., Bernier P.,Duerksen D., Jeejeebhoy K. (2015). The Integrated Nutrition Pathway for Acute Care (INPAC): Building consensus with a modified Delphi. Nutrition Journal201514:63. DOI: 10.1186/s12937-015-0051-y
17. Andersen HK, Lewis SJ, Thomas S. Early enteral nutrition within 24h of colorectal surgery versus later commencement of feeding for postoperative complications. Cochrane Database Syst Rev 2009;4:CD004080.
18. Han-Geurts IJ, Hop WC, Kok NF, et al. Randomized clinical trial of the impact of early enteral feeding on postoperative ileus and recovery. British Journal of Surgery 2007;94:555-61.
19. El Nakeeb A, Fikry A, El Metwally T, et al. Early oral feeding in patients undergoing elective colonic anastomosis. International Journal of Surgery 2009;7:206-9.
20. Charoenkwan K, Matovinovic E. Early versus delayed oral fluids and food for reducing complications after major abdominal gynaecologic surgery. Cochrane Database Syst Rev. 2014 Dec 12;(12):CD004508. doi: 10.1002/14651858.CD004508.pub4.
21. Dirks ML, Wall BT, van de Valk B, Holloway TM, Holloway GP, Chabowski A, Goossens GH, van Loon LJ. One Week of Bed Rest Leads to Substantial Muscle Atrophy and Induces Whole-Body Insulin Resistance in the Absence of Skeletal Muscle Lipid Accumulation. Diabetes. 2016 Oct;65(10):2862-75. doi: 10.2337/db15-1661. Epub 2016 Jun 29.

# References

22. Carli F, Silver JK, Feldman LS, McKee A, Gilman S, Gillis C, Scheede-Bergdahl C, Gamsa A, Stout N, Hirsch B. Surgical Prehabilitation in Patients with Cancer: State-of-the-Science and Recommendations for Future Research from a Panel of Subject Matter Experts. Phys Med Rehabil Clin N Am. 2017 Feb;28(1):49-64. doi: 10.1016/j.pmr.2016.09.002. Review.
23. Stowers MD, Lemanu DP, Coleman B, Hill AG, Munro JT. Review article: Perioperative care in enhanced recovery for total hip and knee arthroplasty. J Orthop Surg (Hong Kong). 2014 Dec;22(3):383-92.
24. Aga Z, Machina M, McCluskey S (2016). Greater intravenous fluid volumes are associated with prolonged recovery after colorectal surgery: a retrospective cohort study. Br J Anaesth. 2016 Jun;116(6):804-10. doi: 10.1093/bja/aew125.
25. Bundgaard-Nielsen M, Secher NH, Kehlet H. 'Liberal' vs. 'restrictive' perioperative fluid therapy--a critical assessment of the evidence. Acta Anaesthesiol Scand. 2009 Aug;53(7):843-51.
26. Conway DH, Mayall R, Abdul-Latif MS, et al. Randomized controlled trial investigating the influence of intravenous fluid titration using esophageal Doppler monitoring during bowel surgery. Anaesthesia. 2002;57:845–849.
27. Wakeling HG, McFall MR, Jenkins CS, et al. Intraoperative esophageal Doppler guided fluid management shortens postoperative hospital stay after major bowel surgery. Br J Anaesth. 2005;95:634–642.
28. Chou R, Gordon DB, de Leon-Casasola OA, Rosenberg JM, Bickler S, Brennan T,Carter T, Cassidy CL, Chittenden EH, Degenhardt E, Griffith S, Manworren R, McCarberg B, Montgomery R, Murphy J, Perkal MF, Suresh S, Sluka K, Strassels S, Thirlby R, Viscusi E, Walco GA, Warner L, Weisman SJ, Wu CL. Management of Postoperative Pain: A Clinical Practice Guideline From the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' Committee on Regional Anesthesia, Executive Committee, and Administrative Council. J Pain. 2016 Feb;17(2):131-57. doi: 10.1016/j.jpain.2015.12.008. Erratum in: J Pain. 2016 Apr;17(4):508-10.
29. Nelson RL, Verma R. Prophylactic nasogastric decompression after abdominal surgery. Cochrane Database Syst Rev 2010;3:CD004929
30. Clarke K, Tong D, Easley KA, Norrick B, Ko C, Wang A, Razavi B, Stein J. Reduction in catheter-associated urinary tract infections by bundling interventions. Inter J Qualty Health Care 2012; 25:43-49
31. Gould CV, Umscheid CA, Agarwal RK, Kuntz G, Pegues DA; Healthcare Infection Control Practices Advisory Committee.. Guideline for prevention of catheter-associated urinary tract infections 2009. Infect Control Hosp Epidemiol.2010 Apr;31(4):319-26.

# References

32. Thanh., Chuck A., Wasyluk T., Lawrence J., Faris P., Ljungqvist O., Nelson G., Gramlich L. (2016). An economic evaluation of the Enhanced Recovery After Surgery (ERAS) multi-site implementation program for colorectal surgery in Alberta. Canadian Journal of Surgery 2016;59(6);415-421. https://canjsurg.ca/wp-content/uploads/2016/11/59-6-415.pdf
33. Canadian Patient Safety Institute (2016). Tools and resources. Retrieved from http://www.patientsafetyinstitute.ca/en/Search/Pages/toolsandresources.aspx
34. Chen, M., Song, X., Chen, L.Z., Zhang, X.L. (2016). Comparing mechanical bowel preparation with both oral and systemic antibiotics versus mechanical bowel preparation and systemic antibiotics alone for the prevention of surgical site infection after elective colorectal surgery; a meta-analysis of randomized controlled clinical trials. *Diseases of the Colon and Rectum, 29,* 70-78.
35. Lee, L.A., Mata, J.S., Ghitulescu, G.M., Boutros, M.S., Carlebois, P.S., Stein, B.S., Liberman, A.S., Fried, G.S., Morin, N.S., Carli, F.S., Latimer, E.S., Feldman, L.S. (2015). Cost-effectiveness of enhanced recovery versus conventional perioperative management for colorectal surgery. *Annals of Surgery, 262*(6), 1026-1033.
36. Gramlich. L.M., Martin, L., Atkins, M., Gillam, M., Sheppard, C., Buhler, S., Basualdo, H.C., Nelson, G. (2017). The impact of enhanced recovery after surgery on nutrition care. *Clinical Nutrition, 36,* 172-173.