



# **Utilizing Informatics to Collect Cardiac Surgical Patient Reported Outcomes and Implement Enhanced Recovery**

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# Disclosures

**None**



# Objectives

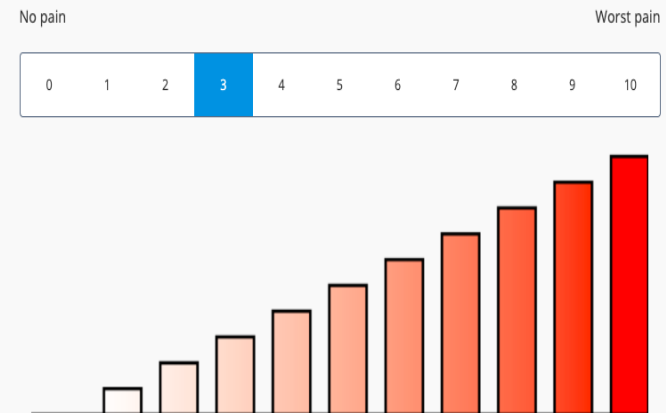
- Define how technology can be leveraged to enhance patient engagement, customize care and obtain patient reported outcomes (PROs)
- Highlight the value of PROs as part of an Enhanced Recovery After Surgery (ERAS) Program
- Outline steps to build an online patient engagement application (APP)
- Compare quality of care outcomes for APP users versus non APP users

# Patient Reported Outcomes (PROs) Compared to Patient Satisfaction Surveys

- PROs provide valuable insight into how well a patient is progressing after a healthcare encounter and what is meaningful to the patient regarding their health care
- Patient satisfaction surveys assess satisfactions with caregivers and an institution as a whole

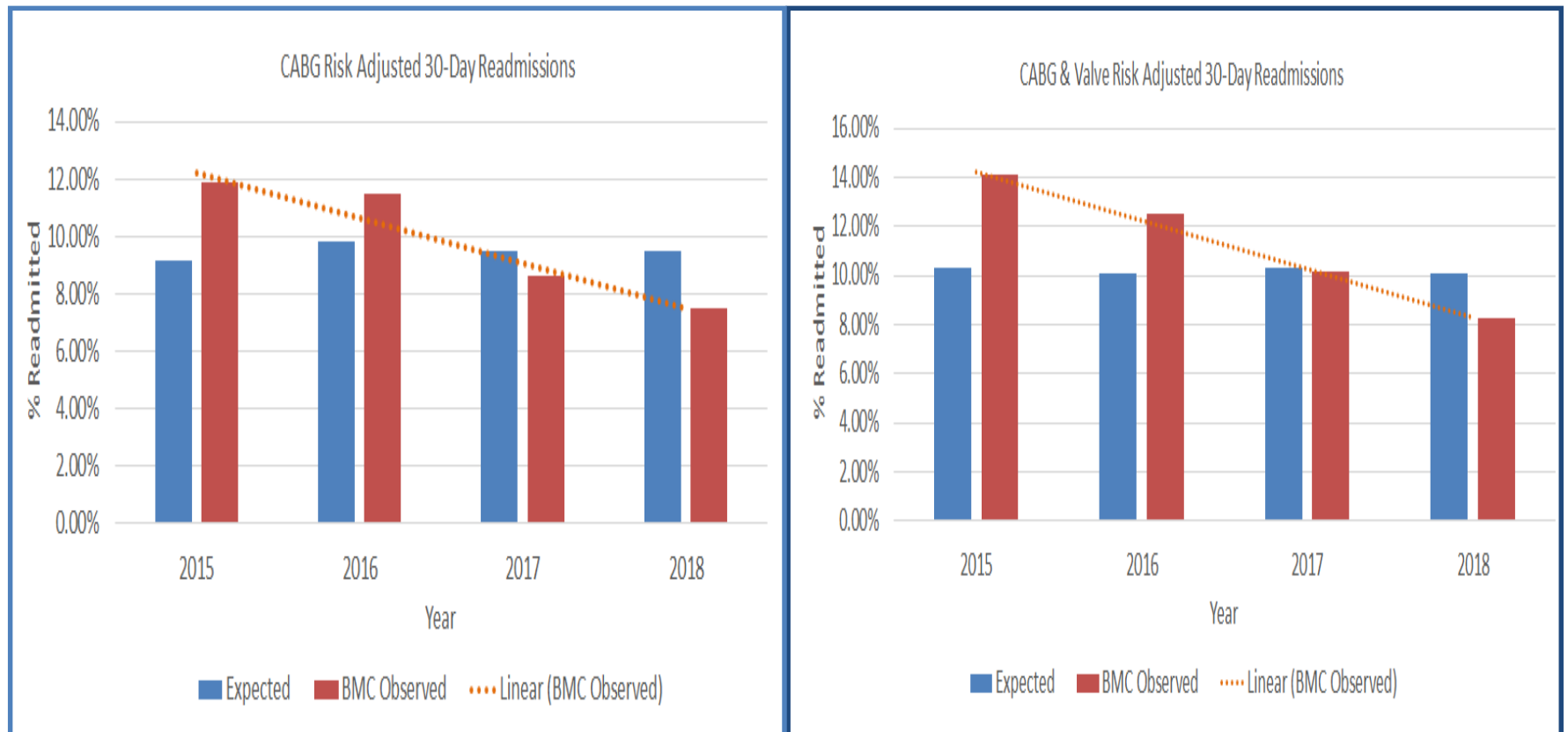
What was the highest level of surgery wound pain you felt yesterday?

