The Personalized cAnceR TreatmeNt and caRe (PARTNR) project: Optimizing intervention recommendations for breast cancer-related fatigue

UNIVERSITY OF TWENTE. | TECHMED CENTRE

Annemieke Witteveen[1], Kim Wijlens[1], Lian Beenhakker[1], Sabine Siesling[2,3], Christina Bode[4], Miriam Vollenbroek-Hutten[1,5]

1 Biomedical Signals and Systems, Technical Medical Centre, University of Twente, Enschede. 2 Netherlands Comprehensive Cancer Organization (IKNL), Utrecht. 3 Health Technology and Services Research, Technical Medical Centre, University of Twente, Enschede. 4 Psychology, Health and Technology, University of Twente, Enschede. 5 Board of directors, Medical Spectrum Twente Hospital, Enschede. All: the Netherlands

Scan for more information on the project!

BACKGROUND
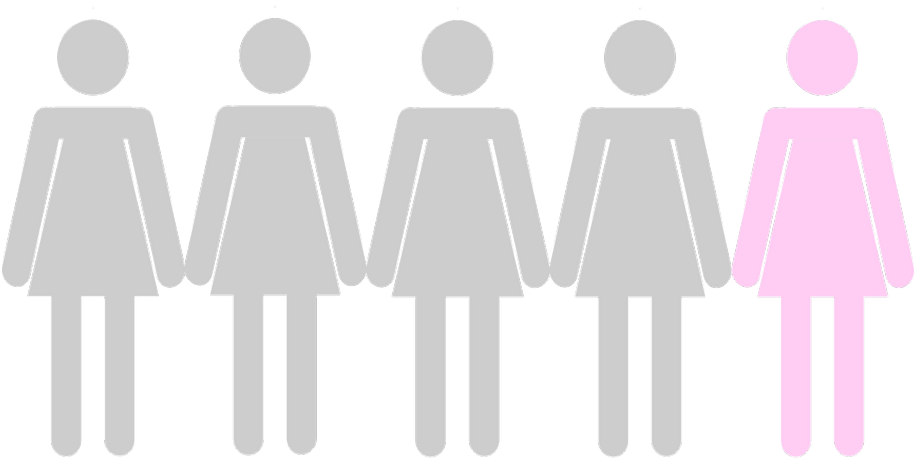
Ten years after breast cancer, 1 in 5 women is still severely fatigued. This has an enormous impact on their QoL and role in society.

- While numerous interventions exist, effectiveness for individual varies.
- PARTNR aims to develop **personalized recommendations for CRF interventions**.
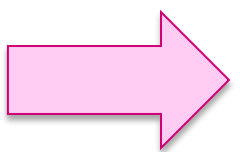
METHODS

Prediction of CRF: Multiple machine learning models (Primary Secondary Cancer Care Registry, n=12,813).

Holistic patient profile:
- 4 semi-structured focus groups (27 patients)
- 14 interviews (healthcare professionals, HCPs)
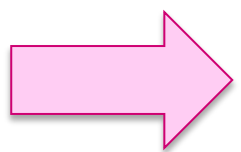
→ Reflexive thematic analysis → Holistic patient profile

HA-CRF questionnaire: 1) construct definition, 2) item selection, and 3) item reformulation: holistic profile → Holistic Assessment of CRF (HA-CRF) questionnaire to monitor CRF over time.

Testing HA-CRF: *Validity*: cognitive walkthroughs and semi-structured interviews 10 patients. *Clarity, relevance, and essentiality*: 10 HCPs. *Feasibility and usability:* 19 patients using app for 4 weeks + group interview.

Review CRF interventions: systematic review: key attributes.

Patient preferences: A best-worst scaling (BWS) study: preference heterogeneity in attributes, integrated in model for eliciting patient preferences.

Prediction treatment effect: Individual patient data 22 exercise and 14 psychosocial RCTs (3,995 participants), to model expected benefits intervention types.

RESULTS

Prediction of CRF: unable to accurately distinguish between fatigued and non-fatigued patients (Figure 1).

Holistic patient profile: to capture the multidimensional nature of CRF (Figure 2).

HA-CRF questionnaire: from 110 relevant questionnaires with >3000 items, 72 items from 21 questionnaires included, divided in 52 screening and 20 deepening items.

Testing HA-CRF: Face and content validity were good and excellent, respectively. Completion rates high (>75%), adherence to monitoring schedule low (21%). Patient acceptability varied; feedback provided to enhance usability.

Review CRF interventions: 35 interventions included. Intervention attributes identified; incl. 9 preference sensitive.

Patient preferences: BWS study found large heterogeneity (n=67 patients, Table 1).

