

A stylized illustration of a Scout in silhouette, wearing a hat and holding a staff with a flag, standing on a mountain peak. The background features rolling green mountains, a bright yellow sun in the top left, and two white clouds in the sky. The text 'BE PREPARED' is at the top, and 'IT'S NOT JUST FOR SCOUTS' is in the middle right.

# BE PREPARED

IT'S NOT  
JUST FOR SCOUTS

## Surgical *Prehab*: From evidence to clinical practice

Daniel Santa Mina, PhD RKin CSEP-CEP

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Clinician Investigator, Department of Anesthesia, University Health Network

Director, Research and Programming, Prehabilitation Program, University Health Network

# Objectives

01

Describe the principles and supporting evidence for surgical prehabilitation

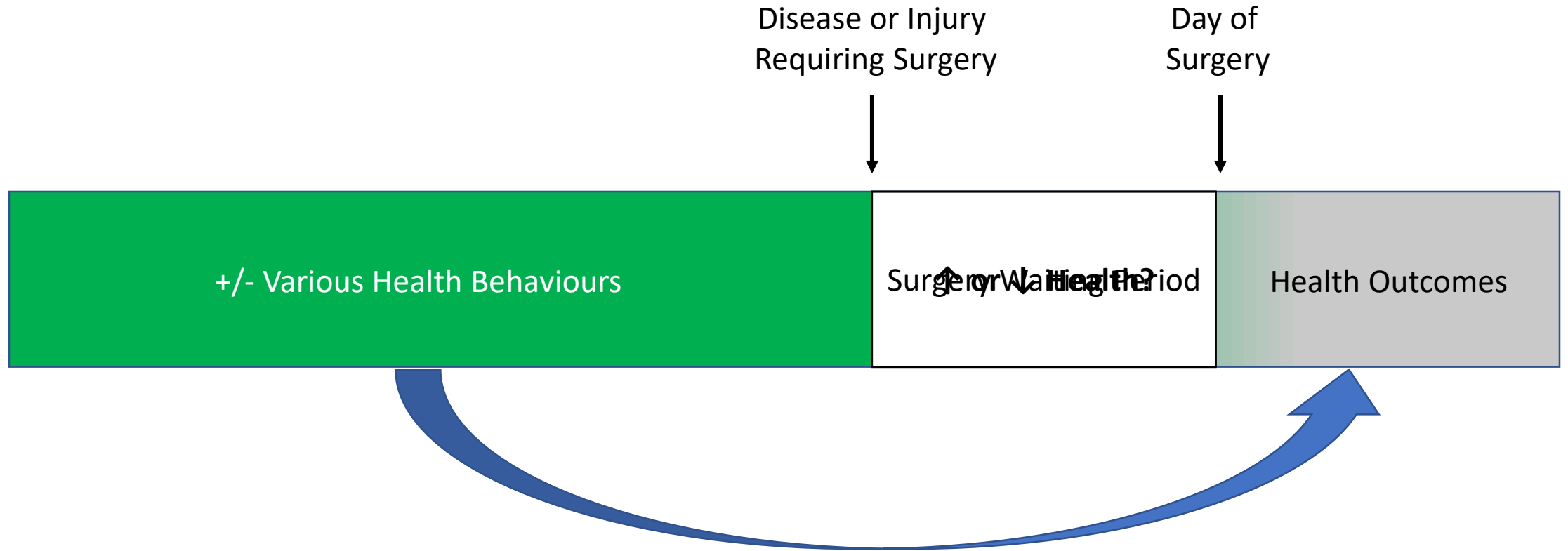
02

Discuss strategies for moving prehabilitation into clinical practice

*Health behaviours are.... Healthy!*



...but, health can change – quickly.



Does health status before surgery matter for surgical outcomes?

# Does health status affect surgical risk and outcomes?

American College of Surgeons Risk Calculator ([riskcalculator.facs.org/RiskCalculator/](http://riskcalculator.facs.org/RiskCalculator/))

ASA III/IV	Sepsis	Indication for surgery	Disseminated cancer	Extent of surgery
Emergent	Age >65	Creatinine	COPD	Wound class
PTT >35	Dyspnea	Albumin $\leq 35$	<i>BMI</i>	<i>Functional health status</i>





## What is *functional health status*?

It's an assessment of a patient's 'functional capacity' and ranges from cardiopulmonary exercise testing (CPET) to "the eyeball test"

CPET has extensive perioperative justification and recommendations are available

- Levett and Colleagues' Consensus guidelines, Br J Anaest 2018 Mar;120(3):484-500

General thresholds for determining high-risk for surgery (see Levett et al Suppl):

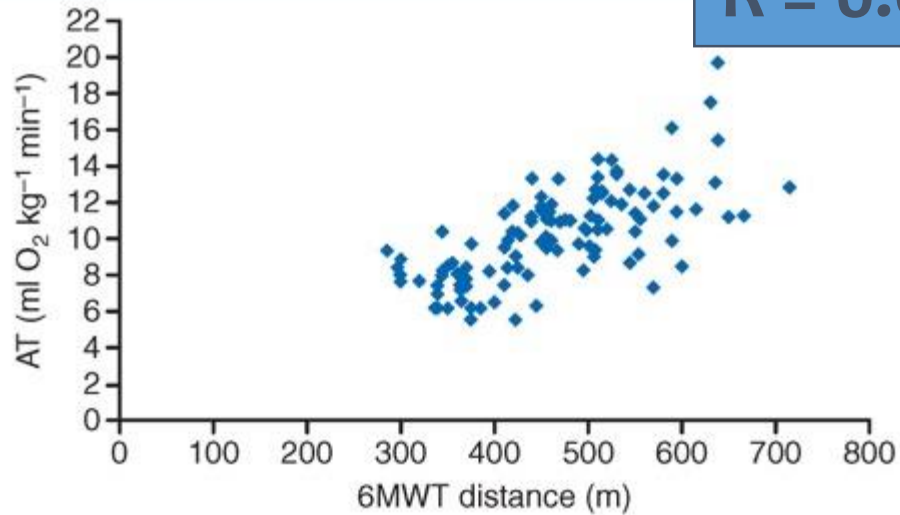
- $VO_{2peak} < \sim 15 \text{ ml O}_2/\text{kg}/\text{min}$
- Anaerobic Threshold  $< \sim 11 \text{ ml O}_2/\text{kg}/\text{min}$

But at a cost:

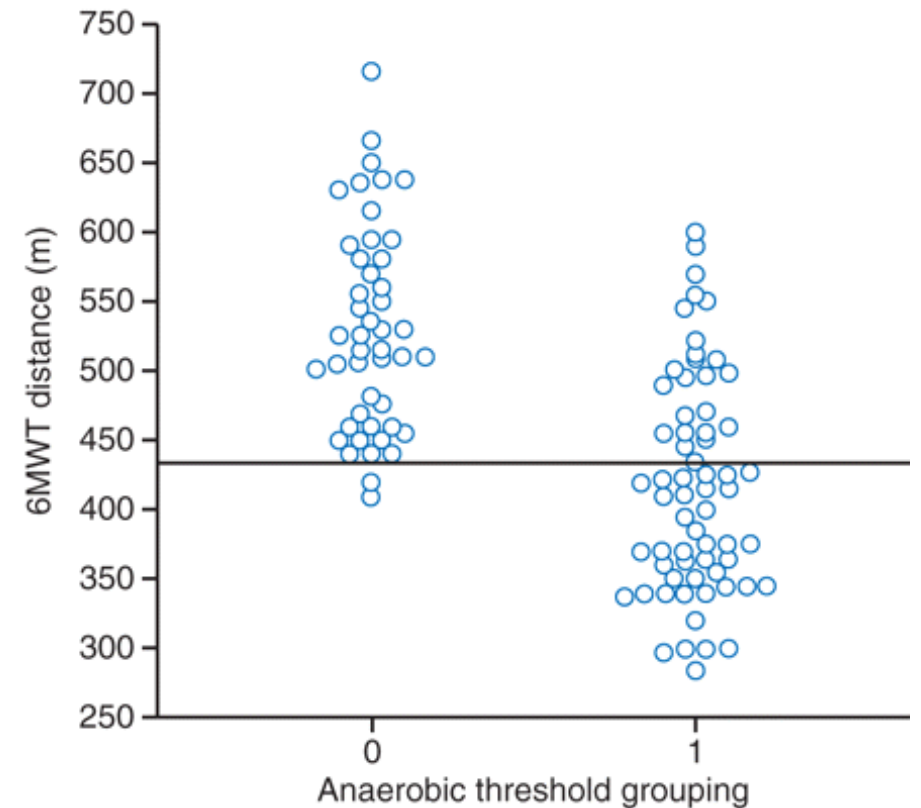
- Infrastructure Resources
- Personnel Expertise
- Overall cost

# FUNCTIONAL CAPACITY VIA SIX-MINUTE WALK TEST (6MWT)

$R = 0.68$



**Fig 1** Scatter plot for 6MWT distance (m) vs AT (ml O<sub>2</sub> kg<sup>-1</sup> min<sup>-1</sup>).



0 = < 1 l mlO<sub>2</sub>/kg/min; 1 = ≥ 1 l mlO<sub>2</sub>/kg/min

Sinclair et al, 2012, Validity of the 6 min walk test in prediction of the anaerobic threshold before major non-cardiac surgery, *BJA: British Journal of Anaesthesia*

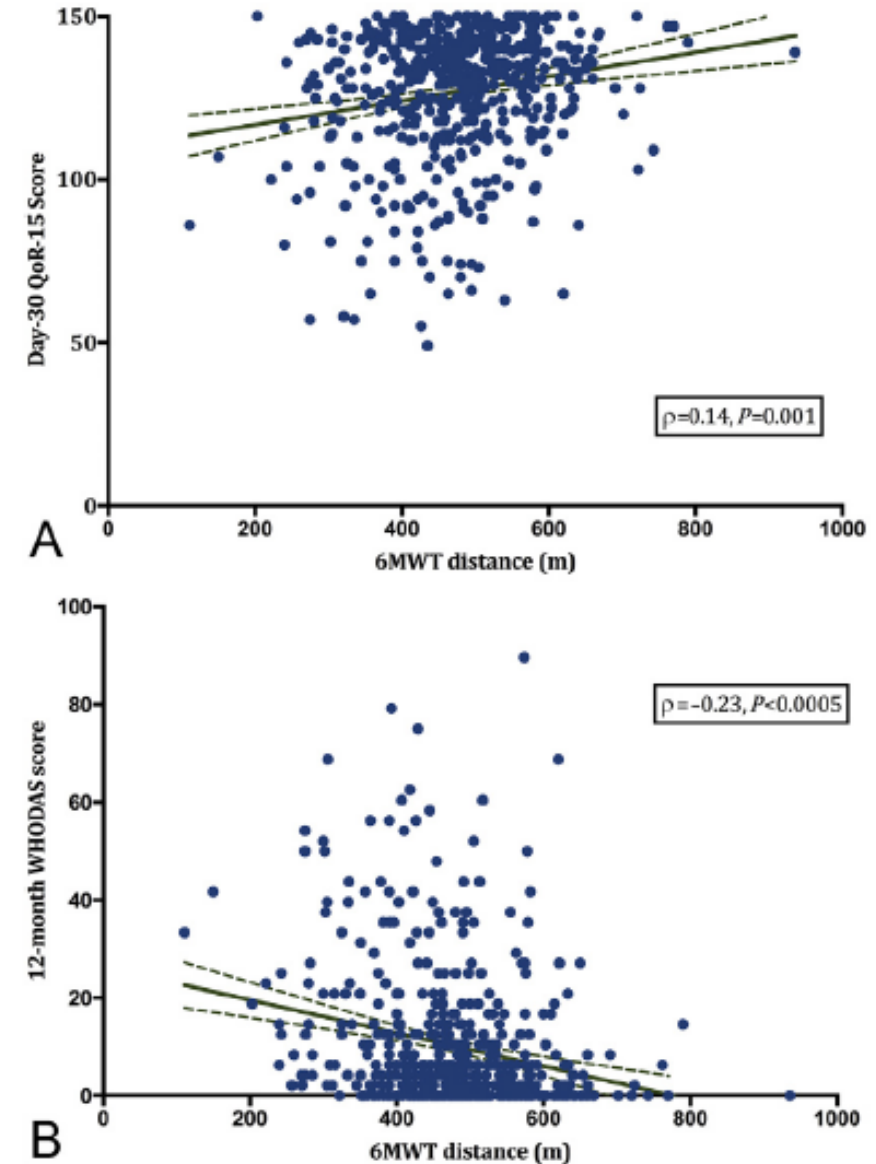
## Using the 6-minute walk test to predict disability-free survival after major surgery

M. A. Shulman<sup>1,2,\*</sup>, B. H. Cuthbertson<sup>3,4</sup>, D. N. Wijeyesundera<sup>4,5,6</sup>,  
R. M. Pearse<sup>7</sup>, B. Thompson<sup>1,2</sup>, E. Torres<sup>5</sup>, A. Ambosta<sup>5</sup>, S. Wallace<sup>1,2</sup>,  
C. Farrington<sup>1</sup>, P. S. Myles<sup>1,2</sup> on behalf of the Measurement of Exercise  
Tolerance for Surgery Study Investigators<sup>†</sup>

<sup>1</sup>Alfred Hospital, Melbourne, VIC, Australia, <sup>2</sup>Monash University, Melbourne, VIC, Australia, <sup>3</sup>Sunnybrook Health Sciences Centre, Toronto, ON, Canada, <sup>4</sup>University of Toronto, Toronto, ON, Canada, <sup>5</sup>St Michael's Hospital, Toronto, ON, Canada, <sup>6</sup>Toronto General Hospital, Toronto, ON, Canada and <sup>7</sup>Queen Mary University of London, London, UK

