Enhanced Recovery After Surgery: Two Health Systems Share Multidisciplinary Approaches to Successful Program Implementation

Melissa Miller, PharmD, Director of Pharmacy, North Suburban Medical Center, HCA

Philip F. Stahel, M.D., FACS, Chief Medical Officer, The Medical Center of Aurora, HCA

Keith Beiermeister, M.D., FACS, FASCRS, Colon & Rectal Surgeon, Medical Director, Scripps Health

Disclosures / Potential Conflicts of Interest

- Keith Beiermeister, MD, FACS, FASCRS is on the Speakers' Bureau for Merck (Entereg/ERAS); all relevant financial relationships have been mitigated
- Melissa Miller, PharmD and Philip F. Stahel, MD, FACS have no real or perceived conflicts of interest related to this presentation

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Learning Objectives

At the end of this session, participants should be able to:

1. Recognize the basic concepts involved in an Enhanced Recovery After Surgery (ERAS)
2. Describe the multidisciplinary approach to building a successful ERAS program, including the creation of standardized order sets
3. Identify ERAS quality metrics to evaluate post-ERAS implementation data to quantify the impact on patient safety metrics, outcomes, patient and staff satisfaction and/or costs

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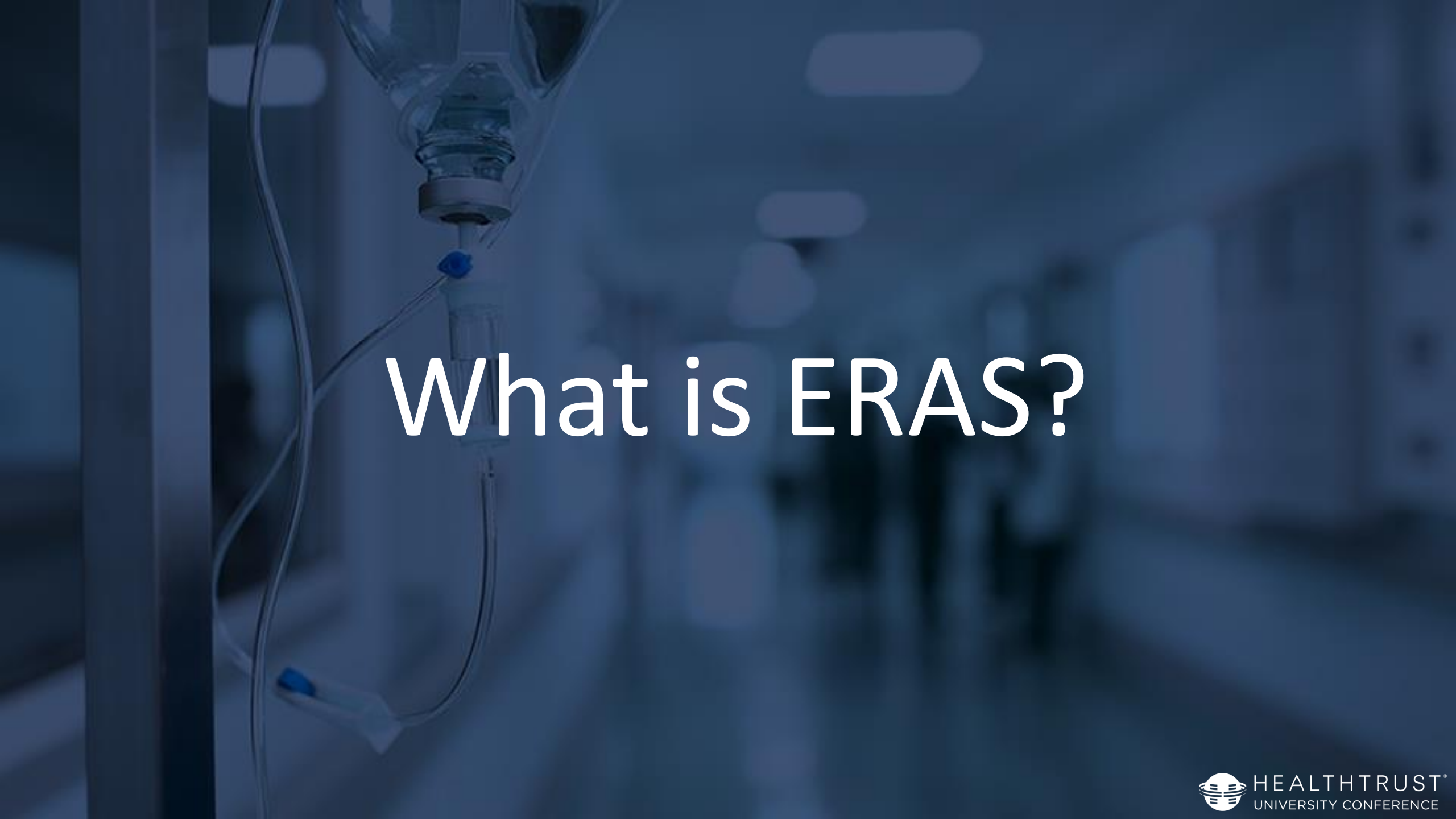
ERAS Implementation & Scaling: North Suburban Medical Center & Continental Division, HCA

Philip F. Stahel, M.D., FACS

Melissa Miller, PharmD



What is ERAS?

