

# The impact of changes in skeletal muscle mass on changes in quality of life in metastatic colorectal cancer patients



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## Introduction

- Increasing evidence indicates that low Skeletal Muscle Mass (SMM) is associated with poor outcomes in various cancers, including metastatic colorectal cancer (mCRC).
- We recently showed, that loss of SMM was associated with poor survival during first line maintenance treatment with capecitabine + bevacizumab (CAP-B) or observation (ASCO, 2017).
- The impact of change of SMM on Quality of Life (QoL) is not yet known.

## Aim

To study the association between change in SMM and concomitant change of QoL in mCRC patients during palliative systemic treatment.

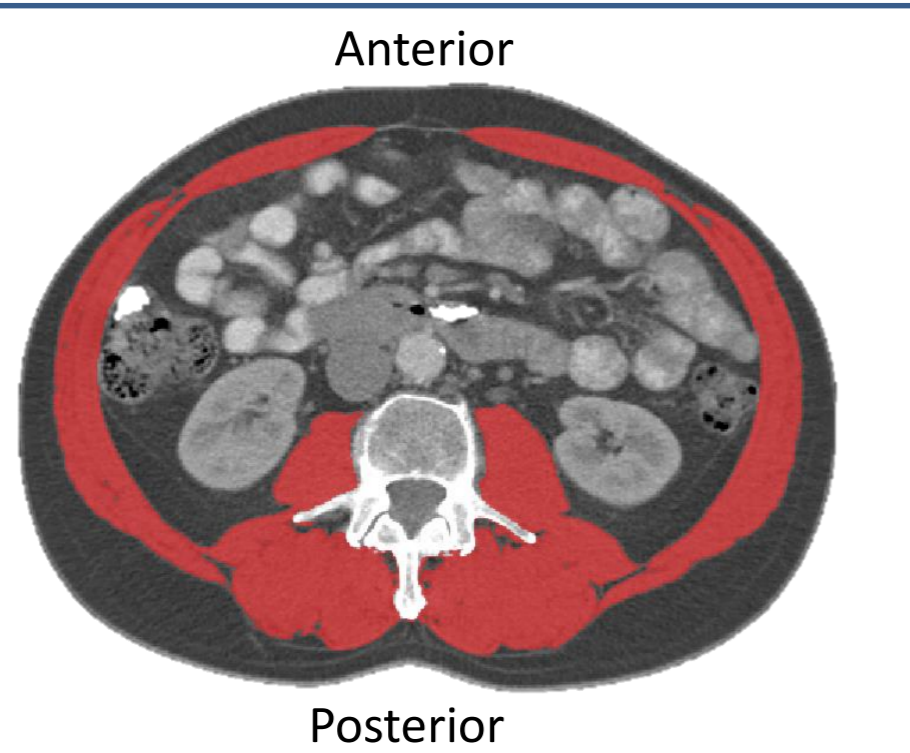
## Methods

- 221 from 558 randomized mCRC patients in CAIRO3<sup>†</sup> (Figure 1), were analyzed of whom both QoL and SMM data were available at randomization and at progression of disease (PD1).
- Patient-reported QoL was measured using the EORTC-QLQ-C30 (v.3), resulting in continuous scores ranging from 0 - 100.
- Routine CT scans were analyzed for SMM. Change in SMM was measured continuously and categorized into loss (>2%), stable (≤2% loss-≤2% gain), and gain (>2%).

## Skeletal muscle analysis

Skeletal muscle area was quantified by trained analysts, using the Slice-O-matic software (Tomovision, Montreal, Canada). Per patient, scans were aligned and rotated to reduce measurement error caused by the positioning of patients (MeVisLab, version 2.7.1).

Skeletal muscle cross-sectional area at the level of third lumbar vertebra (L3). Skeletal muscle, in red, was identified and quantified by use of Hounsfield unit (HU) thresholds (-29 to +150).



Total-body skeletal muscle mass was calculated using previously published<sup>††</sup> regression equations:

- Skeletal Muscle Volume (Liter) =  $0.166 \text{ L} / \text{cm}^2 \times \text{Skeletal Muscle Area in cm}^2 + 2.142 \text{ L}$
- Skeletal Muscle Mass (Kilogram) =  $\text{Skeletal Muscle Volume in L} \times 1.04 \text{ gram} / \text{cm}^3$