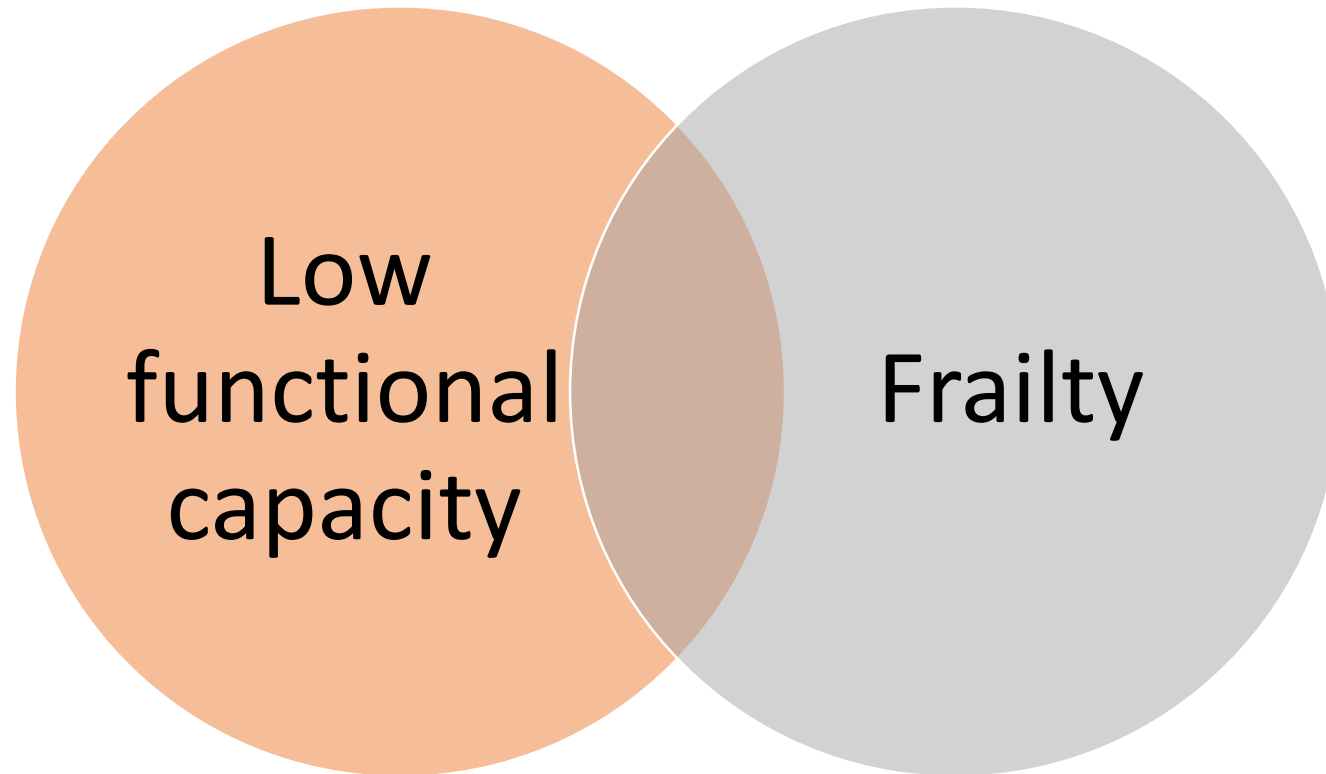
<400m = 2-4x increased risk for surgical complications

Gillis et al, Eur J of Surg Onc, In print

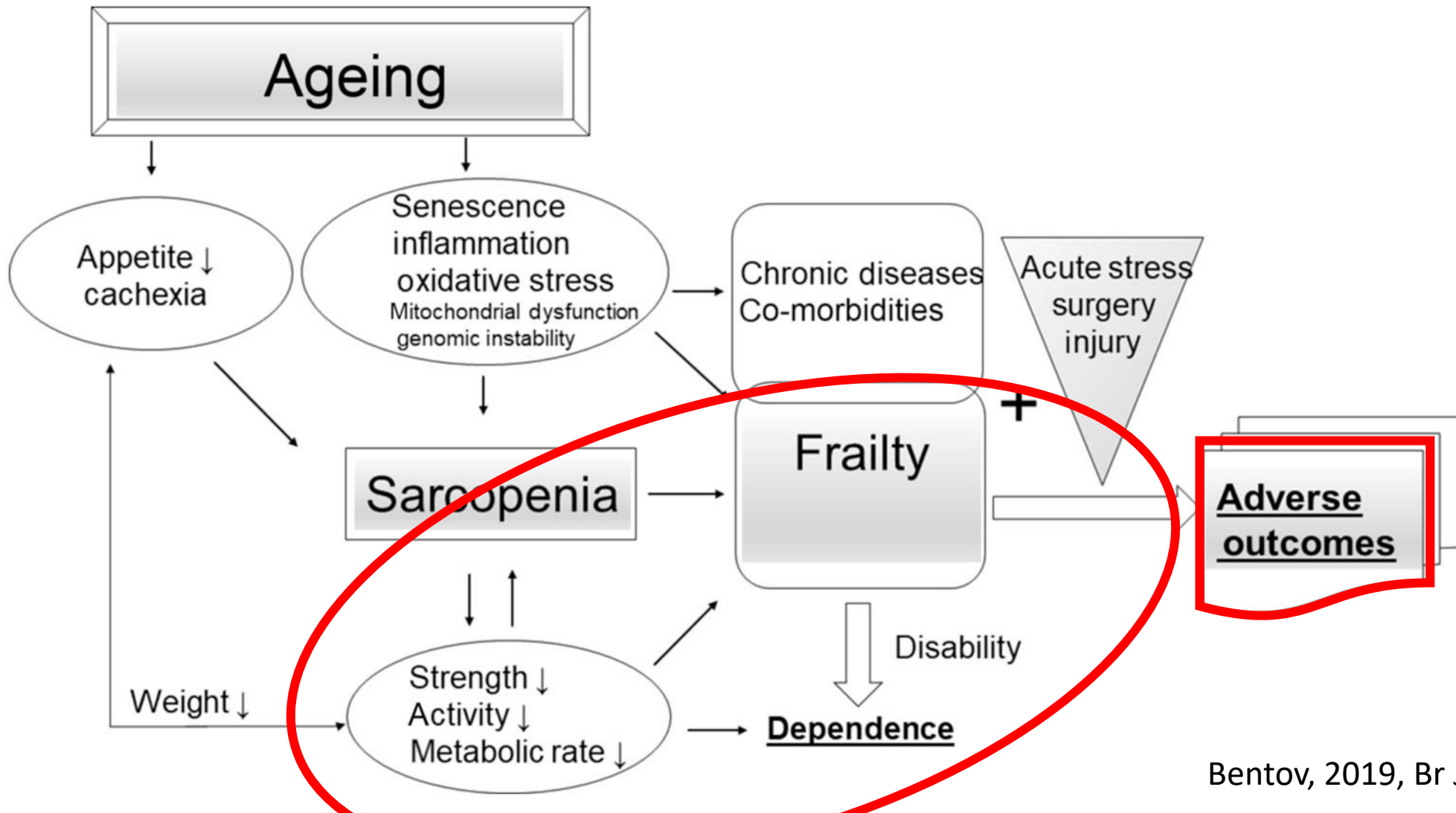




Functional capacity is often an overt measure of frailty



# Frailty Contributes to Adverse Surgical Outcomes





ORIGINAL ARTICLE – GLOBAL HEALTH SERVICES RESEARCH

## **The Association of Frailty with Outcomes after Cancer Surgery: A Systematic Review and Metaanalysis**

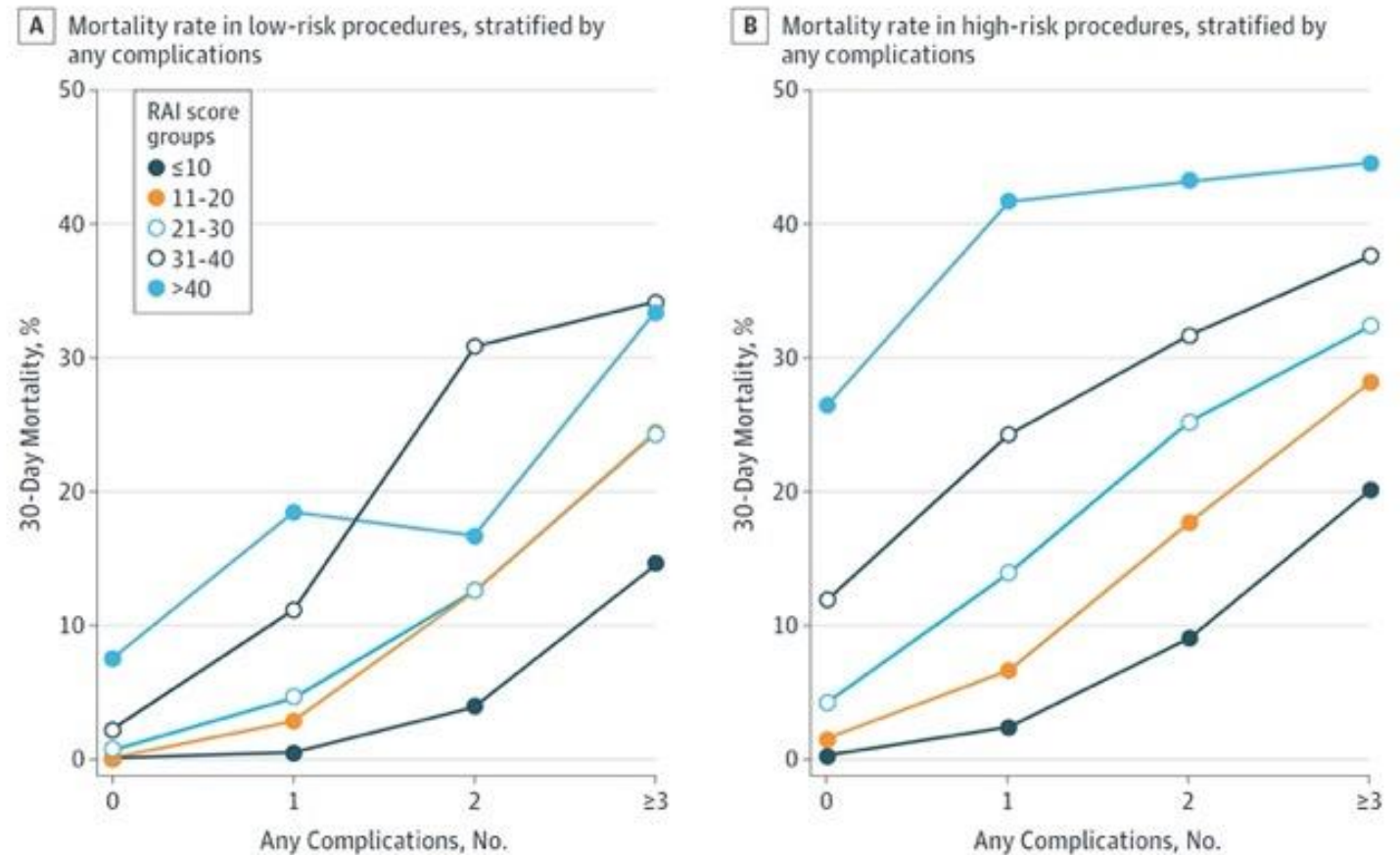
Julia F. Shaw, MSc<sup>1</sup>, Dan Budiansky, BHSc<sup>2</sup>, Fayza Sharif, BSc<sup>1</sup>, and Daniel I. McIsaac, MD, MPH, FRCPC<sup>1,3,4</sup> 

# Frailty and Surgical Complications

- 71 Studies
- Frailty Significantly associated with
  - 30-d and longer-term mortality
  - Adverse discharge disposition
  - Post-operative complications
  - And length of stay

Mortality  
rates  
increase  
with frailty  
severity

Figure 2. Mortality Rates Associated With Major or Overall Complications, Stratified By Procedural Risk and RAI Score



Shah R, Attwood K, Arya S, et al. Association of Frailty With Failure to Rescue After Low-Risk and High-Risk Inpatient Surgery. *JAMA Surg.* 2018;153(5)

# A quick assessment of frailty status

(the “eyeball test”)

## Clinical Frailty Scale\*



**1 Very Fit** – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.



**2 Well** – People who have **no active disease symptoms** but are less fit than category 1. Often, they exercise or are very **active occasionally**, e.g. seasonally.



**3 Managing Well** – People whose **medical problems are well controlled**, but are **not regularly active** beyond routine walking.



**4 Vulnerable** – While **not dependent** on others for daily help, often **symptoms limit activities**. A common complaint is being “slowed up”, and/or being tired during the day.



**5 Mildly Frail** – These people often have **more evident slowing**, and need help in **high order IADLs** (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.



**6 Moderately Frail** – People need help with **all outside activities** and with **keeping house**. Inside, they often have problems with stairs and need **help with bathing** and might need minimal assistance (cuing, standby) with dressing.



**7 Severely Frail** – **Completely dependent for personal care**, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).



**8 Very Severely Frail** – **Completely dependent**, approaching the end of life. Typically, they could not recover even from a minor illness.



**9. Terminally Ill** - Approaching the end of life. This category applies to people with a **life expectancy <6 months**, who are **not otherwise evidently frail**.

## Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common **symptoms in mild dementia** include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In **moderate dementia**, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In **severe dementia**, they cannot do personal care without help.