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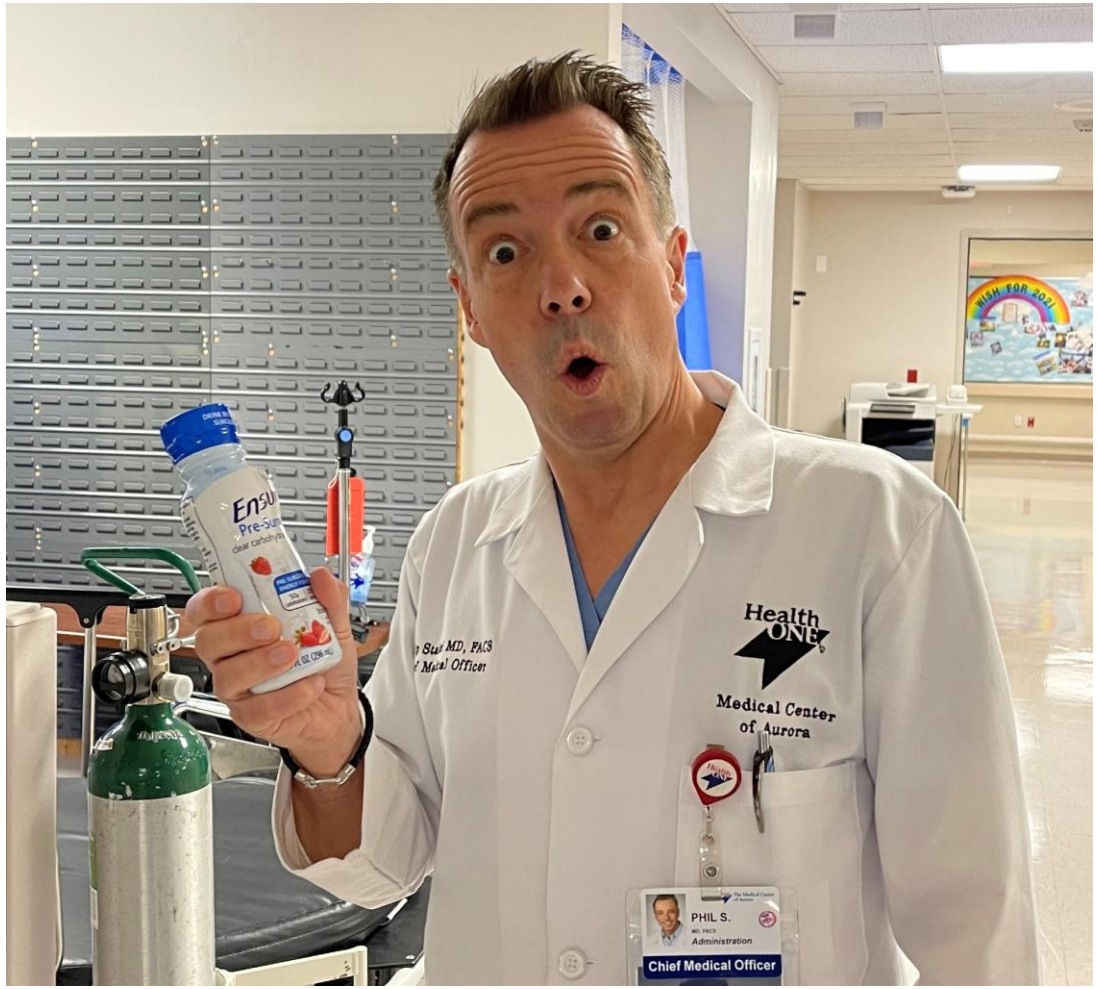
What is ERAS?

More than “just a carbohydrate drink”!



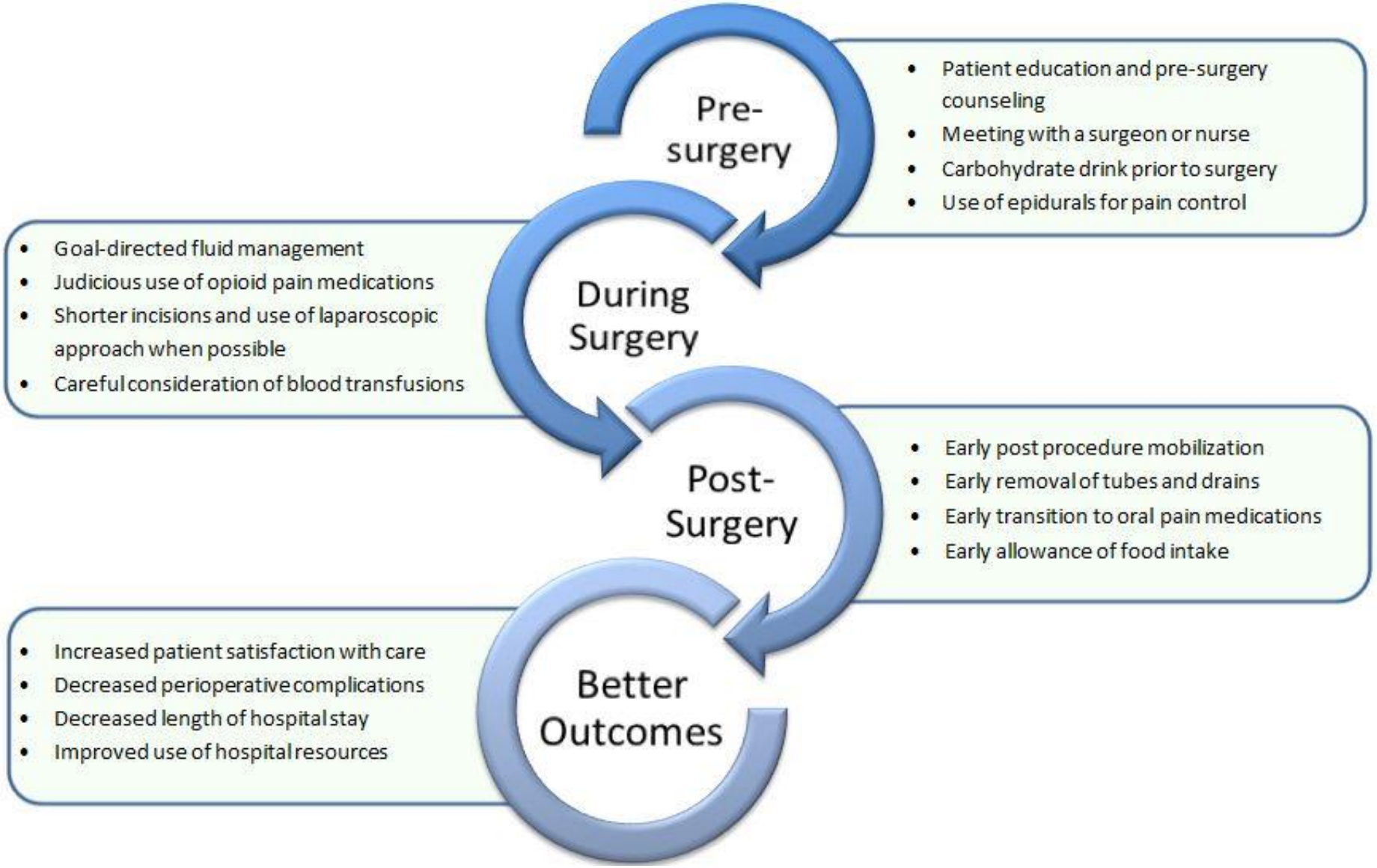
Source: Phil Stahel

What is ERAS?