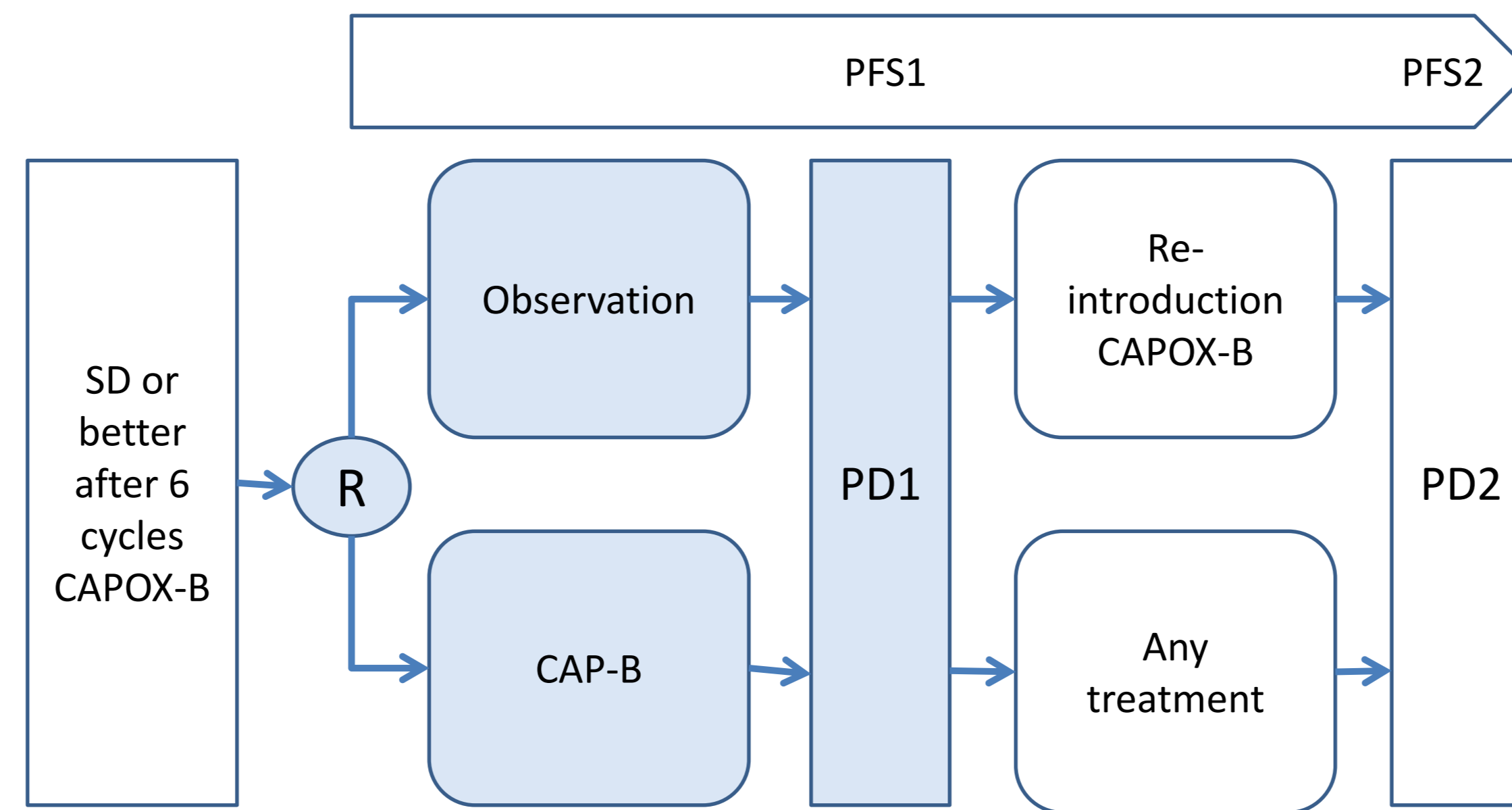
## Statistical analysis

Multiple linear regression models for associations between change in SMM and change in QoL, while adjusting for: previous adjuvant chemotherapy, response to induction treatment, WHO performance status, serum lactate dehydrogenase, and treatment centre.