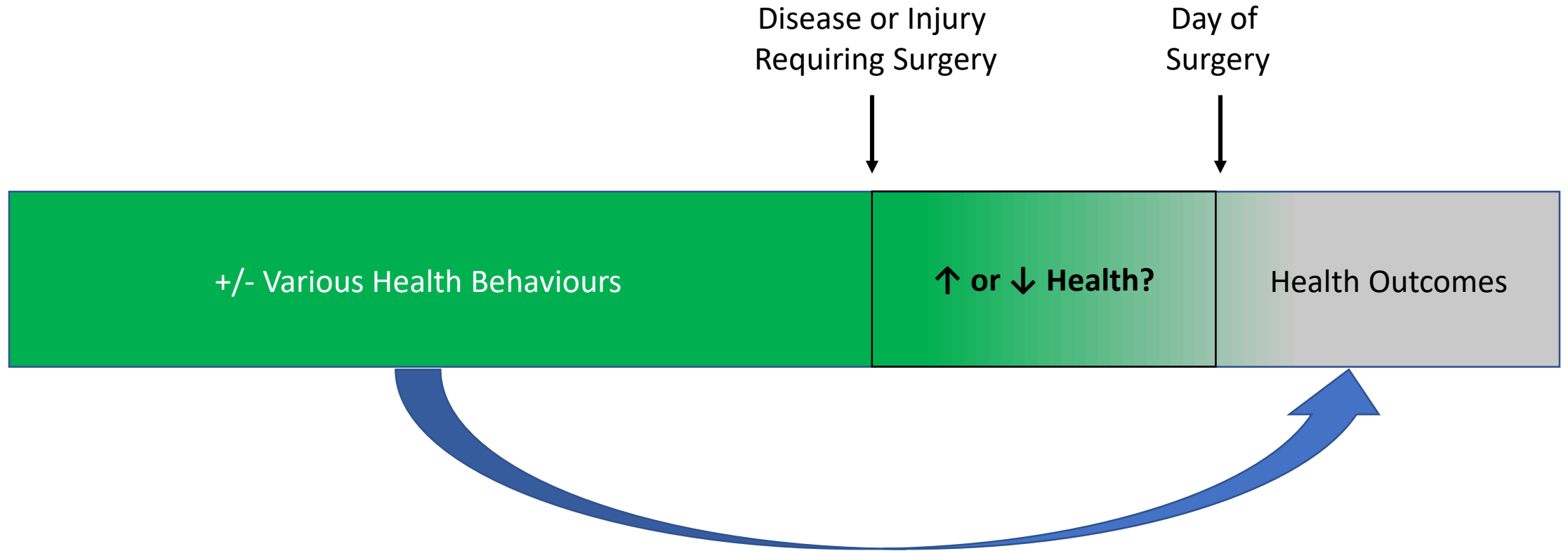
\* 1. Canadian Study on Health & Aging, Revised 2008.

2. K. Rockwood et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.

© 2007-2009, Version 1.2. All rights reserved. Geriatric Medicine Research, Dalhousie University, Halifax, Canada. Permission granted to copy for research and educational purposes only.



# From Prevention to Preparation



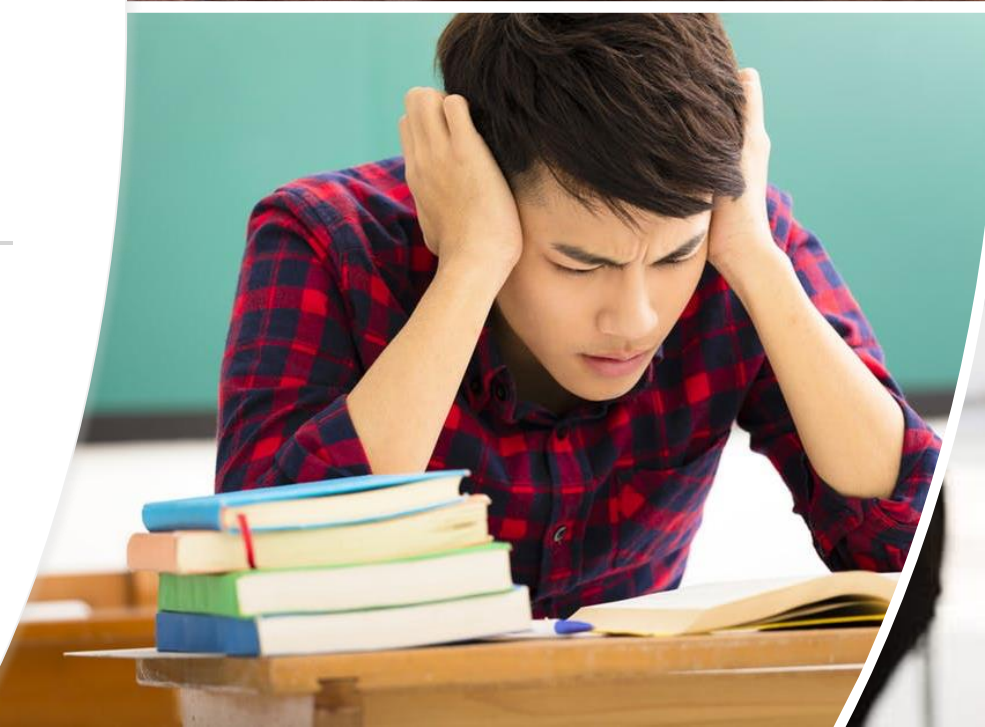
Does health status before surgery impact surgical outcomes?

***YES!***

Can we change health before surgery to improve surgical outcomes?

What do we  
prepare for?

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“MAJOR SURGERY IS  
LIKE RUNNING A  
MARATHON—AND  
BOTH REQUIRE  
TRAINING”

Wynter-Blyth V, Moorthy K. *BMJ* 2017; 358 :j3702



# COMMON STRESS PATHWAYS



Biomarker / Outcome	Exercise
Sympathetic Activation	Yes
Cortisol	Increase
Systolic BP	Increase
Norepinephrine/Epinephrine	Increase
Oxygen Consumption	Increase

No [preparation], I just sat at home and stressed.

(44-year-old woman without cancer)



*Basically, there was no preparation. I just ... I had to come, I had to get it done.*

(46-year-old man with cancer)





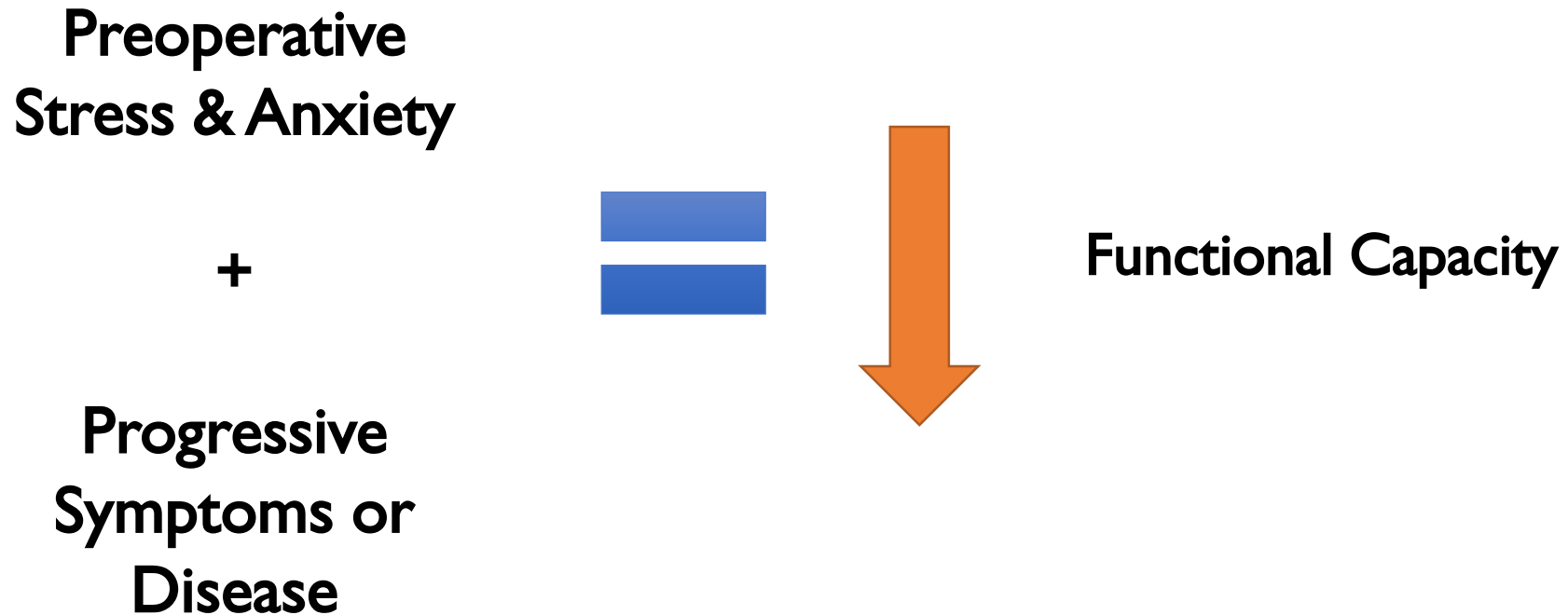
```
graph LR; A[Waiting for surgery] --> B[Fear  
Anxiety  
Isolation  
Frustration  
Exhaustion  
Deterioration]; B --> C[Preparing would have been better than just waiting];
```

**Waiting for  
surgery**

Fear  
Anxiety  
Isolation  
Frustration  
Exhaustion  
Deterioration

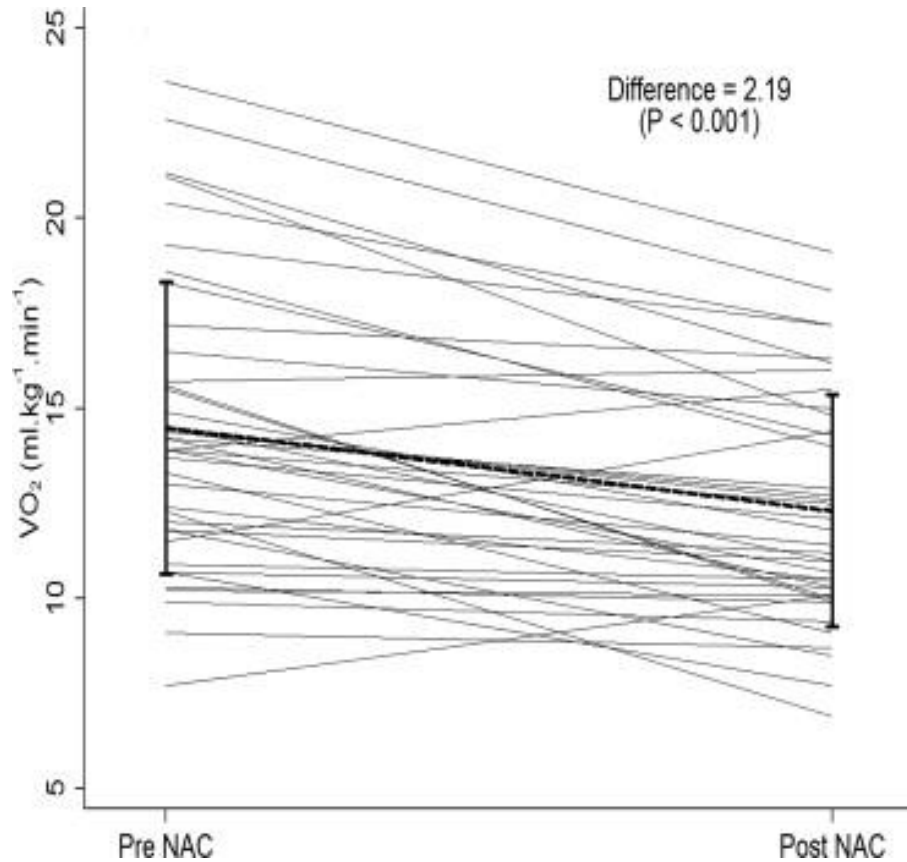
**Preparing would  
have been better  
than just waiting**

# What happens to functional capacity?

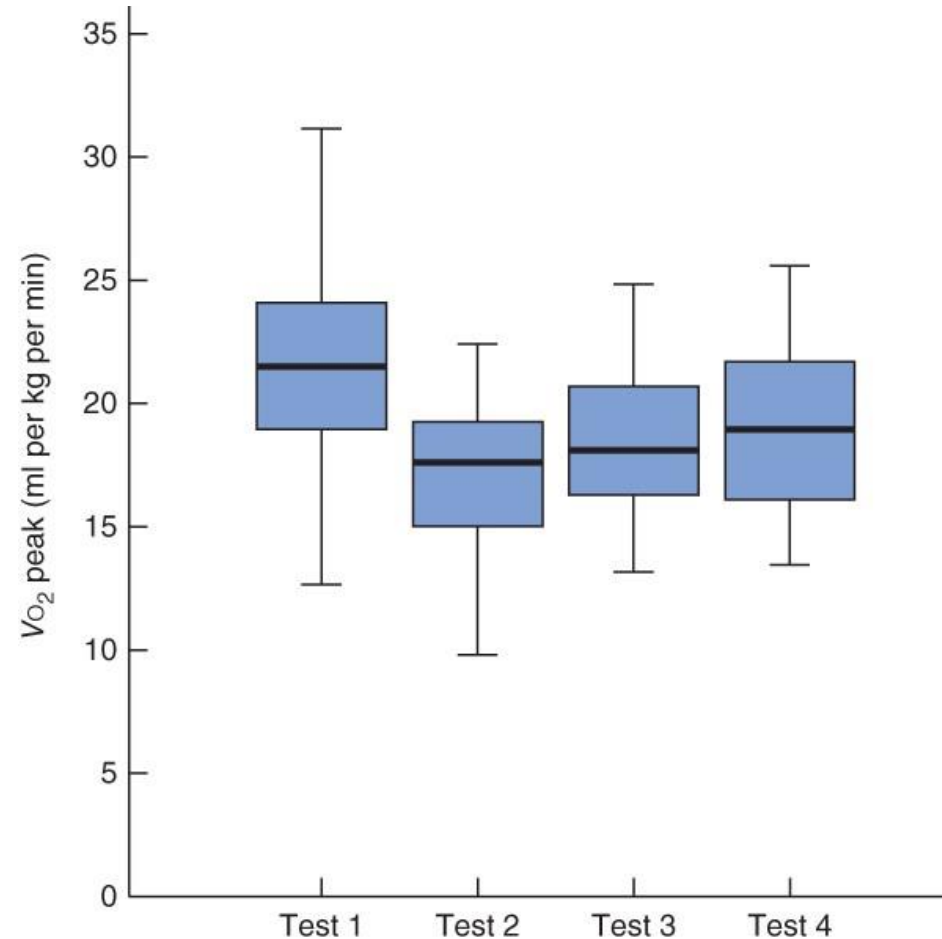


(Beckerman, Grossman, & Marquez, Heart Lung, 1995;  
Miracle & Hovekamp, Am J Crit Care, 1994; Peddle et al. Cancer Nursing, 2009;  
Jenkins, Stanton, Jono, Psychosomatic Medicine, 1994; Pieper, Lepczyk, & Caldwell, Heart Lung, 1985)

# This can be especially profound for some patients...

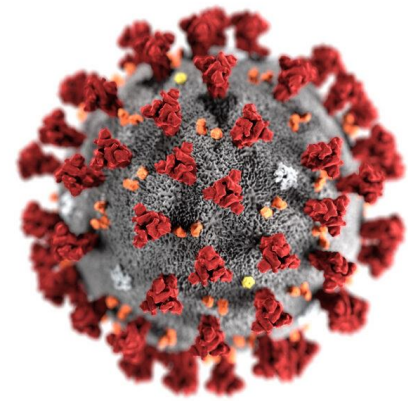


Jack, Sandy, et al. "The effect of neoadjuvant chemotherapy on physical fitness and survival in patients undergoing oesophagogastric cancer surgery." *European Journal of Surgical Oncology (EJSO)* 40.10 (2014): 1313-1320.



