

## University of Groningen

### Preoperative optimization of diagnostic work-up and physical fitness with patients undergoing cancer surgery

Bongers, Bart C.; Cuijpers, A C M; Voorn, M.J.J.; Franssen, R.F.W.; Hildebrand, N D ; Berkel, A.E.M.; Heldens, A.F.J.M.; van Beijsterveld, C.A.F.M.; Lubbers, T.; Vogelaar, J.

**IMPORTANT NOTE:** You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

#### *Document Version*

Publisher's PDF, also known as Version of record

#### *Publication date:*

2021

[Link to publication in University of Groningen/UMCG research database](#)

#### *Citation for published version (APA):*

Bongers, B. C., Cuijpers, A. C. M., Voorn, M. J. J., Franssen, R. F. W., Hildebrand, N. D., Berkel, A. E. M., Heldens, A. F. J. M., van Beijsterveld, C. A. F. M., Lubbers, T., Vogelaar, J., Rensen, S. S., den Dulk, M., Klaase, J. M., van Meeteren, N. L. U., Lenssen, A. F., Janssen-Heijnen, M. L. G., Dejong, C. H. C., Stassen, L. P. S., & Olde Damink, S. W. M. (2021). *Preoperative optimization of diagnostic work-up and physical fitness with patients undergoing cancer surgery: Can we predict and improve outcome?*. Poster session presented at Maastricht UMC+ Wetenschapsdag, Maastricht, Netherlands.

#### **Copyright**

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

#### **Take-down policy**

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

*Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.*

# Preoperative optimization of diagnostic work-up and physical fitness with patients undergoing cancer surgery

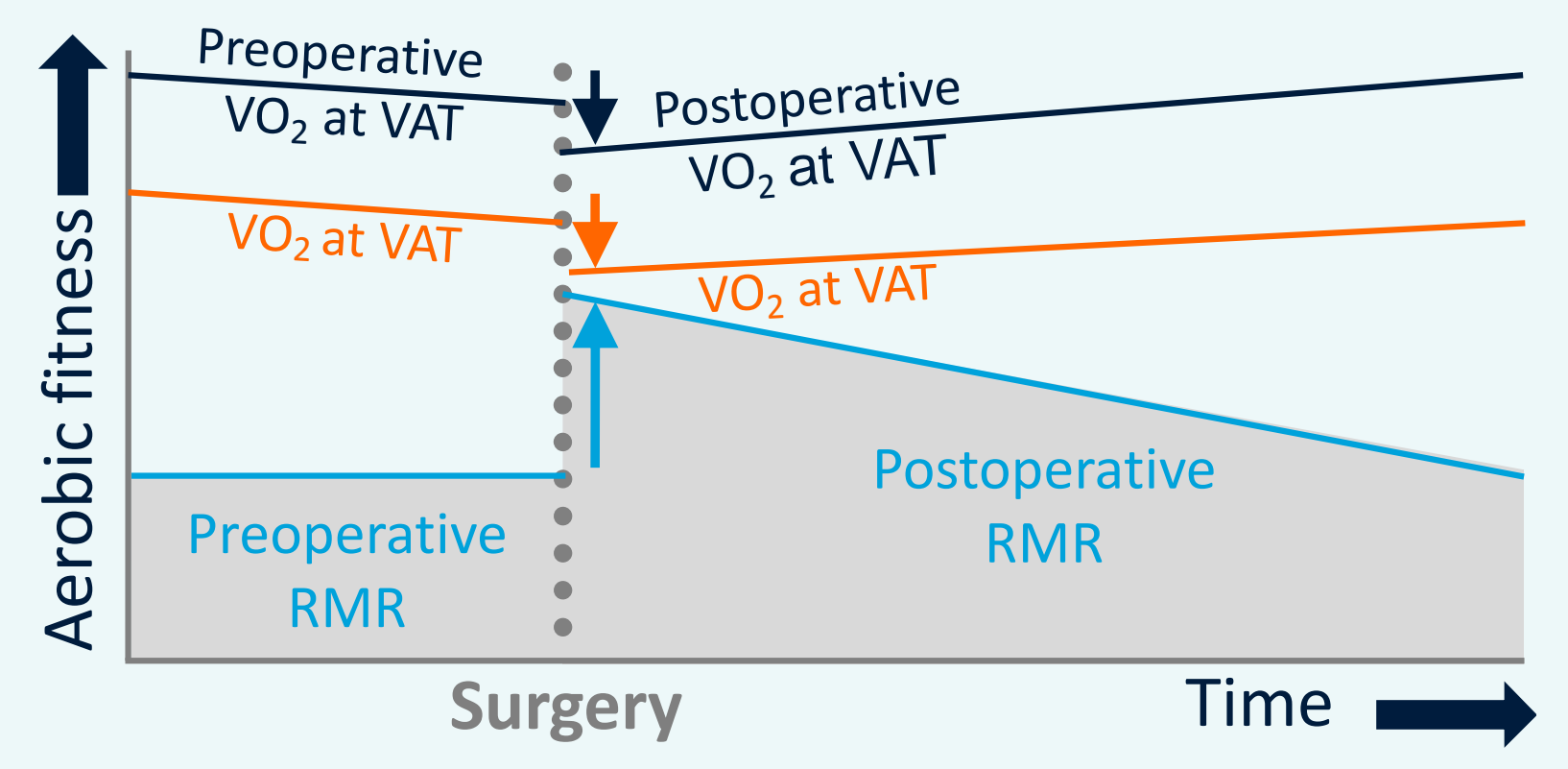
## Can we predict and improve outcome?