Table 1. Demographic and Clinical Patient Characteristics

Characteristics (N=221)	No. (%)
<b>Age, years</b>	
Mean (SD)	63.5 (8.4)
<b>Sex</b>	
Male	142 (64)
<b>WHO performance status</b>	
0	132 (60)
1	89 (40)
<b>Treatment arm</b>	
Maintenance (CAP-B)	103 (47)
<b>Time to PFS1 (days), median (IQR)</b>	
Maintenance	323 (128, 518)
Observation	130 (96, 199)

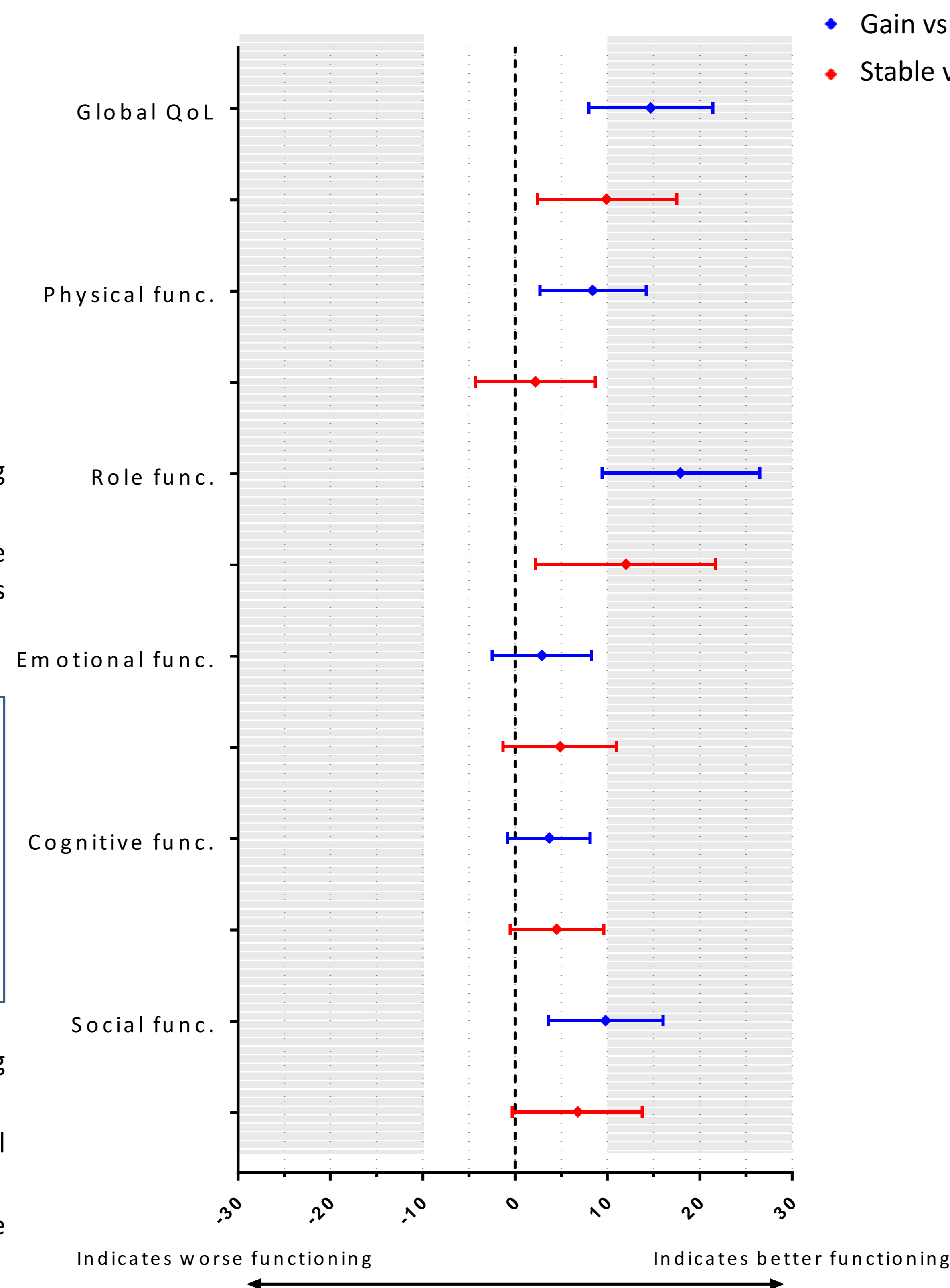
Figure 1. Study design CAIRO3 study



Blue marking, indicates the period included in the current analysis.