Navidi, M., et al. "Cardiopulmonary fitness before and after neoadjuvant chemotherapy in patients with oesophagogastric cancer." *Journal of British Surgery* 105.7 (2018): 900-906.

# ...And what about COVID-19?



Current Anesthesiology Reports  
<https://doi.org/10.1007/s40140-022-00520-6>

PREHABILITATION (B RIEDEL AND S JACK, SECTION EDITORS)



## Physical and Psychological Health Behavior Changes During the COVID-19 Pandemic that May Inform Surgical Prehabilitation: a Narrative Review

Julie K. Silver<sup>1</sup> · Daniel Santa Mina<sup>2</sup> · Andrew Bates<sup>3</sup> · Chelsia Gillis<sup>4</sup> · Emily M. Silver<sup>5</sup> · Tracey L. Hunter<sup>6</sup> · Sandy Jack<sup>3</sup>

Accepted: 4 February 2022

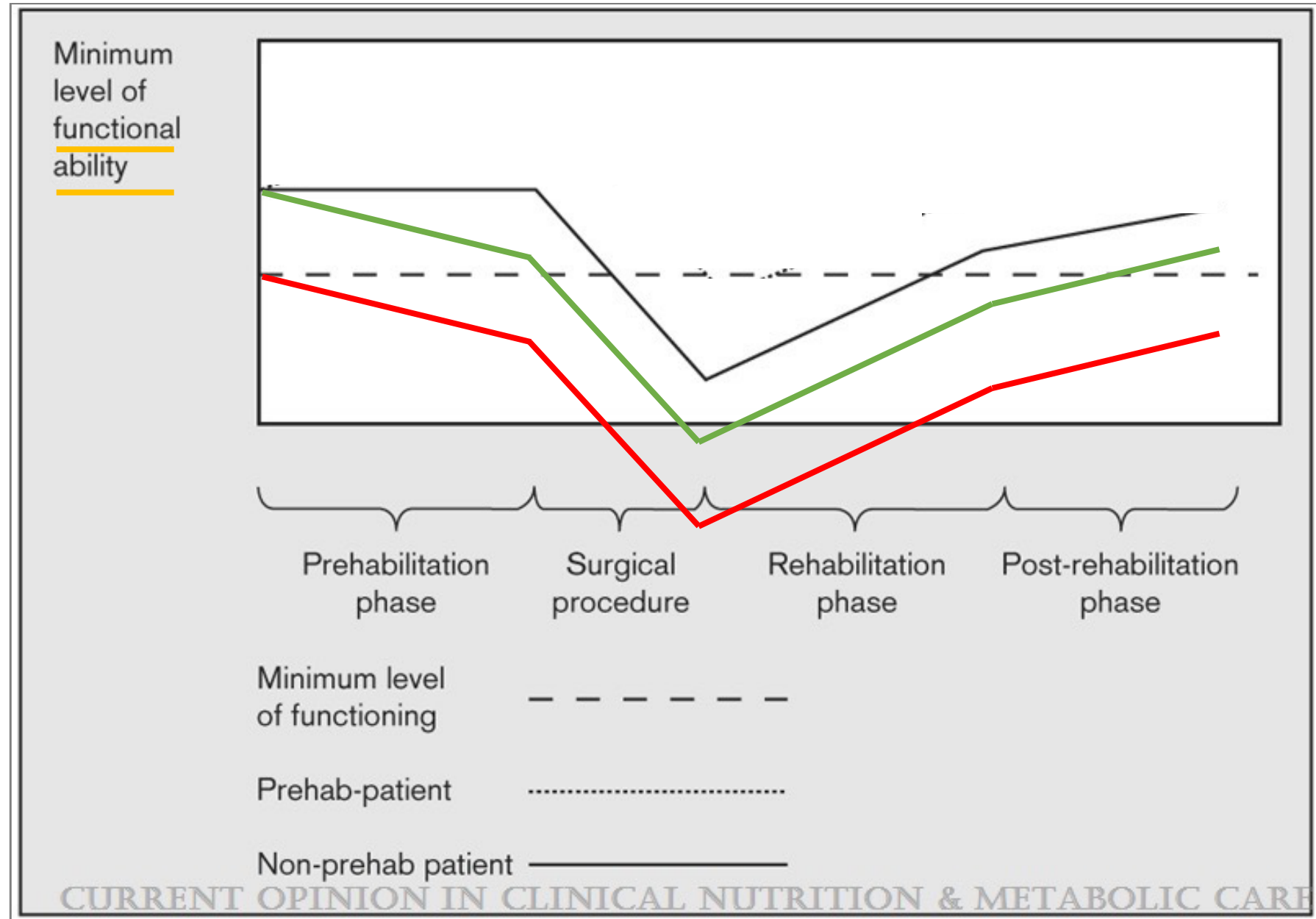
### System Impact

- Canceled/postponed surgery
- Later diagnosis (or more advanced disease)

### Patient Impact

- Social isolation
- Physical distancing and restricted access to health facilities
- Disrupted/inadequate supply of healthy food
- Financial hardship
- Anxiety related to COVID-19
- Increased alcohol/drug use

# Surgical Prehab Conceptual Framework



(Carli & Zavorsky 2005, Curr Opin Clin Nutr Metab Care)



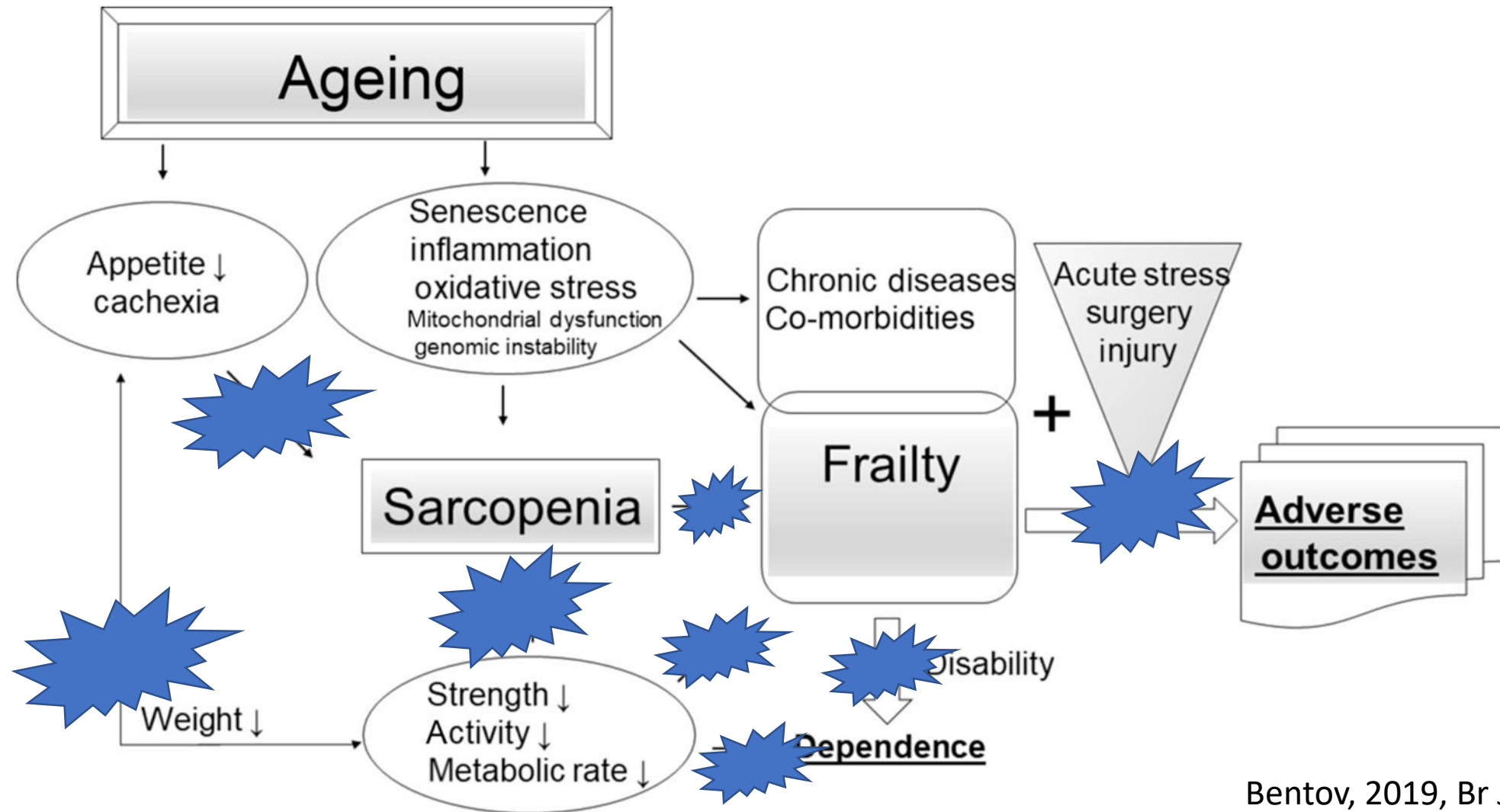
# Prehabilitation

/ˈprē-ə-,bi-lə-'tā-shən/

a process that occurs between the time of diagnosis and the beginning of acute treatment, includes assessing the whole patient (physical, metabolic and psychological) to establish a **baseline functional level**, identify impairments, and provide **targeted interventions** that improve a patient's health to **reduce the incidence and the severity of current and future impairments**.

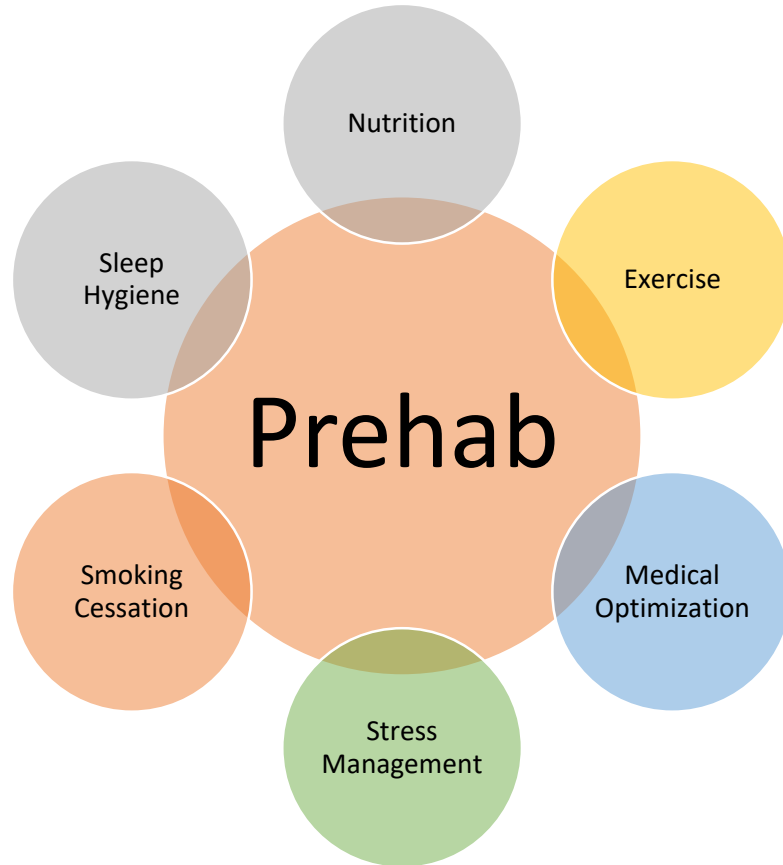
Enhancing functional status before treatment  
means improved outcomes after treatment