Bongers BC<sup>a,b</sup>, Cuijpers ACM<sup>c,d</sup>, Voorn MJJ<sup>e,f</sup>, Franssen RFW<sup>e,f</sup>, Hildebrand ND<sup>d,g</sup>, Berkel AEM<sup>b</sup>, Heldens AFJM<sup>h</sup>, van Beijsterveld CAFM<sup>h,i</sup>, Lubbers T<sup>c,d</sup>, Vogelaar J<sup>j</sup>, Rensen SS<sup>d,g</sup>, den Dulk M<sup>d</sup>, Klaase JM<sup>k</sup>, van Meeteren NLU<sup>l</sup>, Lensen AF<sup>h</sup>, Janssen-Heijnen MLG<sup>e,f</sup>, Dejong CHC<sup>d,g</sup>, Stassen LPS<sup>c,g</sup>, Olde Damink SWM<sup>d,g</sup>

<sup>a</sup>Department of Nutrition and Movement Sciences, NUTRIM, Maastricht University; <sup>b</sup>Department of Epidemiology, CAPHRI, Maastricht University; <sup>c</sup>Department of Surgery, GROW, Maastricht University; <sup>d</sup>Department of Surgery, Maastricht University Medical Center+; <sup>e</sup>Department of Epidemiology, GROW, Maastricht University; <sup>f</sup>Department of Clinical Epidemiology, VieCuri Medical Center; <sup>g</sup>Department of Surgery, NUTRIM, Maastricht University; <sup>h</sup>Department of Physical Therapy, Maastricht University Medical Center+; <sup>i</sup>Center for Acute and Critical Care, Maastricht University Medical Center+; <sup>j</sup>Department of Surgery, VieCuri Medical Center; <sup>k</sup>Department of Hepatobiliary Surgery and Liver Transplantation, University Medical Center Groningen; <sup>l</sup>Department of Anesthesiology, Erasmus Medical Center

### Introduction

- Relatively high percentage (**30-40%**) of postoperative complications in patients undergoing major (elective) cancer surgery
- Body has to cope with surgery-induced physiological stress response
- Patients with a **lower preoperative physical (aerobic) fitness** might have a **higher risk** for adverse postoperative outcomes
- Neoadjuvant therapy is known to preoperatively reduce physical (aerobic) fitness
- It remains to be demonstrated whether exercise prehabilitation in these **high-risk** patients increases **preoperative physical fitness** and **improves postoperative outcomes**



**Aim** To evaluate the association of **preoperative physical fitness** with **postoperative outcomes** in patients preparing for major elective cancer surgery, as well as the **effect of exercise prehabilitation** on postoperative outcomes, especially in **patients characterized as high risk**

### Methods

#### Association between preoperative physical fitness and postoperative outcomes

- **Patient populations:** prospective and retrospective cohort studies and systematic reviews, in patients with colorectal (CRC), liver or pancreatic (HPB), or non-small cell lung cancer (NSCLC)
- **Preoperative exercise tests:** aerobic fitness (e.g., CPET, SRT, iSWT), muscle strength/endurance (e.g., HGS, FTSTST), functional mobility (e.g., TUG test, 2MWT)
- **Postoperative outcomes:** incidence and impact of complications, length of stay, time to recovery of physical functioning
- **Analyses:** univariate, logistic regression, and linear regression analyses