It is normal to have a little pain after surgery. But, while moving around, your pain should be less than 6 out of 10. Less pain helps your body heal faster.



# Motivation to Utilize Informatics

## Four Year Readmissions Rates



# What is ERAS?

JAMA Surgery | Special Communication

## Guidelines for Perioperative Care in Cardiac Surgery Enhanced Recovery After Surgery Society Recommendations

Daniel T. Engelman, MD; Walid Ben Ali, MD; Judson B. Williams, MD, MHS; Louis P. Perrault, MD, PhD;  
V. Seenu Reddy, MD; Rakesh C. Arora, MD, PhD; Eric E. Rosell, MD; Ali Khojenezhad, MD, PhD; Marc Gerdtsch, MD;  
Jerrold H. Levy, MD; Kevin Lobdell, MD; Nick Fletcher, MD, MBBS; Matthias Kirsch, MD; Gregg Nelson, MD;  
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- Utilizes evidenced-based protocols to improve perioperative care
- Avoids unnecessary care variation
- Improves quality, safety and patient-centered value

The Society for Enhanced Recovery After Cardiac Surgery (ERAS® Cardiac) mission is to optimize perioperative care of cardiac surgical patients through collaborative discovery, analysis, expert consensus, and dissemination of best practices.



# ERAS Cardiac Components



## Preoperative

- Patient education
- Pre-habilitation
- Smoking & alcohol cessation
- Nutrition optimization
- No prolonged fasting
- Carbohydrate loading
- Initiate multimodal analgesia

## Intraoperative

- Short acting anesthetics
- Multimodal analgesia
- Goal directed fluid therapy
- Surgical site infection prevention
- Prevent intra-operative hypothermia
- Reduce bleeding risk
- Nausea & vomiting prophylaxis
- Initiate post-operative sedation

## Postoperative

- Multimodal analgesia
- Early removal tubes, lines & drains
- Glycemic control
- Systemic delirium screening
- Goal directed fluid therapy
- Chemical thromboprophylaxis
- Acute kidney injury prevention
- Nausea & vomiting prophylaxis
- Early oral nutrition & bowel regime
- Early ambulation

# Implementing New Technology in Healthcare

- Make a financial investment
- Engage informatics specialists for APP support
- Ensure content development and post implementation monitoring of alerts and PROs
- Obtain support from stakeholders
- Assess patient willingness to embrace technology





# Building an Online Engagement Platform Application (APP)

**Customize APP content to reflect program goals**  
**Collaborate with multidisciplinary team members**



# Operationalizing and Sustain APP

## Determine Workflow

- Educating patient and their caregivers about APP
- Enrolling patient and caregivers in APP platform
- Monitoring input from patients and care givers
- Updating content of APP to reflect program changes

### For Patients and Family:

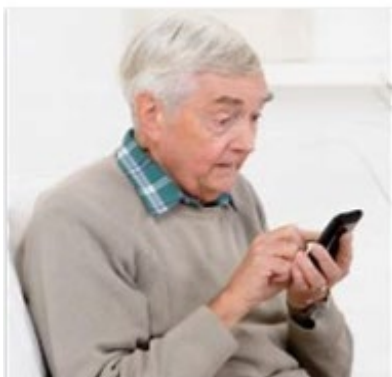
How to get started on  
your Online Surgery Platform