# Frailty Contributes to Adverse Surgical Outcomes



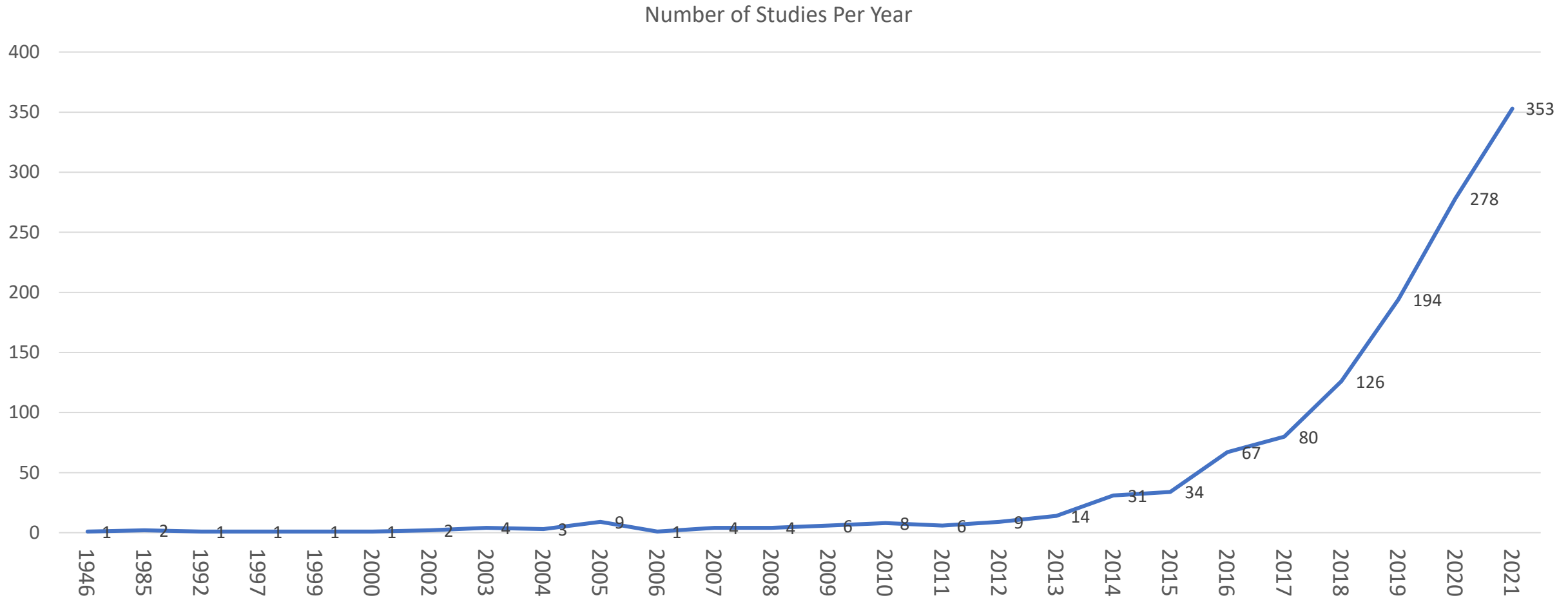
# Finding Synergy: Multimodal Care

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**THE WHOLE IS  
GREATER THAN  
THE SUM OF  
ITS PARTS**

# Prehabilitation Research



March 14, 2022 - PubMed search (TI/ABS): (prehabilitation) OR (pre-habilitation)  
Yield = 1240 publications

**>70 in 2022**

## CLINICAL PRACTICE

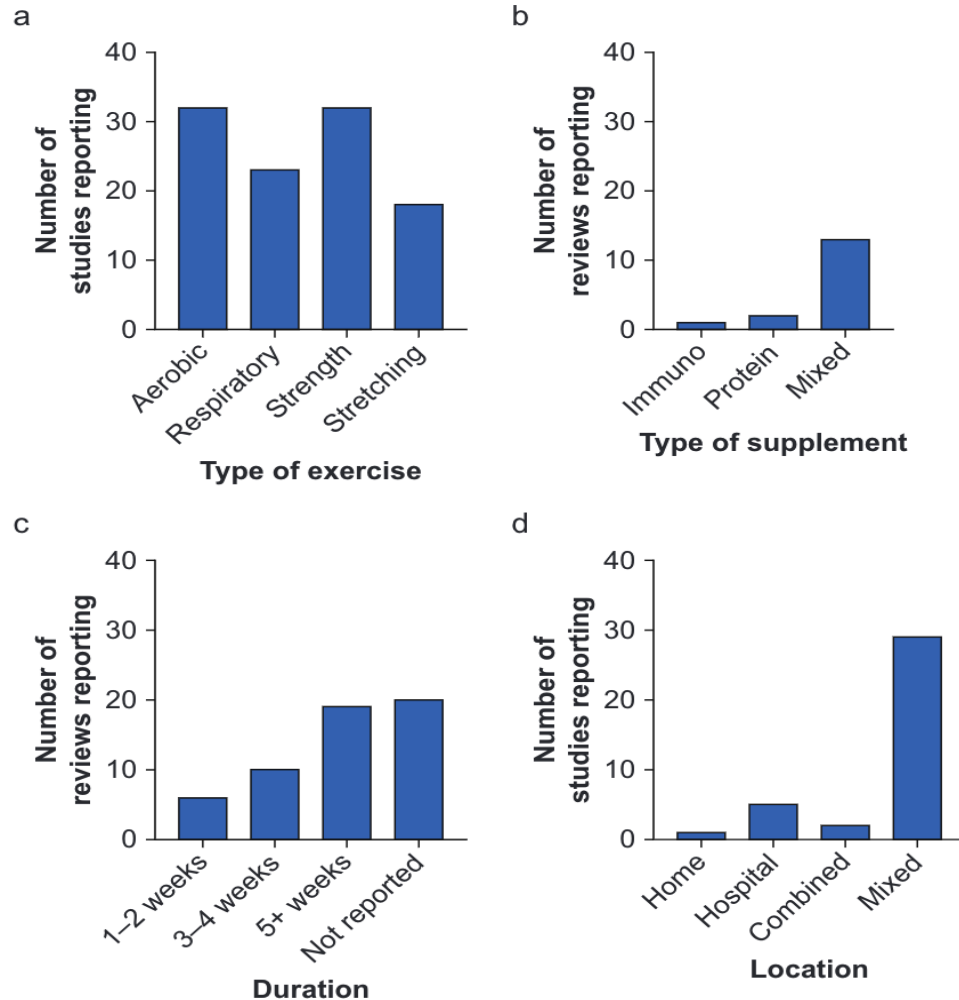
## Prehabilitation in adult patients undergoing surgery: an umbrella review of systematic reviews

Daniel I. McIsaac<sup>1,2,3,\*†</sup>, Marlyn Gill<sup>4</sup>, Laura Boland<sup>5</sup>, Brian Hutton<sup>1,3</sup>, Karina Branje<sup>1,2</sup>, Julia Shaw<sup>1,2</sup>, Alexa L. Grudzinski<sup>1</sup>, Natasha Barone<sup>6</sup>, Chelsia Gillis<sup>7</sup> on behalf of the Prehabilitation Knowledge Network<sup>†</sup>

<sup>1</sup>Department of Anesthesiology and Pain Medicine, University of Ottawa, Ottawa, ON, Canada, <sup>2</sup>Clinical Epidemiology Program, Ottawa Hospital Research Institute, Ottawa, ON, Canada, <sup>3</sup>School of Epidemiology and Public Health, University of Ottawa, Ottawa, ON, Canada, <sup>4</sup>Patient and Community Engagement Research Program, University of Calgary, Calgary, AB, Canada, <sup>5</sup>Centre for Practice-Changing Research, Ottawa Hospital Research Institute, Ottawa, ON, Canada, <sup>6</sup>Department of Medicine, McGill University, Montreal, QC, Canada and <sup>7</sup>Department of Anesthesia, McGill University, Montreal, QC, Canada



# After 55 Systematic reviews, what's the scientific verdict on Prehab?



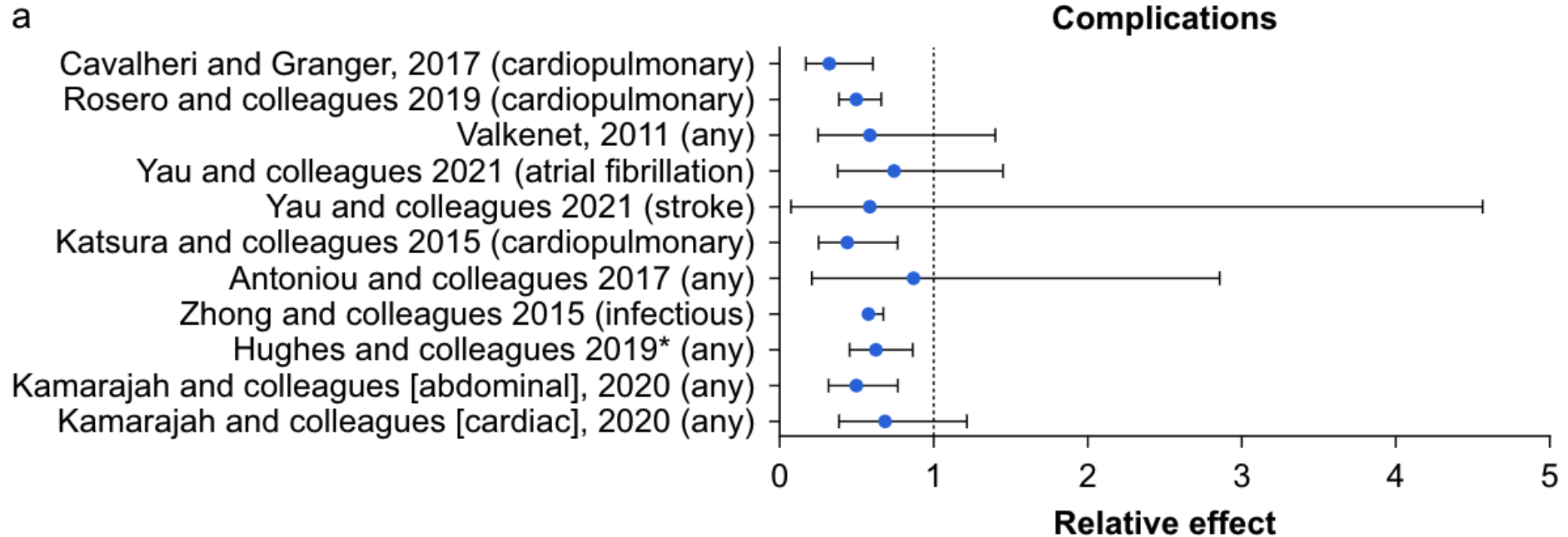
## Moderate Certainty Evidence

- Functional Capacity

## Low/Very Low Certainty Evidence:

- Mortality (nutrition only)
- Non-home discharge (ortho)
- Length of stay
- ***Complications***

# Surgical Complication Rates: OR = 0.33-0.88



# Cost & Cost Savings of Prehab



## Cost of Prehab

**\$1600 CAD**

Multimodal care including: case manager/research assistant, administrative coordinator, dietitian, psychologist, kinesiologist, physician, protein/vitamin supplementation and consumables (i.e. parking, printing, website, equipment, etc.)

## Net Savings per Patient

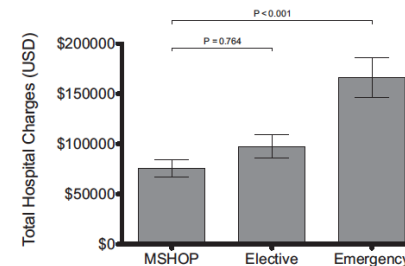
**\$3200 CAD**

Data presented by Dr. Stefan van Rooijen at the World Prehab Congress, 2019, London, UK.



**\$100 USD**

Self-management support for physical activity, pulmonary rehabilitation, nutritional optimization, stress reduction.



**Figure 3.** Differences in total hospital charges between 3 groups. Total costs were significantly lower for the Michigan Surgical and Health Optimization Program (MSHOP) group compared with the emergency surgery group; however, this decreased cost was not significantly different compared with the elective surgery group's cost.

**\$21,946 USD**

Howard, R., Yin, Y. S., McCandless, L., Wang, S., Englesbe, M., & Machado-Aranda, D. (2019). Taking control of your surgery: impact of a prehabilitation program on major abdominal surgery. *Journal of the American College of Surgeons*, 228(1), 72-80.



**\$570 CAD**

4-week program: motivational interviewing, hospital-based high-intensity endurance-exercise, promotion of healthy physical activity volume

**\$1200 CAD;**  
\$1300-\$3900, p=0.365

Barberan-Garcia, A., Ubre, M., Pascual-Argente, N., Risco, R., Faner, J., Balust, J., ... & Martinez-Palli, G. (2019). Post-discharge impact and cost-consequence analysis of prehabilitation in high-risk patients undergoing major abdominal surgery: secondary results from a randomised controlled trial. *British Journal of Anaesthesia*.

# The Cost estimates do NOT Factor in...

## Preventable Costs Related To

- Medical procedures
- Rehabilitation
- Time off of work
- Utilization of additional health services
- Chronic morbidity

## Prioritization of at-risk patients

- Targeted referral strategies

## Enhance Preoperative Experience

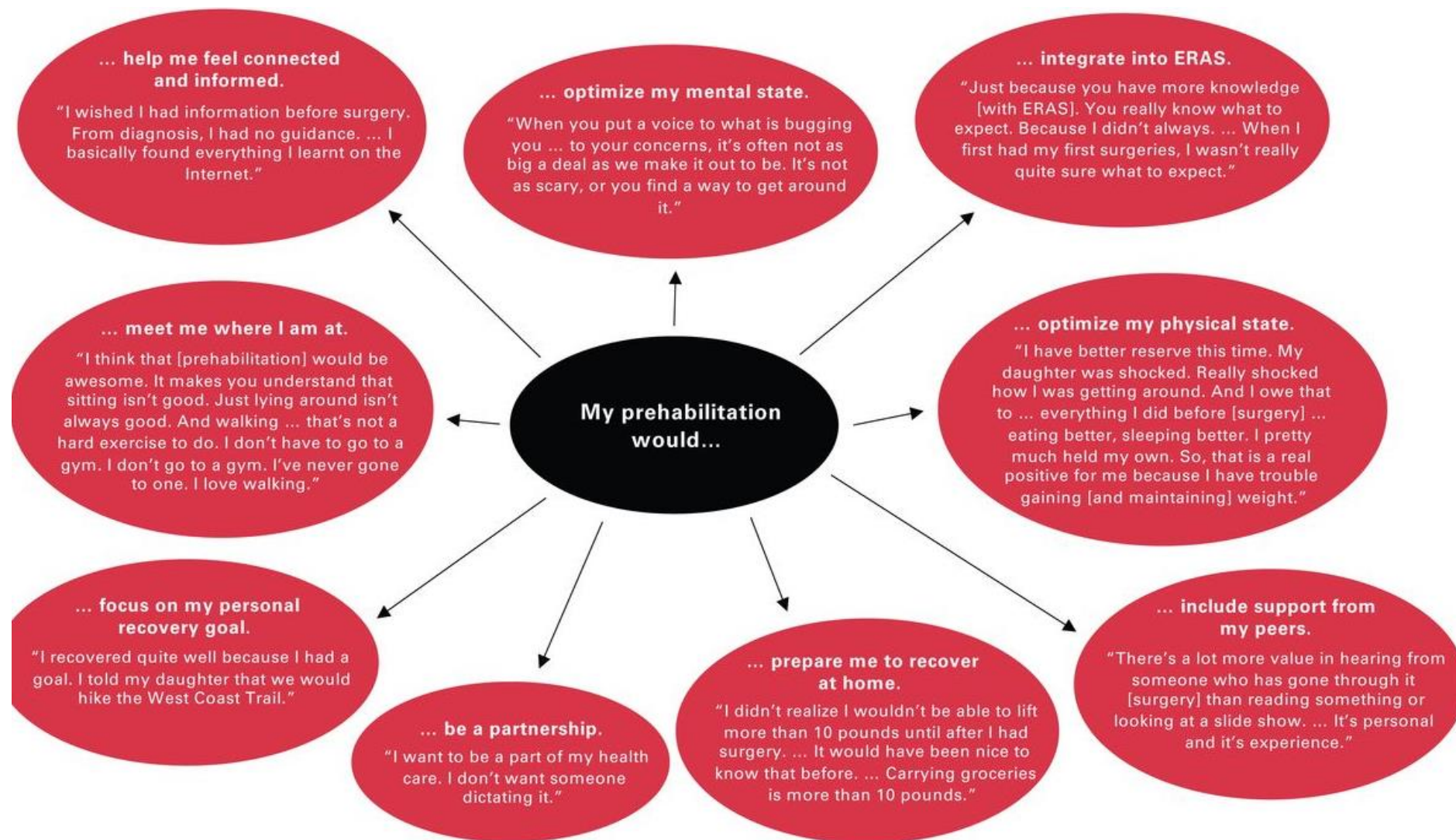
### • Patient Outcomes

- Quality of life
  - Functional capacity
  - Psychosocial Wellbeing
  - Satisfaction with care
- } Pre **AND** postoperative period