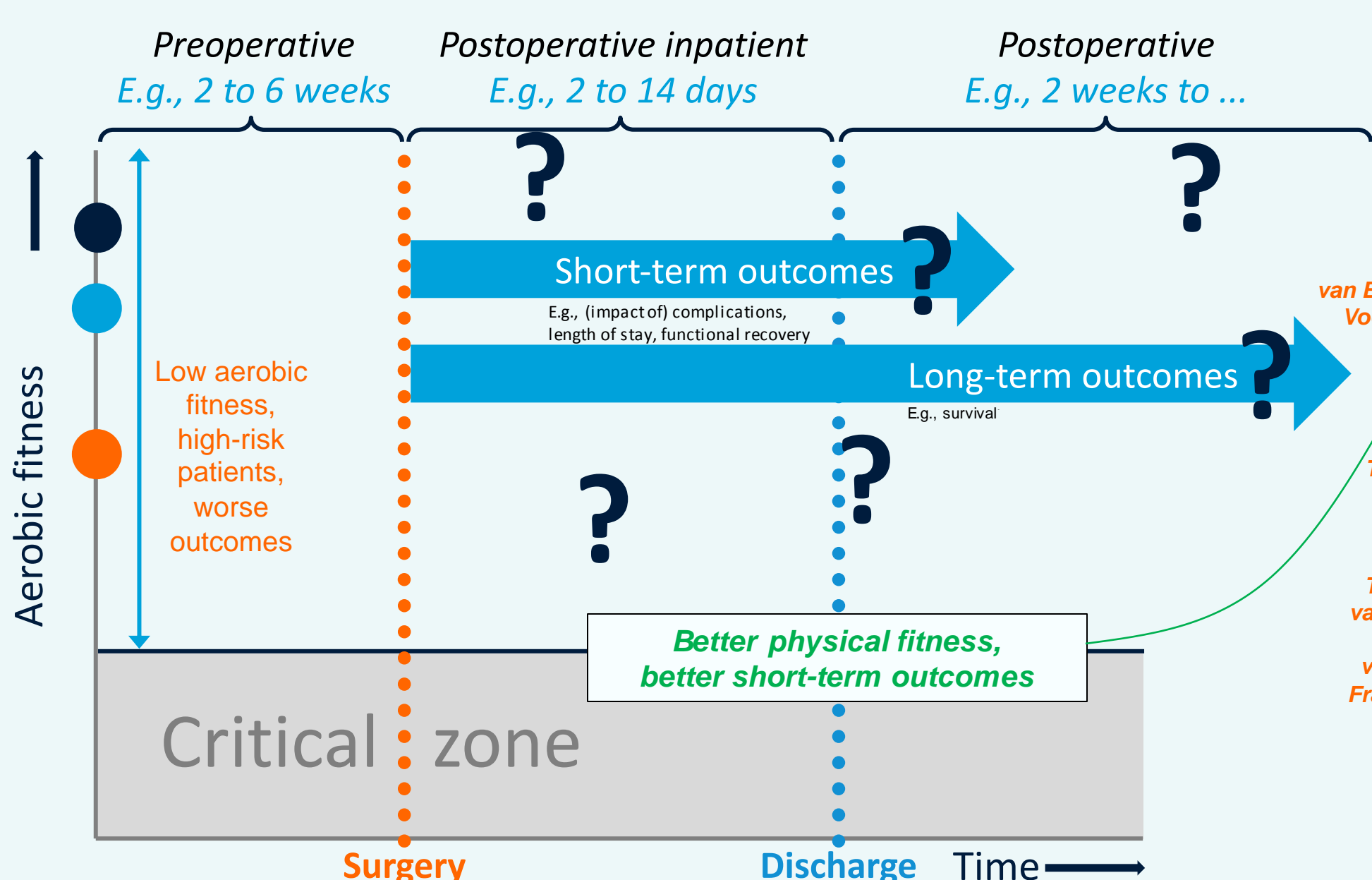
#### Effects of preoperative physical exercise training (prehabilitation)

- **Study design and patient populations:** a randomized clinical trial, pre-post studies, and a case study in **high-risk** patients (low preoperative aerobic fitness) with colorectal (including patients **during** neoadjuvant therapy in rectal cancer), liver, or pancreatic cancer
- **Preoperative intervention:** **community- or home-based supervised** exercise prehabilitation (3-6 wks), **outpatient supervised** exercise prehabilitation during neoadjuvant therapy (9-17 wks)
- **Pre- and postoperative outcomes:** feasibility (CRC, HPB), change in physical fitness (CRC, HPB), and postoperative outcomes (CRC)

Abbreviations: CPET=cardiopulmonary exercise testing; CRC=colorectal cancer; FTSTST=five times sit-to-stand test; HGS=handgrip strength; HPB=hepatopancreatobiliary; iSWT=incremental shuttle walk test; NSCLC=non-small cell lung cancer; SRT=steep ramp test; TUG=timed up-and-go; 2MWT=two-minute walk test.