Prediction treatment effect: Pre-intervention fatigue emerged as strongest predictor of treatment benefit following both exercise and psychosocial interventions.
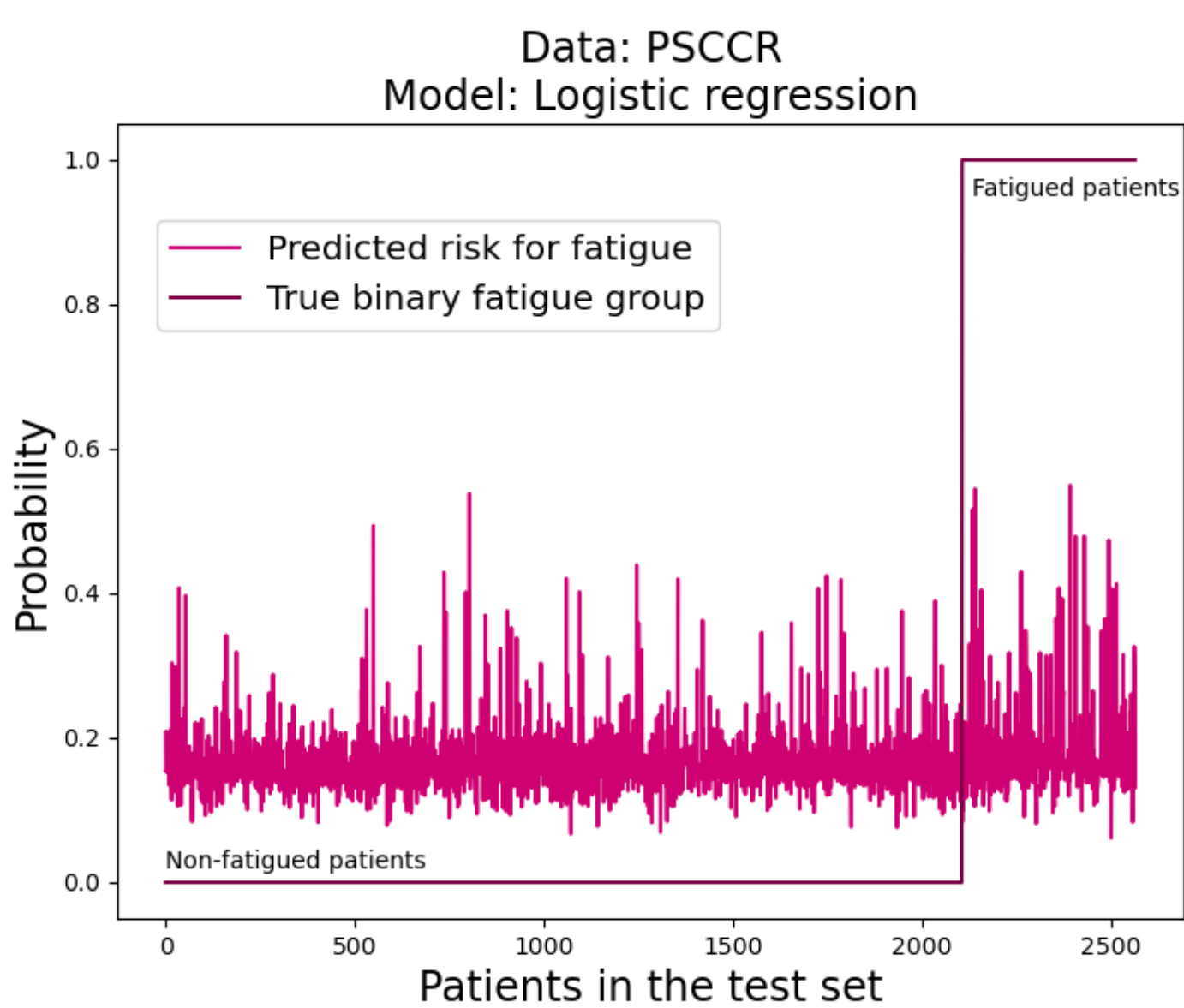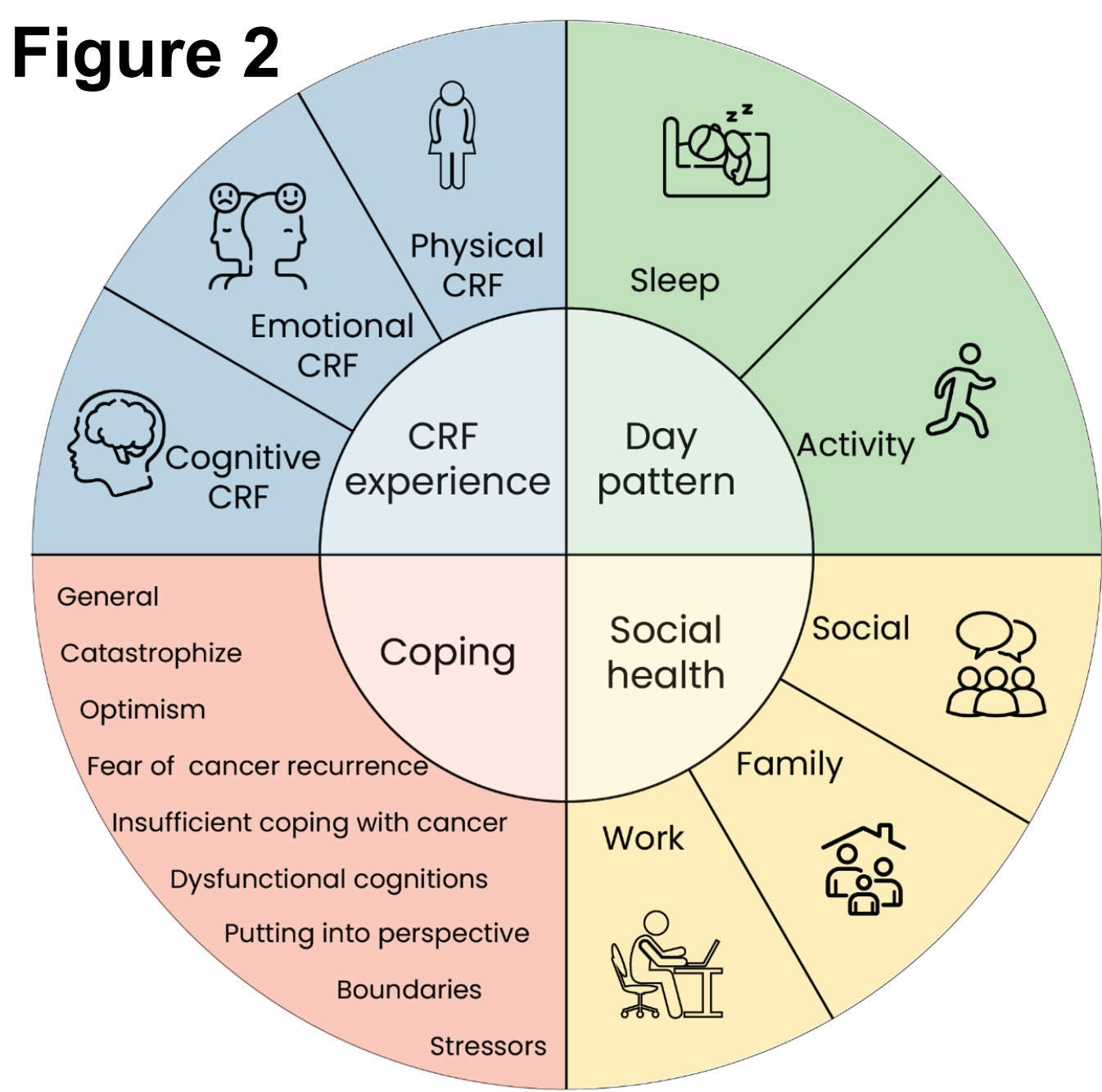
Figure 1