### • System Outcomes

- Decreased in-patient bed usage
  - ...and downstream effects, such as surgical wait times
- Comprehensive health evaluation *prior* to pre-adm (or integration with pre-adm)

# PATIENT VOICE...





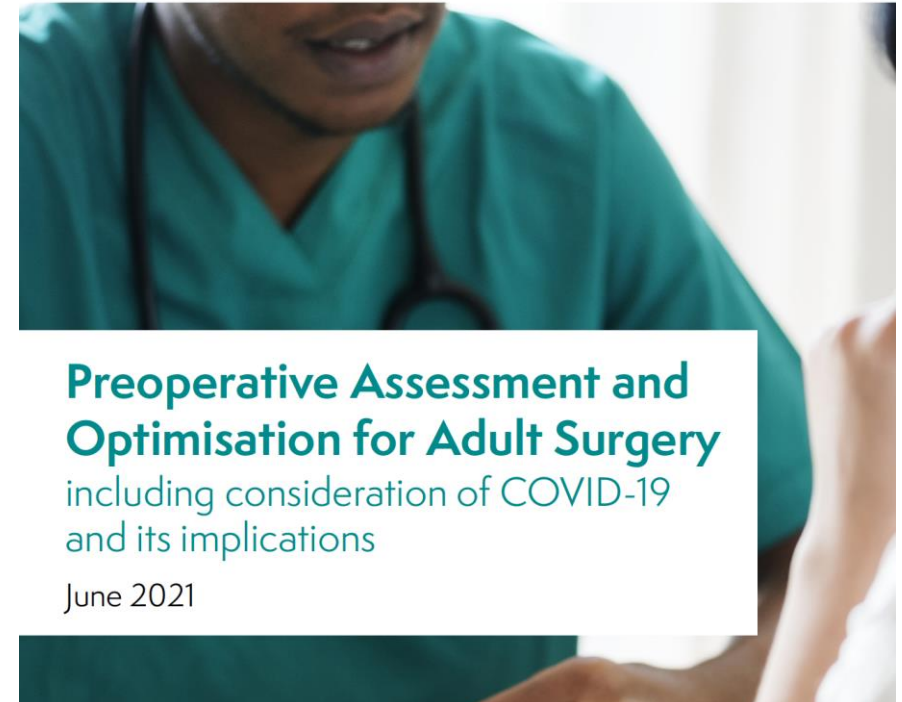
# Evidence is Catching Up to the Recommendations

General limitations identified in the reviews include:

- Intervention heterogeneity
- Outcome heterogeneity
- Overall, very low to moderate evidence certainty

More RCTs are needed to increase confidence and specificity of the benefit of prehab prior to surgery

Evidence sufficient to recommend prehab as a best practice care strategy







So, how do we  
get to  
implementation?

# Prehab Business Case and Implementation Guidance

ACTA ONCOLOGICA, 2017  
VOL. 56, NO. 2, 128-133  
<http://dx.doi.org/10.1080/0284186X.2016.1266081>

REVIEW

Promoting a culture of prehabilitation for the

Francesco Carli<sup>a</sup>, Chelsia Gillis<sup>b</sup> and Celena Scheede-Bergdahl<sup>c</sup>

<sup>a</sup>Department of Anesthesia, McGill University, Montreal, QC, Canada; <sup>b</sup>Cumming School of Medicine, University of Alberta, Edmonton, AB, Canada; <sup>c</sup>Department of Kinesiology and Physical Education, McGill Research, Centre for Prehabilitation, Montreal, QC, Canada



## Making the Business Case for Implementing Prehabilitation Services

By Chris Wilson, PT, DPT, DScPT, and Reyna Colombo PT, MA



## Implementing a system-wide journey of Greater Manchester

John Moore<sup>a, \*</sup>, Zoe Merchant<sup>b</sup>, Ki Gemma Faulkner<sup>f</sup>, Javed Sultan<sup>g, \*</sup>

Leading article

## Framework for prehabilitation services

A. Bates<sup>id</sup>, M. A. West and S. Jack

Anaesthesia and Critical Care Research Area, National Institute for Health Research Biomedical Research Centre, University Hospital Southampton NHS Foundation Trust, Tremona Road, Southampton SO16 6YD, and Integrative Physiology and Critical Illness Group, Clinical and Experimental Sciences, and Academic Unit of Cancer Sciences, Faculty of Medicine, University of Southampton, Southampton, UK  
(e-mail: a.bates@soton.ac.uk; @AndyCBates, @ICU\_Research, @UHSFT)



Published online in Wiley Online Library (www.bjs.co.uk). DOI: 10.1002/bjs.11426

**Table 1 Considerations for development of a prehabilitation service**

Assess and map the surgical pathways – how might they be amended to accommodate prehabilitation? Positive change can be effected within just 2 weeks
Gain clinical buy-in – prehabilitation crosses multiple clinical specialties and should be delivered by a specialist multidisciplinary team
Does an existing service offer prehabilitation? There are a number of local health referral schemes to both gymnasias and well-being services. How effective are these?
Can they align with existing rehabilitation services?
Recommendations for specific interventions are dependent on local surgical cohort
Assess capacity for delivery – assess local availability within primary care, community services, third sector and in-hospital
Cost will depend on the assessment of the above considerations
Co-design prehabilitation services with the expert guidance of patient experience
Quality assurance, audit and robust data collection focusing on patient-reported outcomes is essential for service development, business case planning and quality improvement



# A Pragmatic Non-Randomized Trial of Prehabilitation Prior to Cancer Surgery: Study Protocol and COVID-19-Related Adaptations

*Daniel Santa Mina<sup>1,2,3\*</sup>, Daniel Sellers<sup>2,3</sup>, Darren Au<sup>3</sup>, Shabbir M. H. Alibhai<sup>2,4</sup>, Hance Clarke<sup>2,3</sup>, Brian H. Cuthbertson<sup>2,5</sup>, Gail Darling<sup>2,6</sup>, Alaa El Danab<sup>7</sup>, Anand Govindarajan<sup>2,8</sup>, Karim Ladha<sup>2,9</sup>, Andrew G. Matthew<sup>2,6</sup>, Stuart McCluskey<sup>2,3</sup>, Karen A. Ng<sup>2,10</sup>, Fayez Quereshy<sup>2,6</sup>, Keyvan Karkouti<sup>2,3</sup> and Ian M. Randall<sup>2,3\*</sup>*

OPEN ACCESS

# Study Objectives and Research Questions

## Primary Objective: Program Feasibility

- RQ1a: How many patients will be **referred** and for what reasons?
- RQ1b: What percentage of surgeon-referred patients **participate** in the program?
- RQ1c: What are the **characteristics** of participants and non-participants who are referred to the program?
- RQ1d: What factors contribute to participants **choosing** either FBP or HBP?
- RQ1e: What is the **'prehabilitation window'** for participants (i.e. time from treatment decision to surgery)?
- RQ1f: What is the **adherence** rate to the multimodal components defined by the prehabilitation protocols?
- RQ1g: Is prehabilitation **safe** within a clinical model of care?
- RQ1h: What are the common and unique **barriers and facilitators** to FBP and HBP?
- RQ1i: What are the various **costs and savings** associated with delivering FBP and HBP?

## Exploratory Objectives: Program Effectiveness

- RQ2a: What **changes** in do HBP and FBP participants experience by the week prior to surgery and up to 90 days after surgery?
- RQ2b: Compared to usual care (non-participants), what **effect** do FBP and HBP have on peri- and postoperative outcomes (up to 90 days after surgery)?
- RQ2c: Do surgeon's bedside assessment of frailty (as indicated by referral and reason for referral) correlate with established frailty indices?

# Multimodal Service



## Medical Optimization

- Medication review
- Anemia management
- Pain Management via Transitional Pain Service (TGH, TWH, MSH)



## Exercise

- Aerobic
- Resistance
- Loco-regional modalities (e.g., IMT, pelvic floor exercises)



## Nutrition

- Dietetic Consult(s)
- Healthy eating education and strategy
- Nutritional supplementation (protein, high calorie)



## Psychology

- Stress & Distress Management
- Behaviour Change
- Sleep Hygiene



## Smoking Cessation (±Referral)

- UHN Smoking Cessation Program (referral)
- Smoker's Helpline (CCS)



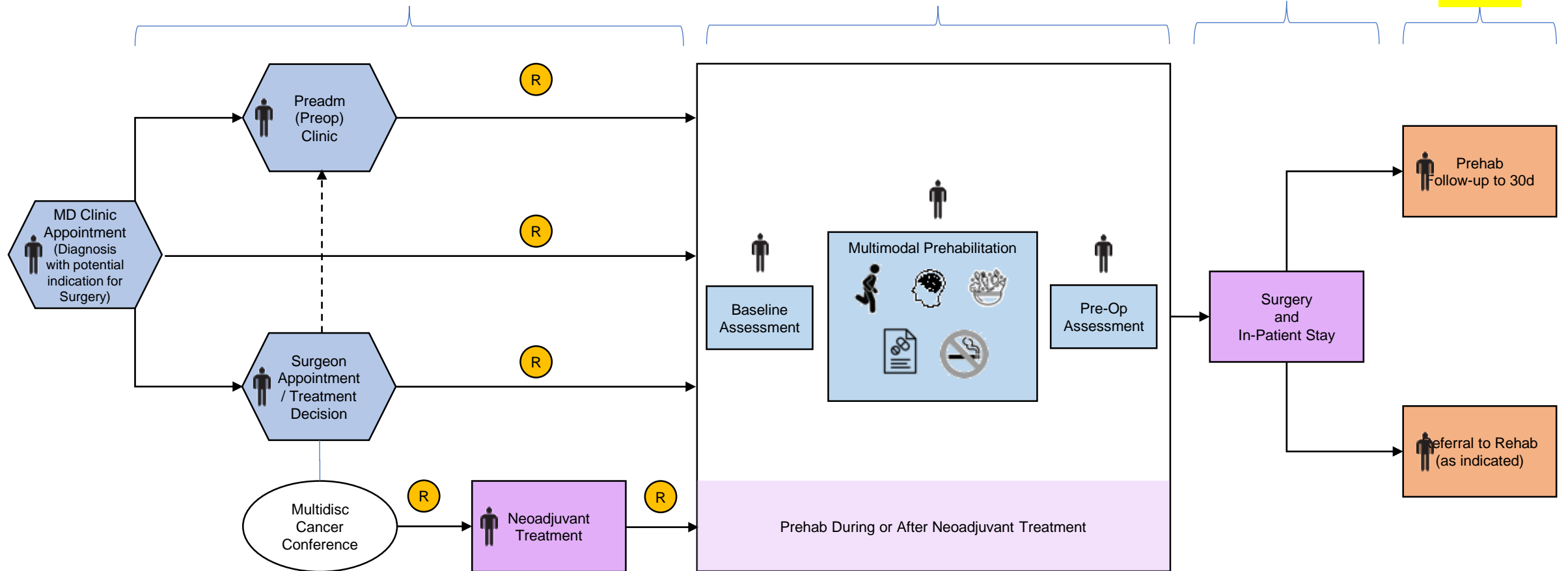
# Map the Patient Journey and Find the Opportunities for Integration

## Minimize Time from Dx to Prehab

## Maximize Prehab Duration

## ERAS

## Post-Discharge Rehab



# Target Population and Program Entry

Any patient at **elevated risk for adverse pre, peri, and/or post-operative outcomes**

(e.g., frail, deconditioned, distressed, vulnerable)



Prehabilitation Program  
Fax: 416-340-3698  
Email: prehabilitation@uhn.ca

MRN: \_\_\_\_\_  
Name: \_\_\_\_\_  
DOB: \_\_\_\_\_ Sex: ☐ Male ☐ Female  
Tel: (home) \_\_\_\_\_ (mobile) \_\_\_\_\_  
Address: \_\_\_\_\_  
(use patient card stamp / sticker if needed)

## Referral to the Prehabilitation Program

Eligibility requirement:

- Patient must be seen by physician for surgical treatment at the University Health Network.