### Results

#### Association between preoperative physical fitness and postoperative outcomes

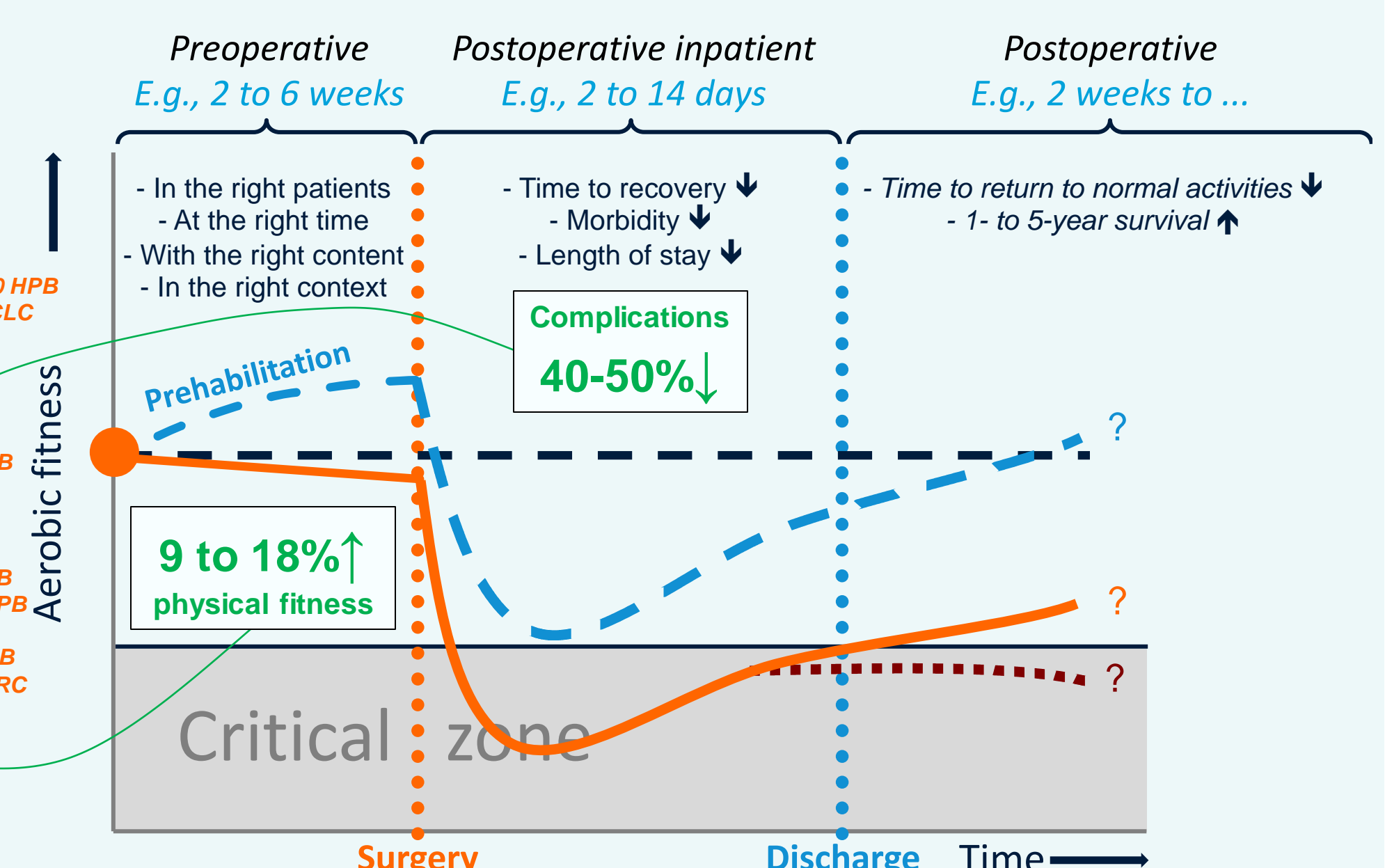


Heldens et al. 2017 CRC  
Berkel et al. 2019 CRC  
van Beijsterveld et al. 2019; 2020 HPB  
Voorn et al. 2021a; 2021b NSCLC  
Cuijpers et al. 2021 CRC

Thomas et al. 2019 CRC HPB  
Berkel et al. 2021 CRC

Heldens et al. 2016 CRC  
Thomas et al. 2019 CRC HPB  
van Beijsterveld et al. 2020 HPB  
Berkel et al. 2021 CRC  
van Wijk et al. submitted HPB  
Franssen et al. in progress CRC

#### Effects of preoperative physical exercise training (prehabilitation)



**Conclusion** Better preoperative physical fitness is associated with better postoperative outcomes in patients preparing for major elective cancer surgery. Short-term exercise prehabilitation by unfit patients improves preoperative physical fitness and seems to reduce both the incidence and impact of postoperative complications.