Data: PSCCR
Model: Logistic regression
- Predicted risk for fatigue
- True binary fatigue group

Fatigued patients
Non-fatigued patients

Probability / Patients in the test set

Figure 2

CRF experience: Physical CRF, Sleep, Day pattern, Activity, Social, Family, Work, Social health, Coping, General, Catastrophize, Optimism, Fear of cancer recurrence, Insufficient coping with cancer, Dysfunctional cognitions, Putting into perspective, Boundaries, Stressors, Emotional CRF, Cognitive CRF

Table 1

Attribute	Levels
Duration	6-12 or 20-26
Sessions /week	Daily or weekly
Time /session	10 min or 1 hour
Intervention type	Physical activity or psychosocial
Anonymity	Y/N
Contact w/therapist	Y/N
Contact w/peers	Y/N
Proven effective	Y/N
Costs	Y/N

CONCLUSIONS

Insights from the holistic profile, along with patient preferences and anticipated intervention benefits, will be synthesized to formulate optimal, explainable recommendations for CRF interventions, ultimately aiming to enhance the quality of life after cancer.

ACKNOWLEDGEMENTS

PARTNR
Personalized cAnceR TreatmeNt and caRe platform

More information:
Annemieke Witteveen, PhD

Associate Professor
A.Witteveen@utwente.nl