**Read this brochure to learn:**

- What the platform is
- How the platform helps you
- How you can sign up on the platform

# Willingness of Patients to Embrace Technology

- BMC experience: Average age of APP users the same as nonusers
- Strategy to enhance APP utilization: Encourage family & caregiver use of APP



# Leveraging Technology for Patient Engagement

## Before Surgery

- Helpful messages sent to help patient prepare for surgery
- To-do list sent to help patients prepare for surgery
- Patients given access to self care library with key self-care topics

## In-Patient Stay

- Patient sent messages about what to expect each day
- Patient sent daily health checks to make sure they are track with recovery
- To-do list sent to enhance safer, fast recovery

## Home Recovery

- Patient sent messages about what to expect during recovery
- To-do list sent to help patients heal well at home
- Daily Health Checks to make sure patients are on track with recovery and to give recovery feedback

# Leveraging Technology For Patient Engagement



Warfarin Education

# How PROs Assist Customizing Care

## Pre-operative recovery PRO surveys demonstrated:

- 96% of patients completed preoperative online education
- 91% picked up the pre-operative chlorhexidine soap



# In Hospital Postop PRO Question

Did your healthcare team support all your needs yesterday?

- ☐ Yes, I feel extremely supported
- ☐ Yes, I feel very supported
- ☒ Yes, I feel a little supported
- ☐ No, I do not feel supported

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# In-Hospital Postop PRO Question

**Is there anything else you would like to write down?**

Your healthcare team may not see this today. Talk to your nurse right away if you need help with something.

Type your response here...



# In-Hospital Recovery PRO Question

How many walks did you take yesterday?

Walking helps your blood flow well. This will speed up your healing. It will also prevent blood clots and infections.

- ☐ 0 times
- ☐ 1 time
- ☐ 2 times
- ☐ 3 times
- ☐ 4 times
- ☐ 5 or more times

There was no one around to help me out.

**Patient Responses demonstrated early mobilization started at 0% on POD 1 and reached a maximum of 73% by POD 5.**

# Care Changes Related to PROS

**Telemetry floor created patient & staff magnetic ambulation engagement boards for each patient room.**

**Heart & Vascular Intensive Care/Progressive Care Unit hired fulltime walking orderly.**



# How PROs Assist Customizing Care

## In-Hospital Recovery PRO Surveys

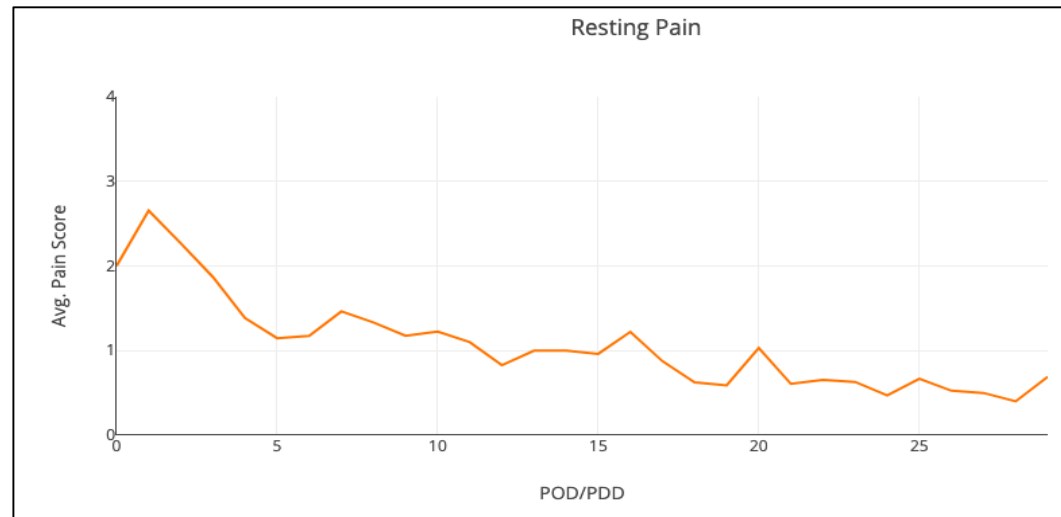
Demonstrated breathing exercises compliance started at 55% on postoperative day POD 1 and reached a maximum of 100% by POD 4.