### REFERRING PHYSICIAN: PLEASE COMPLETE ALL PARTS OF THIS BOX

Date of referral: \_\_\_\_\_  
Diagnosis: \_\_\_\_\_  
Surgery date (or estimate): \_\_\_\_\_  
Prior treatment(s): \_\_\_\_\_  
Attending physician: \_\_\_\_\_

Reason for Referral (select one):	Brief explanation (please provide):
<input type="checkbox"/> Frail / low physiological reserve/ deconditioned (clinical impression) →	Reason: <input type="checkbox"/> low fitness <input type="checkbox"/> overweight <input type="checkbox"/> underweight
<input type="checkbox"/> Elevated risk for surgical complications (for non-technical reasons) →	Reason: _____
<input type="checkbox"/> Other →	Reason: _____ (e.g. suspected malnutrition, psychological distress, rehabilitation preparation, patient request)

CSHA Clinical Frailty Scale (circle one): 1 2 3 4 5 6 7 8 9  
(see reverse for details)

Other relevant clinical information: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### FOR OFFICE USE ONLY

Date referral received: \_\_\_\_\_ ☐ Facility-based; ☐ Home-based; ☐ Virtual  
Date patient contacted: (1) \_\_\_\_\_ Baseline assessment date: \_\_\_\_\_  
(2) \_\_\_\_\_ Surgical preadmission date: \_\_\_\_\_  
(3) \_\_\_\_\_  
Decline to participate: ☐ Reason for decline: \_\_\_\_\_  
Remarks: \_\_\_\_\_

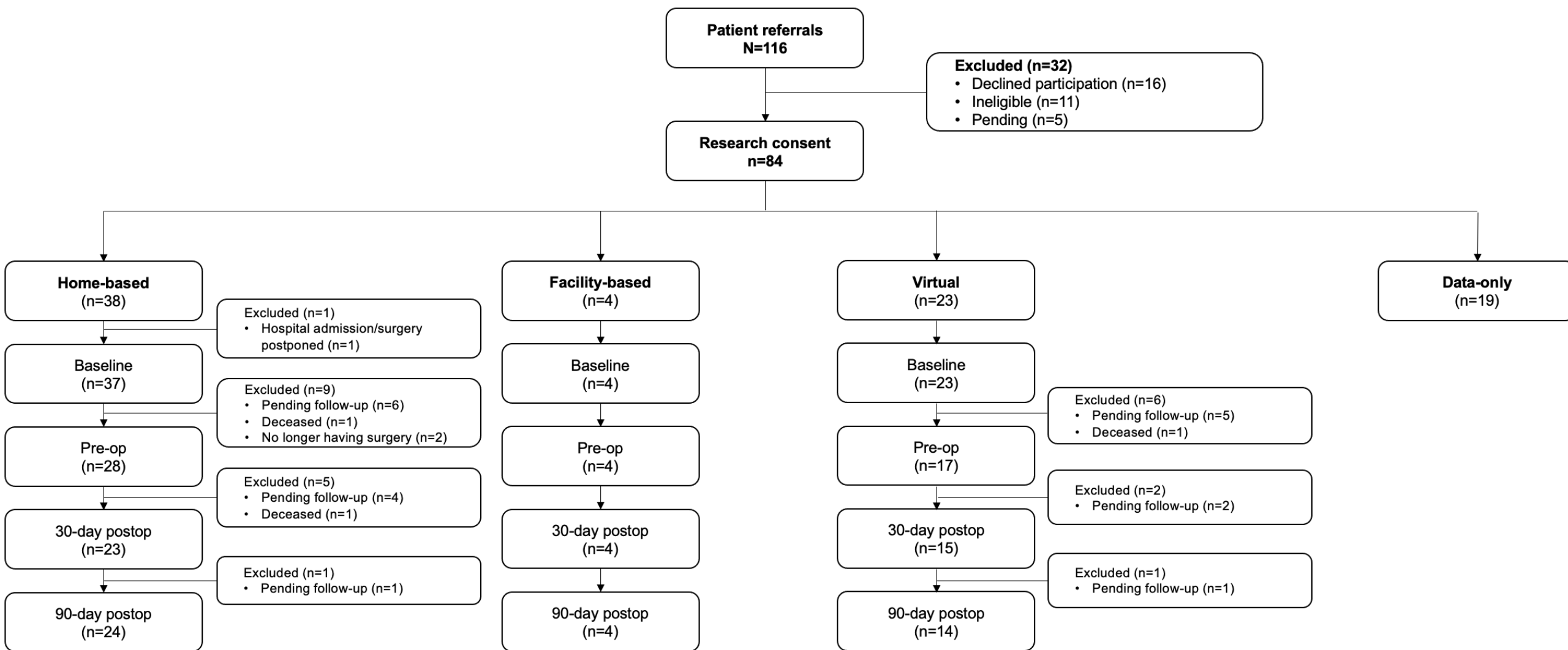
This referral includes consultation(s) with various health professional(s) as part of a screening for exercise programming for patients undergoing surgery.

Ver: Sept 13, 2021

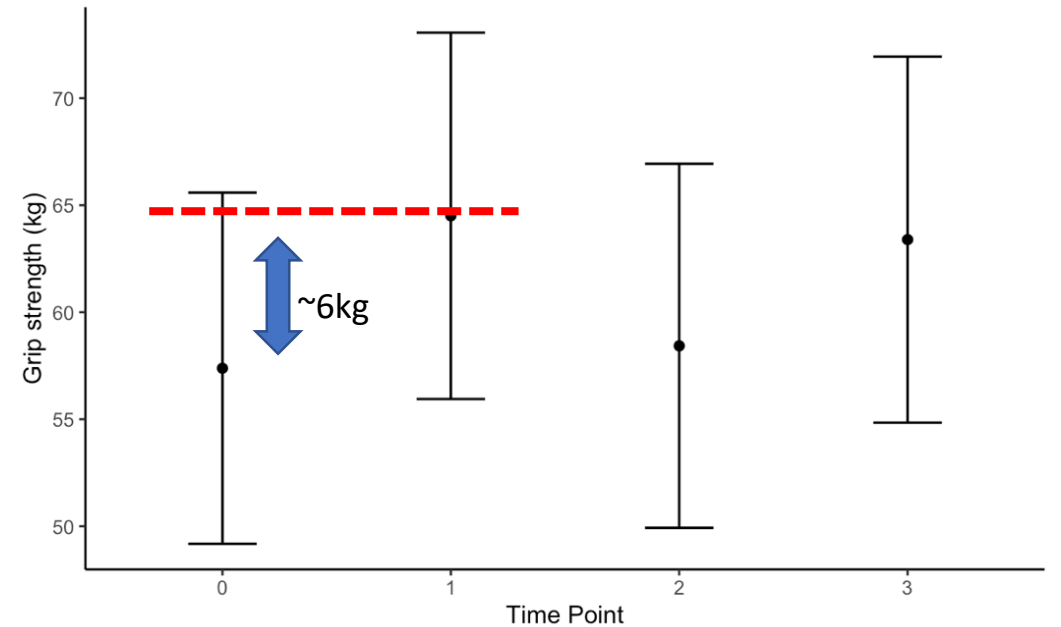
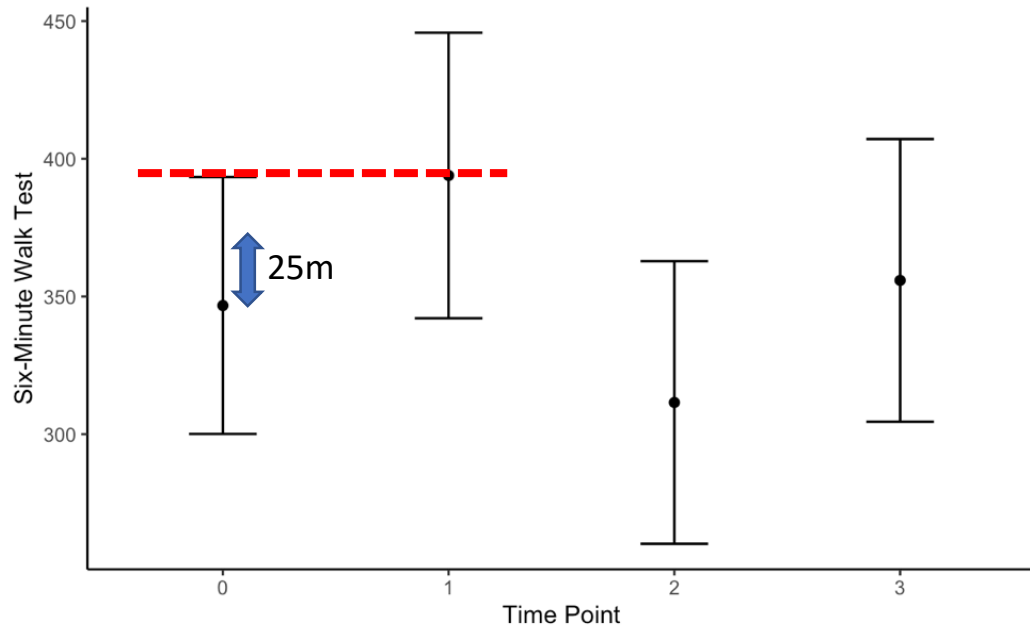
# Program Data Capture

	Referral	Baseline	Pre-op	Periop (EPR)	45-day post-op
<b>Patient characteristics</b>		✓□			
<b>Referral / enrollment / retention</b>	✓□	✓□	✓□		✓□
<b>Safety and adverse events</b>	✓□	✓□	✓□		✓□
<b>Adherence to prehabilitation</b>	✓□	✓□	✓□		✓□
<b>Program cost</b>		✓□	✓□	✓□	✓□
<b>Complications (Clavien-Dindo / NSQIP)</b>				✓□	✓□
<b>Hospital length of stay</b>				✓□	
<b>Readmission and ER visits</b>				✓□	✓□
<b>Participant qualitative interviews</b>					✓□
<b>Patient-reported outcomes</b> (SF-12, PHQ9, EQ5D-5L, cost diary, DASI, PROMIS tools)		✓□	✓□		✓□
<b>Physical fitness</b> (6MWT, grip strength, body composition)		✓□	✓□		✓□

# Prehab Implementation Study (2019-2021, ~20 months)



# Changes in Functional Capacity with Prehab: 6MWT & Grip Strength

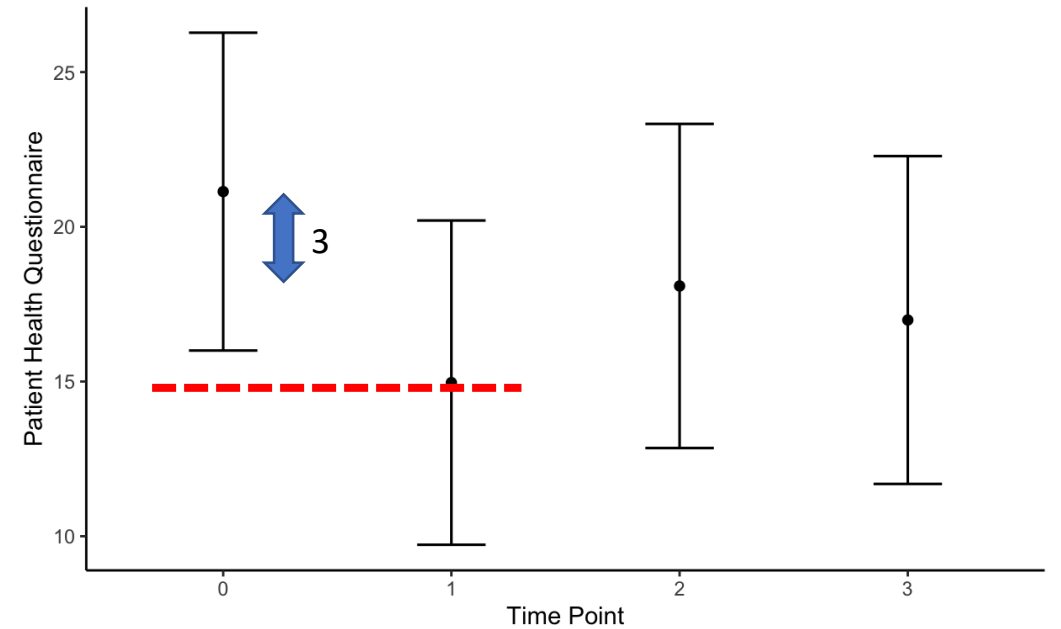
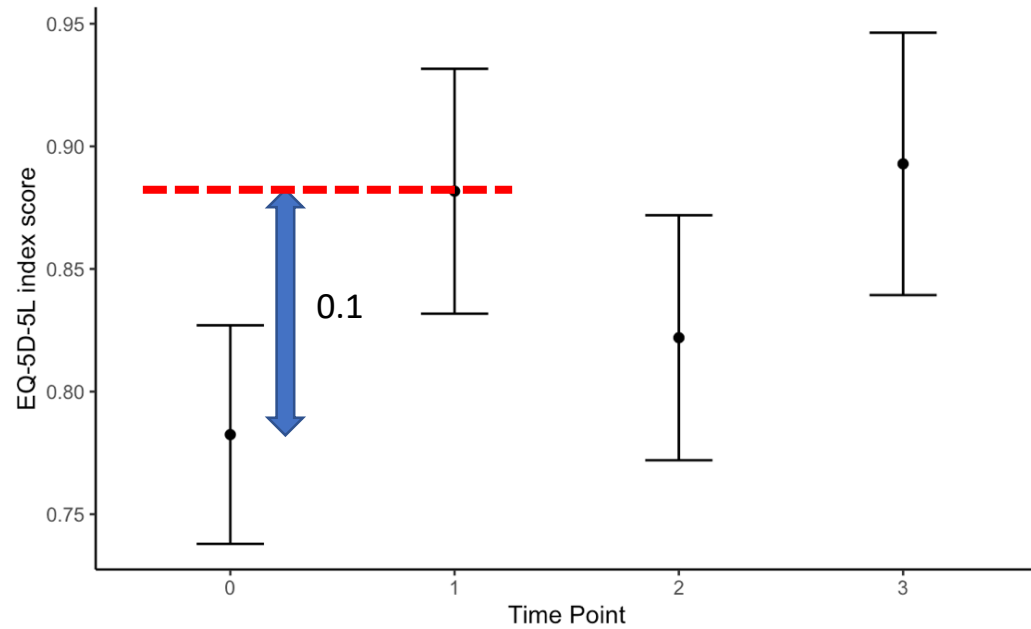