More than “just a carbohydrate drink”!

ERAS	Enhanced Recovery After Surgery
ESR	Enhanced Surgical Recovery
ERACS	Enhanced Recovery After C-Section

What is ERAS?



Source: HCA.

The Global Impact of Surgery

Stahel *et al. Patient Safety in Surgery* 2014, **8**:9
http://www.pssjournal.com/content/8/1/9

PATIENT SAFETY IN SURGERY

EDITORIAL Open Access

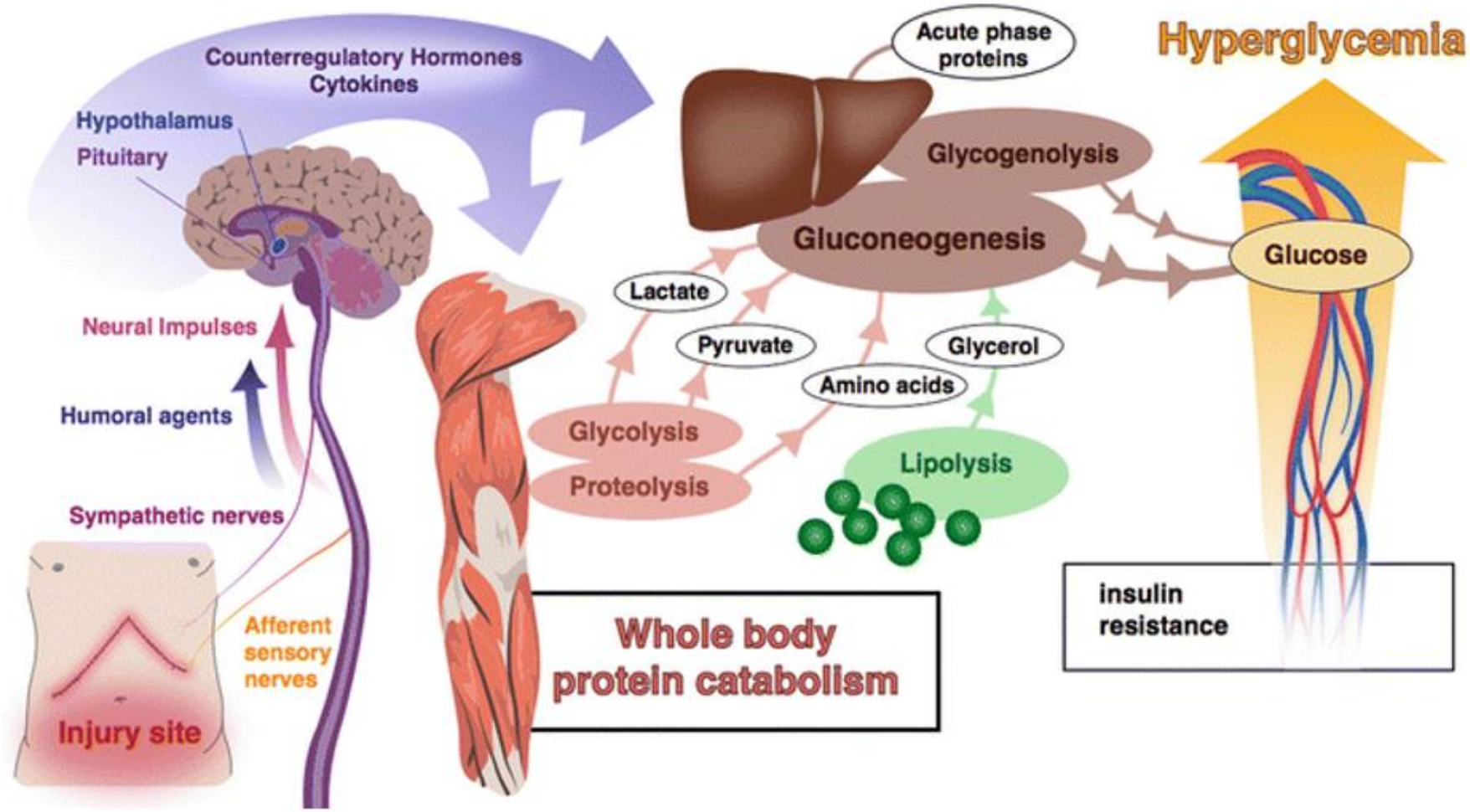
Current challenges and future perspectives for patient safety in surgery

Philip F Stahel*, Cyril Mauffrey and Nathan Butler

More than 200 million surgeries are performed worldwide every year!

Source: Stahel et al., Patient Saf. Surg. 2014, 8:9 (Open Access)

The Surgical Stress Response



Source: Courtesy of McGill University Health Centre Patient Education Office, Montreal, Quebec, Canada.

The Surgical Stress Response

What is the patient's perspective???

Source: iStock / Getty Images

The Patient's Perspective!

Preventable perioperative suffering:

- Fear
- Uncertainty
- Pain (or fear of pain)!
- Lack of mobility and independence
- Sleep disturbance
- Fatigue
- Starvation / catabolism
- Hypothermia
- Drains / tubes / catheters
- Fluid homeostasis alteration
- Ileus / nausea / vomiting
- Immunodysfunction
- Organ dysfunction (cerebral, pulmonary, cardiac, intestinal)
- Surgical complications!

Source: iStock / Getty Images

The Patient's Perspective!