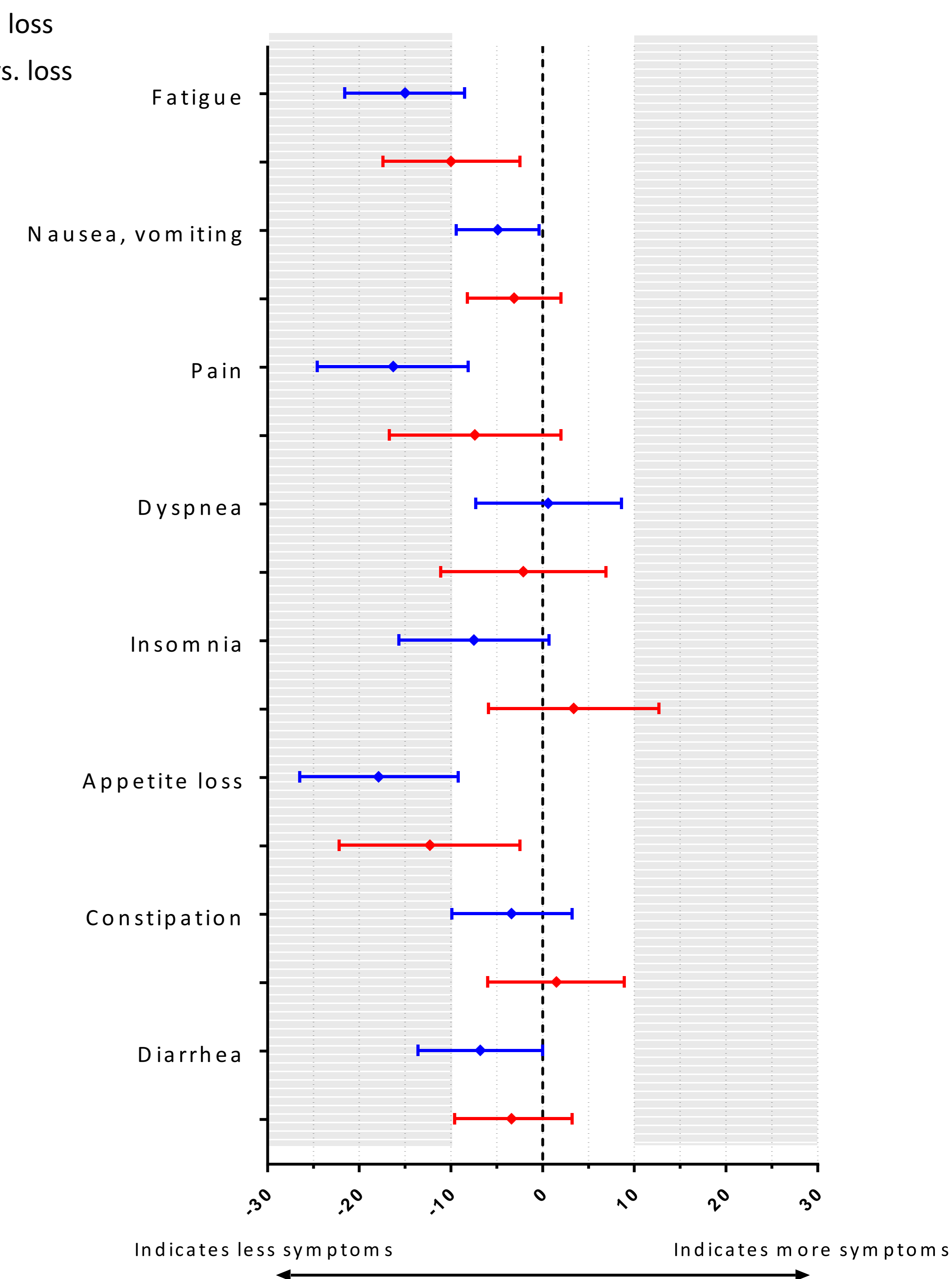
SD = stable disease, CAPOX-B = capecitabine+bevacizumab+oxaliplatin initial treatment, PD (1/2) = first/second progression of disease, PFS (1/2) = time to PD (1/2).

Table 2. Change scores for association between SMM change (categorized) on change in QoL and functional scales (continuous)



Grey zones, indicate clinically relevant (i.e. >10 points) changes in global quality of life, functional-, and symptom-scores. Change scores are shown as means with 95% CI. Confidence intervals not including 0 (P < .05) are considered statistically significant.

Table 3. Change scores for association between SMM change (categorized) on change in symptoms (continuous)



## Conclusion

- Stable SMM during first line maintenance CAP-B treatment or observation was associated with a clinically relevant increase in QoL and role functioning, and a clinically relevant decrease in fatigue and appetite loss.
- In addition, SMM gain was significantly associated with even larger positive QoL changes.
- Our results further strengthen the importance of preserving or increasing SMM, since this is not only related to better treatment outcomes, but also to improved patient-reported QoL during mCRC treatment.

## Acknowledgements

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## References

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- †† Shen W. *et al.* Total body skeletal muscle and adipose tissue volumes: estimation from a single abdominal cross-sectional image. *J Appl Physiol.* 2004; 97: 2333-2338. doi:10.1152/jappphysiol.00744.2004.