↕ = MCID



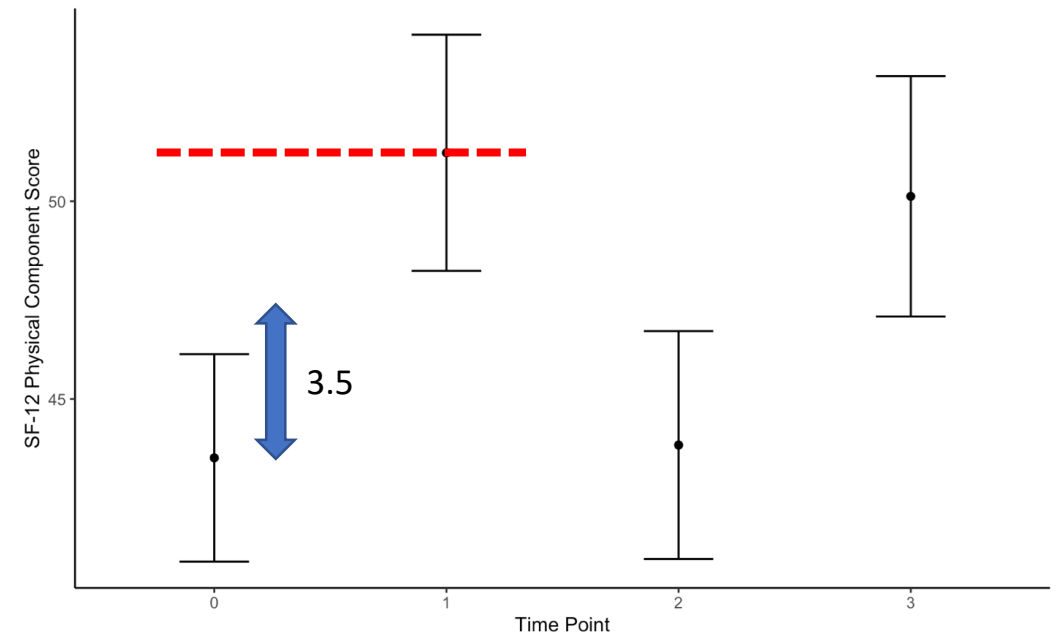
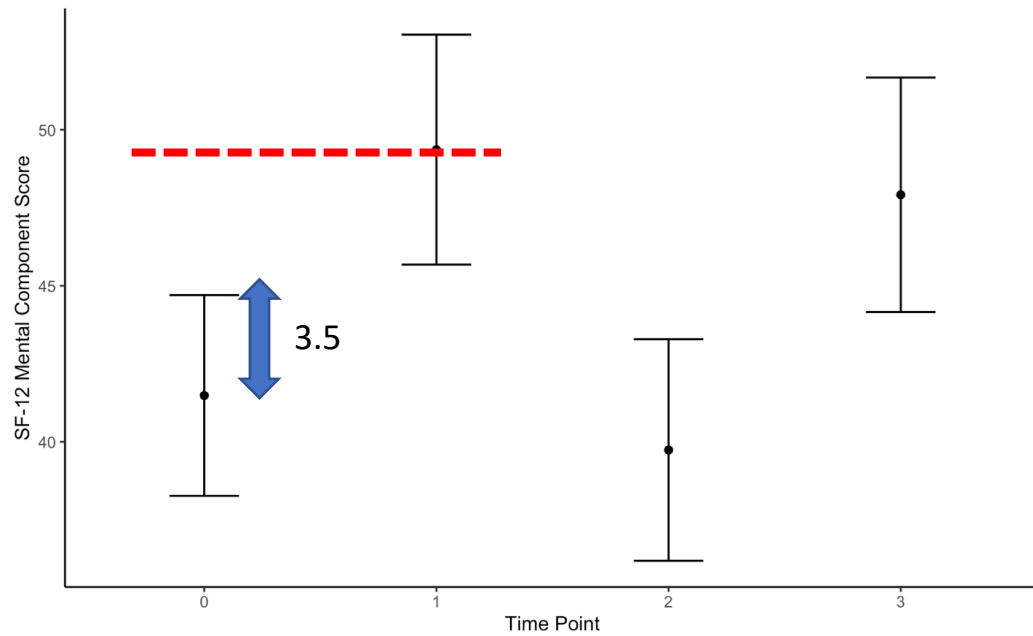
# Changes in QOL and Anxiety

## EQ5D-5L & PHQ-9



↕ = MCID

# Changes in QOL (SF-12): Mental and Physical Health



↕ = MCID

# Length of Stay and Wound Infections

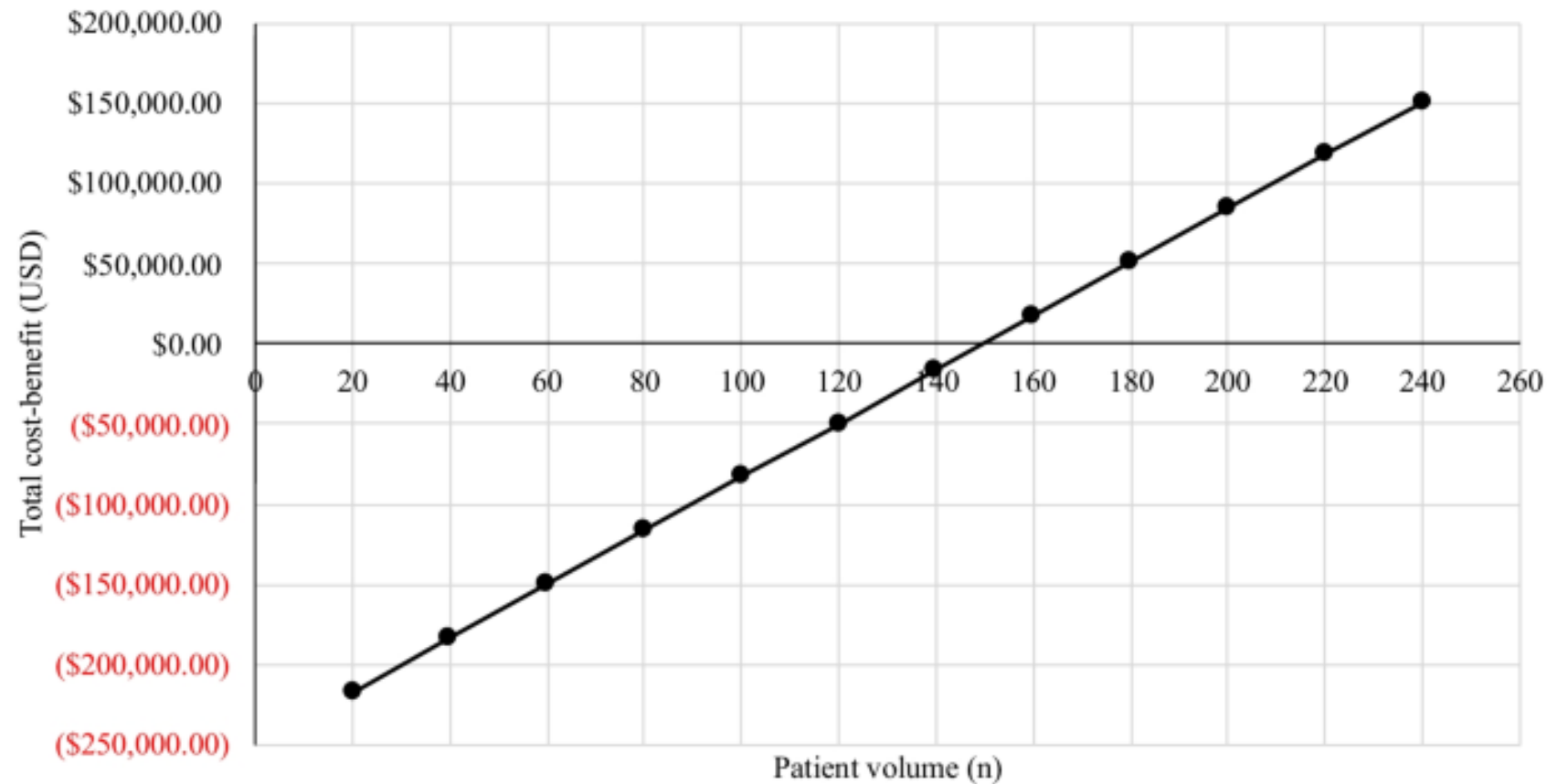
Mean LOS (days)			
Prehab (n=47)	Data-only (n=17)	95% CI	p-value
8.52	12.84	(-12.93, 4.28)	.309

Wound infections			
	Prehab (n=47)	Data-only (n=17)	p-value
Yes	6 (12.8%)	6 (35.3%)	.094
No	41 (87.2%)	11 (64.7%)	

*\*No statistically significant difference between groups across demographic and disease/treatment variables*

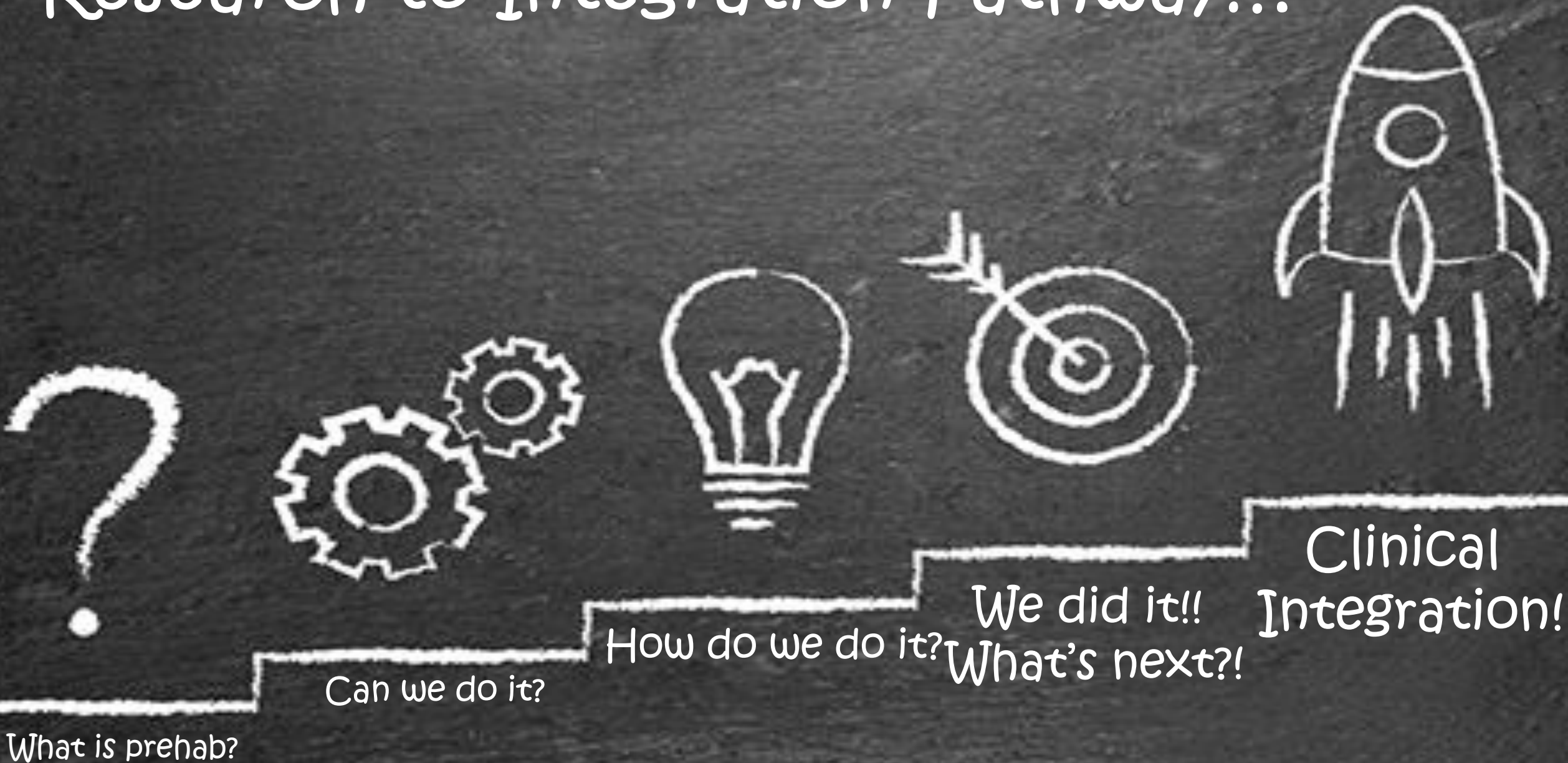
# Is the Integration of Prehab Financially Viable?

Chen et al, 2022, Current Anesthesiology Reports



Uses OR=0.63 from Moran et al, 2016

# Research to Integration Pathway...





# Prehab Program at UHN

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- Service for all surgical patients
- All referred patients receive:
  - A comprehensive health evaluation
  - An individualized exercise, nutrition, and stress management plan
  - A medical assessment and treatment (if needed)
  - Referral to the Smoking Cessation Program (if needed)
  - Routine follow-ups to support their readiness for surgery

## For more information:

- Email [Prehabilitation@uhn.ca](mailto:Prehabilitation@uhn.ca)
- Visit [www.uhn.ca/prehab](http://www.uhn.ca/prehab)

# Early Insights

- Everyone is enthusiastic, but workflow challenges are real
- Triage system for preop optimization of ALL patients
- *A la carte* prehab
- More modalities (e.g., sleep health, wound care education)
- Strengthen pathways from prehab to rehab
- Embed QI and research to inform clinical programming
- Engage Foundation, Corporate, and non-traditional \$ sources

# BOTTOM LINE

Many patients could be more ready for surgery..

This may improve many important comes, especially for the most vulnerable..

Encourage (***and support***) your patients to be as healthy as they can be for surgery!



THANK  
YOU

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