And when it's "all good" from our perspective, the patient's suffering has just begun…

Source: iStock / Getty Images

The Opioid Crisis: By the Numbers

HHS 5-Point Strategy to Combat the Opioid Crisis

Source: HHS.gov/opioids

The 5 Principles of ERAS

The 5 Tactics of ERAS

Patient education

Source: Phil Stahel

The 5 Tactics of ERAS

Permissive pre-op hydration/carb loading

- Clear liquids allowed up to 2 hours before surgery!
- Prevention of starvation state!
- ERAS drink must contain maltodextrin as the carbohydrate of choice
  - Lower osmolality and quicker gastric emptying time
  - Needs to be consumed in 5-10 min to elicit insulin response (vs sipped over time)
  - Appropriate for type 2 diabetics, should also take morning diabetes meds

	Ensure Pre-Surgery	Gatorade	Apple Juice
Carbohydrates (g)	**50**	21	29
Carbohydrate source	**Maltodextrin**	Dextrose, sucrose, glucose	Fructose, sucrose, glucose
Osmolality	**274 (low)**	420 (high)	719 (high)
Protein (g)	0	0	0
Na (mg)	180	160	**15**
K (mg)	45	45	**345**
Anti-oxidants	**Zinc, Selenium**	---	---
Cost	$2.00/bottle	$0.42/can	$0.36/8oz

The 5 Tactics of ERAS

Goal directed fluid therapy

Source: Phil Stahel

The 5 Tactics of ERAS

DREAM:
drinking, eating and mobilization within 24 hours post-op

Source: Phil Stahel

The 5 Tactics of ERAS

Multimodal pain management

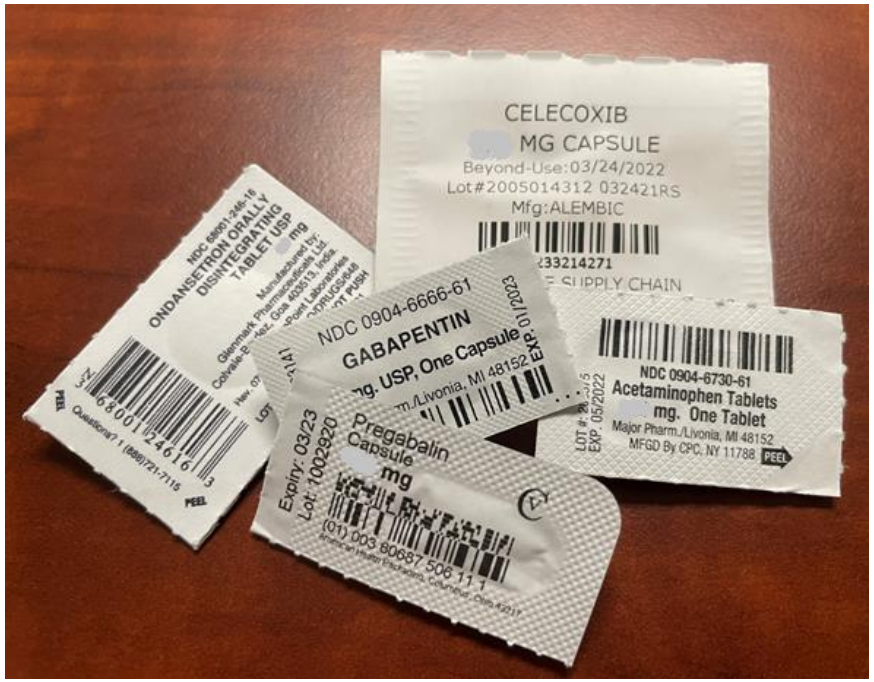
Source: iStock / Getty Images

The 5 Tactics of ERAS

Don’t wait for the Pain!

- Pain management begins in the outpatient setting
  - Scheduled acetaminophen before surgery
- Pre-operative tactics
  - Non-opioid pain control
  - Prevention of nausea & vomiting
  - Avoid fluid overload

Multimodal pain management



Source: Melissa Miller

The 5 Tactics of ERAS

Consider ALL the sources of pain

- Post-operative tactics
  - Scheduled non-opioid pain control
  - PRN opioids for breakthrough pain
  - Scheduled antiemetics
  - Scheduled bowel regimen
  - Promote PO intake and limit IV fluids

Multimodal pain management

Source: HealthOne

ERAS Program Implementation

Scaling from Facility to Division Level

Source: HCA

North Suburban Medical Center / Continental Division

A Streamlined Team-Approach to Scaling ESR Implementation From Facility to Division Level

Operationalization/ implementation categories

Team

Philip F. Stahel, MD, FACS, CMO, North Suburban Medical Center; Melissa Miller, PharmD, Pharmacy Director, North Suburban Medical Center; Shawn Enlow, BS, MHSM, VP Surgical Services, North Suburban Medical Center; Jason Kelly, MD, CMO, Sky Ridge Medical Center; Gary Winfield, MD, DCMO, Continental Division

Source: HCA

North Suburban Medical Center / Continental Division

A Streamlined Team-Approach to Scaling ESR Implementation From Facility to Division Level

Approach: The first staged goal for ESR program adoption was to implement the two major orthopaedic service lines, total hip arthroplasty (THA) and total knee arthroplasty (TKA), by end of year 2018. Designed to foster a collaboration among all relevant stakeholders, a new weekly "ESR taskforce" was initiated at NSMC in February 2018, comprised of the following:

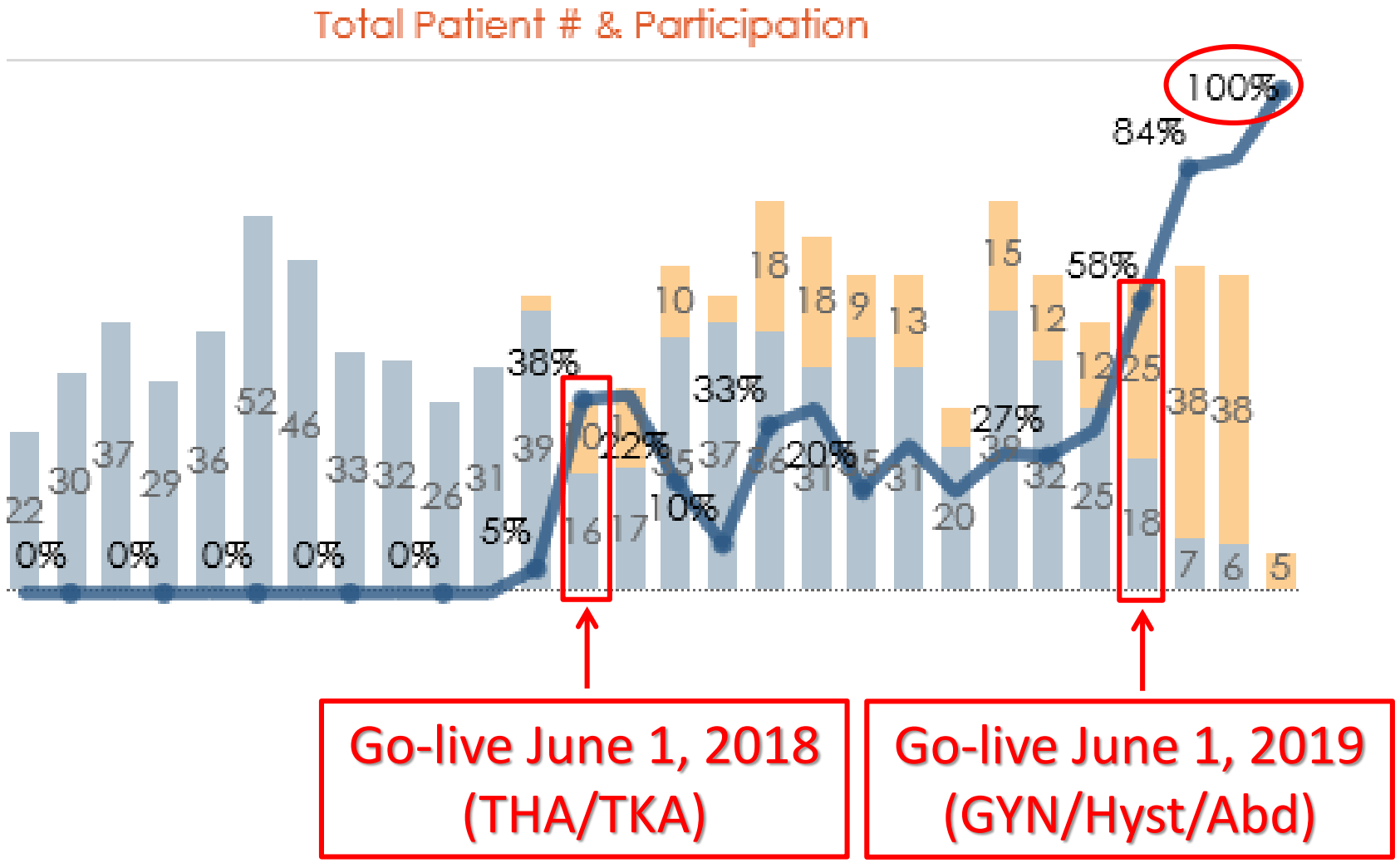
- Facility CMO (chair)
- Pharmacy Director (co-chair)
- Anesthesia physician champion
- Surgery physician champion
- VP Surgical Services
- Nursing director of surgical inpatient unit(s)
- Director Case Management
- Director Therapies
- Lead dietician
- Pharmacy IT liaison
- IT&S and CPOE liaisons.

Source: HCA

ERAS Program Implementation

1. Unwavering partnership: CMO & Director of Pharmacy!
2. Engaged anesthesia & surgeon champions
3. Weekly ERAS taskforce meetings
4. Standardization of order sets
5. Vetting/approval by MEC & surgical service lines
6. Define go-live date(s)
7. Concurrent monitoring, education, and continuous program improvement

ERAS “Success Story” at NSMC



ERAS “Success Story” at NSMC

<u>Within 1 year of program implementation (2018-2019):</u>

1. Improved patient outcomes, decreased perioperative complications and mortality rates
2. Decreased median LOS
3. Decreased opioid utilization through multimodal pain therapy
4. Program was templated and scaled across all facilities in Continental Division (2019-2020)
5. **Go-live for all surgical procedures (2021) !**

ERAS Scale Across the Enterprise

2019 HCA Healthcare ESR data, collected from approximately:

- 24,000 joint replacements
- 4,300 gyn/onc surgeries
- 3,500 colorectal surgeries
- 1,800 bariatric surgeries

3.5 days average reduction in length of stay	**52.3%** decrease in total morphine equivalents per encounter	**9.6%** increase in patient's pain goal being met	**19.6%** decrease in 30-day readmissions
$2,292 variable cost savings per case	**225%** increase in multimodal pain management use	**39.9%** decrease in complication rate	**20.8%** decrease in 90-day readmissions

*Information current as of September 30, 2019.

Source: HCA

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ERAS Implementation: Scripps Health

Keith Beiermeister, M.D., FACS, FASCRS

Who Am I?

- Small private practice colorectal surgeon (group of 2) – 100% of my clinical practice is dedicated to colorectal surgery
- Affiliated with Scripps Health which is a five hospital, not-for-profit, nonacademic community system in San Diego County with 1400 total beds
- Predominately private physicians (2/3 vs 1/3)
- Clinical practice is confined to the largest of the five hospitals (Scripps Memorial La Jolla)
- Administrative roles currently include Section Chief of General Surgery and Vice Chairman of the Department of Surgery
- System-wide Medical Director of Scripps ERAS program (since 2017)

Defining the Problem in Order to Identify a Solution

- Colorectal surgery often associated with long LOS (8 days for open surgery and 5 days for lap surgery), high cost and rates of SSI approaching 20%
- Average cost per inpatient hospital day in California is $2,140
- Total annual cost of all HAIs is $9.8 billion with SSI contributing the greatest percentage (33.7%)
- Enhanced Recovery Programs (ERPs) associated with decreased LOS, decreased healthcare costs, decreased complication rates and overall greater patient satisfaction

Kang CY et al. 2009. *Am J Surg*. 2012;204:952–957.
Thiele RH et al. *J Am Coll Surg*. 2015;220:430–443.
www.beckershospitalreview.com
Zimlichman, E et al. JAMA Intern Med. 2013;173(22):2039-2046.