# How PROs Assist Customizing Care

## Post Hospital Recovery PRO Surveys

- Demonstrated post-discharge scores for pain while resting averages of 2.0/10 on Day 1 and 1.3/10 on Day 7
- Demonstrated post-discharge scores for pain while moving averages 3.0/10 on Day 1, 1.9/10 on Day 7, and 0.7/10 on Day 30



# Patient Engagement

## Your Recommendation

Call the Surgery team



Today, you identified the following issues or concerns:

- Systolic blood pressure is 150 or more. Your blood pressure is higher than normal.
- Gained 3lbs of weight in the past 24 hours. This may be a sign your body is holding water (swelling).
- Heart rate is 111 beats per minute or more. Your heart is beating faster than normal.
- A little trouble breathing while resting or not moving. This may be the sign of a blood clot or allergic reaction to medicines. If it is not safe to wait, call 911.

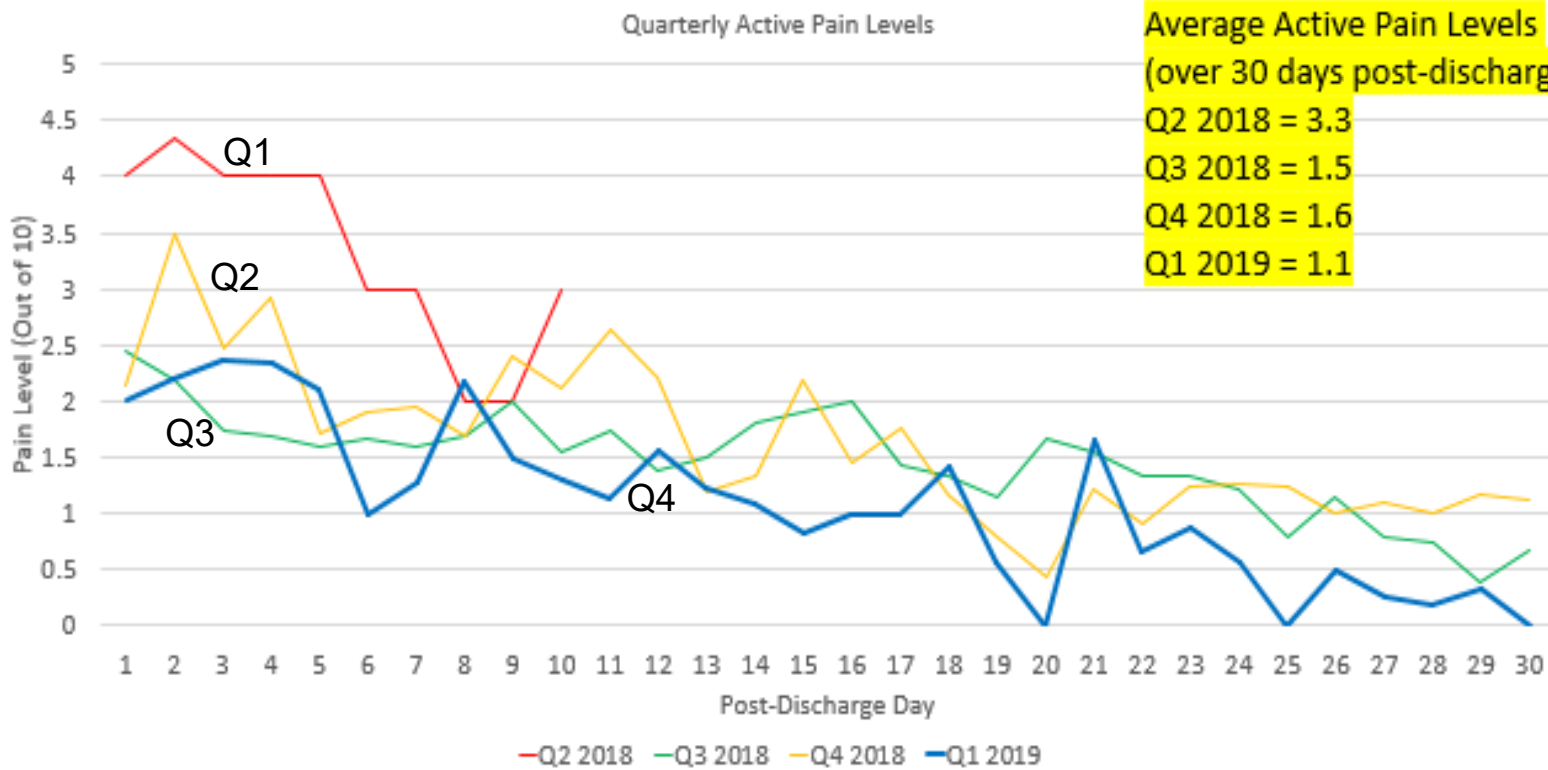
[Click here to review these topics](#)

# ERAS Protocol: Multimodal Analgesia



Baystate  
Health

Collecting ERAS Patient-Reported Outcomes (PROs) ((+))



# How PROs Assist Customizing Care

## Post Hospital Recovery PRO Surveys

Demonstrated:

- 29% reported no issues
- 49% reported issues that could be managed with self-care education
- 22% reported issues for which patients were recommended to speak with a provider


# APP Versus Non APP Patient Outcomes

- Length of stay 1.5 days lower
- Relative reduction of hospital readmissions by 25%
- Relative reduction of skilled nursing facility utilization by 24%
- Overall decrease in the cost of care by 8.1%



# Conclusion

- An APP-based platform to engage patients and collect PROs provides an ideal opportunity for real-time individualized care customization.
- Future research will consider multi-site PRO data collaboration and benchmarking to drive quality improvement.



It's not a faith in technology.  
It's faith in people.

Steve Jobs

# Questions



## References

- Armstrong, K., Coyte, P., Brown, M., Beber, B., & Semple, J. (2017, July). Effect of home monitoring via mobile app on the number on in-person visits following ambulatory surgery: A randomized clinical trial. *The Journal of the American Medical Association Surgery*, 152, 622-627.  
<https://doi.org/10.1001/jamasurg.2017.0111>
- Brown, J. K., Singh, K., Dumitru, R., Chan, E., & Kim, M. P. (2018). The benefits of enhanced recovery after surgery programs and their application in cardiothoracic surgery. *Methodist Debaque Cardiovascular Journal*, 14 (2), 77-88.
- Ellen, M. E., Shach, R., & Balicer, R. D. (2018, September 18). Helping patients help themselves: Supporting the healthcare journey. *Patient Education & Counseling*, 101, 1708-1711. <https://doi.org/https://doi.org/10.1016/j.pec.2018.04.005>
- Engelman, D. T., Walid, B. A., Williams, J. B., Perrault, L. P., Reddy, V. S., Arora, R. C., ... Khoynezhad, A. (2019, May 4). Guidelines for perioperative care in cardiac surgery Enhanced Recovery After Surgery Society recommendations. *Jama Surgery*, E1-E12.  
<https://doi.org/10.1001/jamasurg.2019.1153>
- Lavallee, D., Chenok, K., Love, R., Peterson, C., Holve, E., Segal, C., & Franklin, P. (2016, April). Incorporating patient reported outcomes into health care to engage patients and enhanced care. *Health Affairs*, 35, 575-582. <https://doi.org/10.1377/hlthaff.2015.1362>
- McConnell, G., Woltz, P., Bradford, W. T., Ledford, E., & Williams, J. (2018). Enhanced recovery after cardiac surgery program to improve patient outcomes. *Nursing 2018*, 11, 24-31. <https://doi.org/10.1097/01.NURSE.0000546453.18005.3f>
- Pecoreli, N., Fiore, J., Somasundram, A., Charlebois, P., Liberman, A., Stein, B., ... Feldman, L. (2018, May). An app for patient education and self-audit within an enhanced recovery program for bowel surgery: A pilot study assessing validity and usability. *Surgical Endoscopy*, 32, 2263-2273.  
<https://doi.org/10.1007/s00464-017-5920-3>
- Rosner, B. I., Gottlieb, M., & Anderson, W. N. (2018, April 1). Effectiveness of an automated digital remote guidance and telemonitoring platform on costs, readmissions, and complications after hip and knee arthroplasties. *Journal of Arthroplasty*, 33, 988-996. <https://doi.org/10.1016/j.arth.2017.11.036>
- Williams, J. B., McConnell, G., Allender, J. E., Woltz, P., Kane, K., Smith, P. K., ... Bradford, W. T. (2019, May). One-year results from the first US-based enhanced recovery after cardiac surgery (ERAS Cardiac) program. *The Journal of Thoracic and Cardiovascular Surgery*, 157, 1881-1888.