Fast Track Protocol/Enhanced Recovery Pathway/Enhanced Recovery After Surgery

- First described by Kehlet in 2000 in his seminal paper in the Annuls of Surgery – 60 patients undergoing elective colon resection

- Multidisciplinary ***evidence based*** approach that combines "multiple interventions, each of which may have a modest impact in isolation, into a standardized package with synergistic beneficial effects on reducing physiologic stress and supporting early return of function"

- Shift from clinician-focused system to patient-centered system

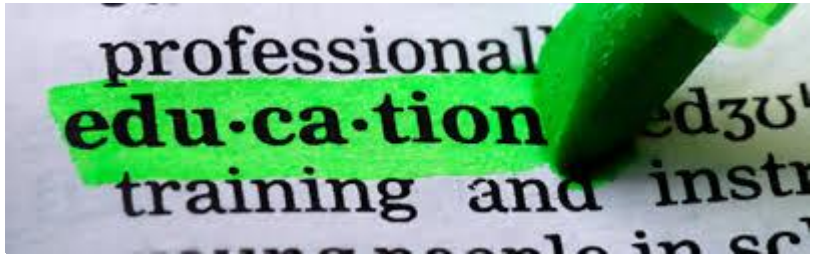
- Not just a set of standardized orders! – standard consensus reached within each institution

- Not clear which elements alone are most important – strict adherence to institution-specific protocols provide best results

Basse et al., Ann Surg. 2000;232(1):51-7
Feldman L.S. et al., The SAGES/ERAS Society Manual of Enhanced Recovery Programs for Gastrointestinal Surgery. 2015

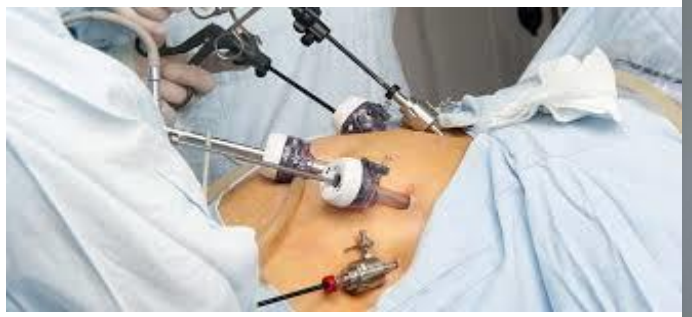
Preoperative

- Patient education/setting expectations
- Exercise/prehabilitation
- Smoking cessation
- Bowel preps?
- Modern fasting guidelines
- Carbohydrate loading



Intraoperative

- Judicious use of IV fluid
- Minimally invasive surgery
- Short-acting opioids
- Normothermia
- Antiemetic prophylaxis
- Regional anesthesia



Postoperative

- Multimodal, opioid-sparing analgesia
- Anti-ileus prophylaxis
- Limit use of drains, tubes and catheters
- Early enteral nutrition
- Early ambulation
- Daily care maps/predefined discharge criteria

Source: Melissa Miller

ERAS Journey

History of ERAS Implementation at Scripps

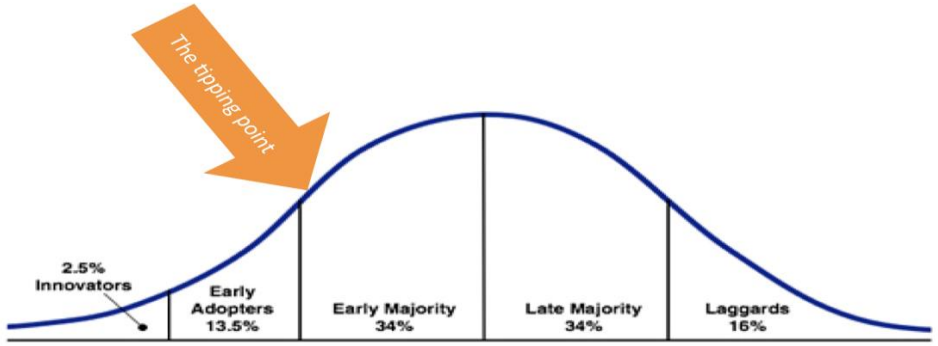
- Formal program started in 3/2017 but the actual work started well before then
- Initial protocols (2015) driven by the desire to improve patient care based on robust national and international **evidence-based data**
- Controlled things that were within our control – buy-in from anesthesia and nursing to come with time
- Education and setting of appropriate expectations proved to be the biggest change in mindset
- With adherence to this make-shift program in our practice alone noted a LOS of 3.74 days for all-comers (open and MIS) for first 100 pts

History of ERAS Implementation at Scripps

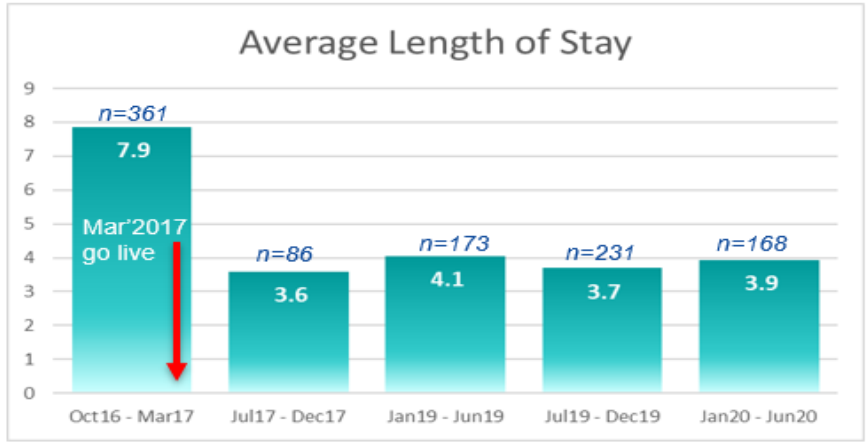
- Participation of administration, the surgeon, the anesthesiologist, the PACU nurses, the floor nurses, the case managers and home health

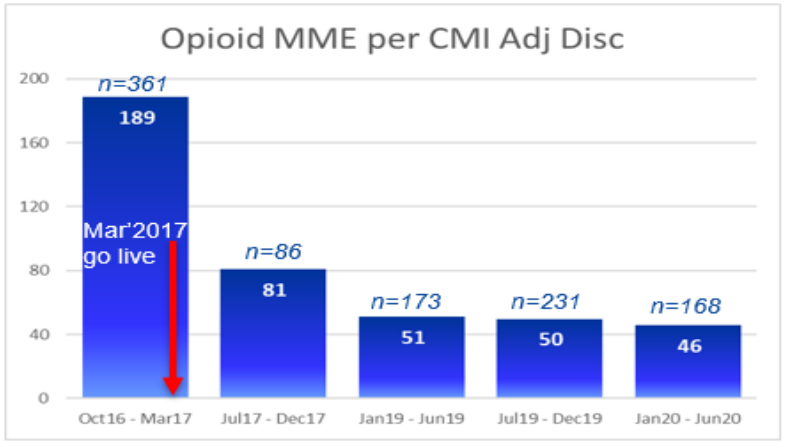
- Buy-in not as robust as you might think!
- Why?
  - Don’t tell me how to take care of my patient’s!
  - I don’t need to do this! – Already have the best LOS!
  - That stuff may work at other places but we don’t need to do it here!

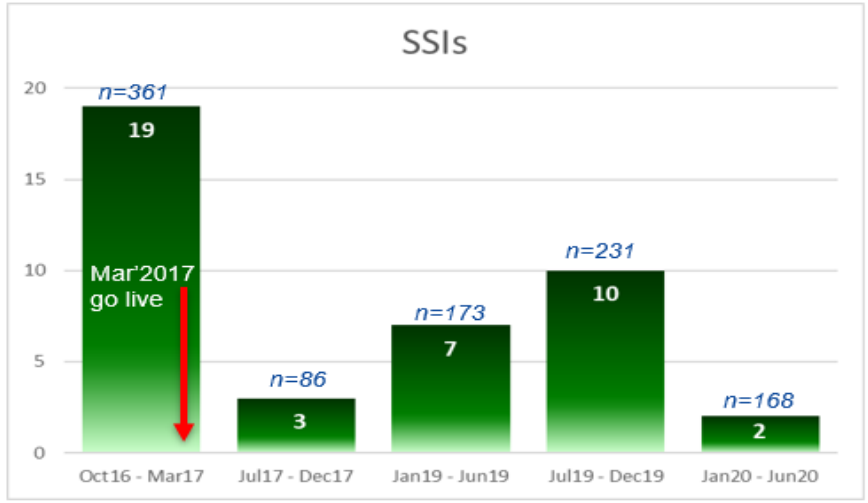
- Rogers diffusion of innovation: focus of the Early Adopters and Early Majority!

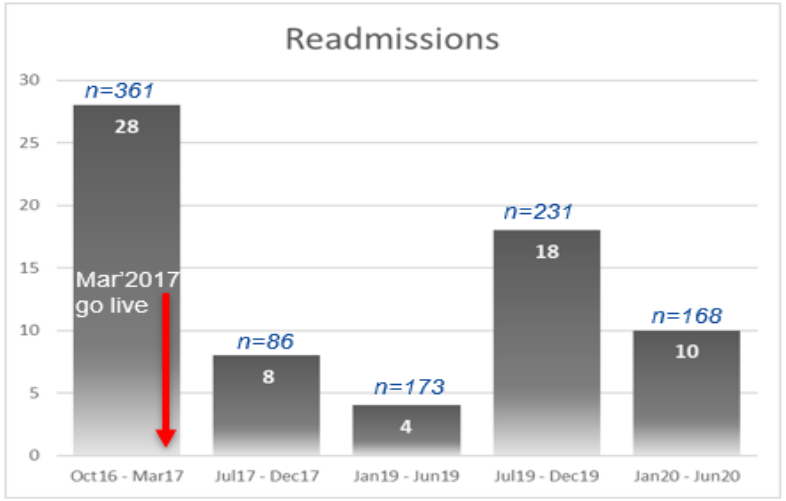


Colorectal ERAS Outcomes









Scripps

Excludes Emergent and Urgent Cases
Prior to go live = ERAS Eligible, After = ERAS Ordered

2

Previously presented at ASCRS 2021: "The Impact of an Enhanced Recovery After Surgery Program in a Non Academic Hospital System" 4/2021.

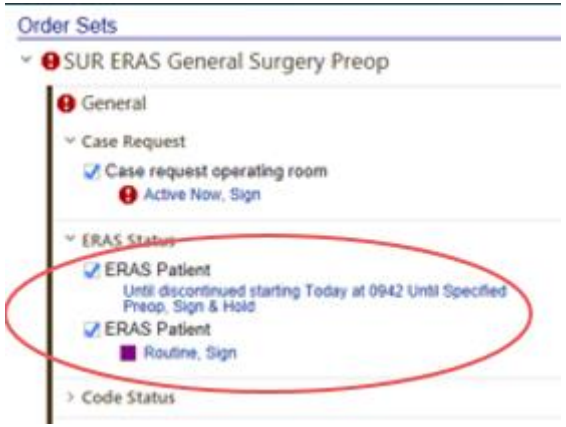
Potential Pitfalls & Obstacles

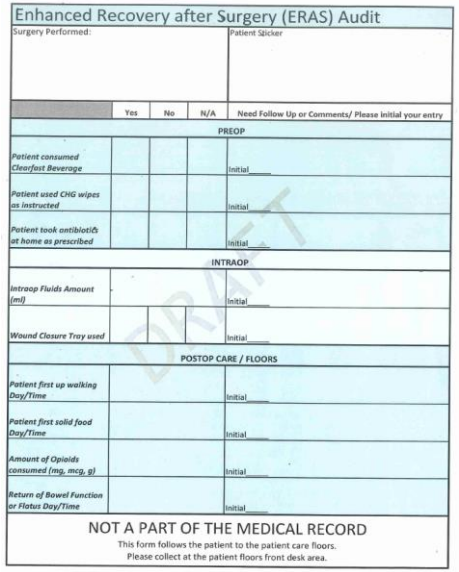
- Buy-in on all levels can be a challenge
  - Administration
  - Physician
  - Nursing

- System-specific obstacles will inevitably present themselves
  - Integration into EHR
  - Standardization of order sets
  - Identification of physician champions

- Establishment of a protocol is a huge win which should be celebrated but without ongoing audit and editing it will ultimately fail

Electronic Health Record





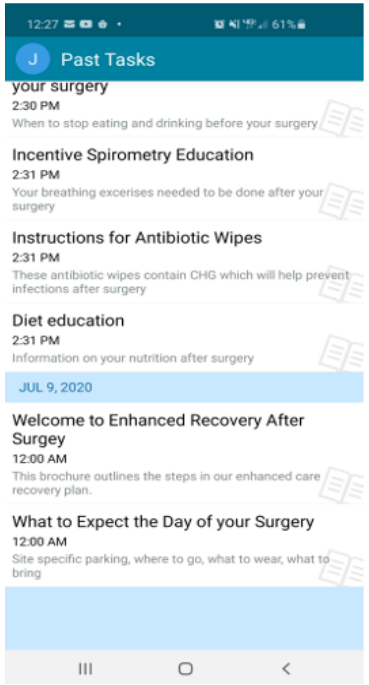
Subsequent Updates & Future Directions

- Leveraging the success of our colorectal program we have now established protocols in multiple different service lines
  - Gyn/Onc and Gynecology
  - Bariatric
  - Cardiac

- Future targets include: Breast, Total Joint and Spine

- Role of the ERAS committee is not to dictate how physicians practice, but to provide them with the tools to develop meaningful evidence-based protocols that will ultimately improve patient care

- Actively developing and beginning to test a patient engagement app



Take-Home Messages

- Positive impact of a coordinated ERAS Program is undeniable
- Focus your efforts on those who you know will make an ongoing positive impact on your program and your patients (Early Adopters and Early Majority)
- Unforeseen obstacles are inevitable – stay the course and work with your committee and physician champions to find a solution for the good of your patients
- Audit is essential for the ongoing success of your program
- ERAS is NOT just a colorectal thing – actively moving forward in a coordinated fashion to phase in to multiple service lines with the help of both physician champions here at Scripps as well as outside experts

Assessment Question #1

What is a key principle of ERAS?

a. Optimizing perioperative care
b. Reducing complications
c. Mitigating the surgical stress response
d. All of the above

Assessment Question #2

The multidisciplinary approach discusses the creation of standardized order sets; these are:

a. A set of standardized orders
b. A standard consensus reached within each institution
c. A separate order for each individual patient need

Assessment Question #3

What might occur in patients after an implementation of an ERAS program?

a. Increased length of stay (LOS)
b. Decreased opioid utilization
c. Increased patient post-operative complications
d. Both A and B

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Thank you…

Melissa.Miller@HealthONEcares.com
Philip.Stahel@HealthONEcares.com
Beiermeister.Keith@scrippshealth.org

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Clinical Evidence Summary

Endoscopic Vein Harvesting

This Clinical Evidence Summary was developed to provide a synopsis of the current clinical literature and study data specific to products available in the United States for Endoscopic Vein Harvesting (EVH).

More than 200,000 coronary artery bypass graft (CABG) surgeries are performed annually in the United States.[1] One key to the success of a CABG surgery is to ensure a quality graft/conduit to bypass the diseased vessel.[2] Graft selection and method of harvesting play an important role in successful short-term and long-term outcomes.[3] Endoscopic Vein Harvesting (EVH), introduced in the mid-1990s, is a minimally-invasive procedure for harvesting the saphenous vein to use as a graft for CABG.[4]

Performed through a three (3) cm incision just above the medial aspect of the knee, 35 cm of the thigh saphenous vein may be harvested.[4] If a 70 cm length of vein is needed, there is an option to repeat the procedure using the same incision in the opposite direction or begin the harvesting procedure 2-3 cm above the medial malleolus, followed by a second incision just above the knee to harvest the entire length of the saphenous vein. The vein is identified and the tunnel is either closed with a balloon (closed tunnel system) or left open (open tunnel system) and the tunnel is insufflated with carbon dioxide. Videoscopic visualization is used to advance the conical dissection cone or spoon-shaped dissector tip toward the groin. Once circumferential blunt dissection of the vein is completed the collateral branches are isolated and divided with bipolar electrocautery. Ligation is performed through a stab and graft incision.[4]

EVH is the preferred method over traditional SVG harvesting, which involves creating a long incision along the medial part of the lower leg or thigh.[5] There are significant advantages for EVH, including reduction in leg wound complications, ameliorated postoperative pain and improved cosmetic outcomes, resulting in increased patient satisfaction.[6]

Professional Society Statements

Three professional society statements recommend use of arterial grafts over saphenous vein graft (SVG) in CABG procedures; particularly for the left coronary system.[7,8] Guidelines support using the left internal mammary artery (LIMA) as the primary graft for a left anterior descending (LAD) target vessel (Class I; LOE B per STS). Consideration for bilateral (BIMA) in patients with low risk for sternal complications is a secondary conduit recommendation

Summary

- Current professional society guidelines favor the use of arteries rather than veins for secondary conduit in CABG; however, SVG seems to be the conduit of choice for secondary graft with many surgeons.
- EVH is a minimally-invasive procedure for harvesting the saphenous vein to use as a graft for CABG.
- EVH is performed using CO_2 insufflation in a closed tunnel system or open tunnel system.
- EVH (closed or open) is the preferred method over open-vein harvesting due to the reduction in leg wound complications, decreased post-operative pain and cosmetic outcomes—all leading to improved patient satisfaction.
- Studies and professional guidelines have revealed the safety and efficacy of EVH in harvesters with proper training and experience.
- EVH, (closed and open) when properly used, demonstrates outcomes that are similar to open procedures with regard to MACE.

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