

# From Worn Out to Energized: Tackling Fatigue After Transplant and CAR T-cell Therapy

**Celebrating a Second Chance at  
Life Survivorship Symposium**

May 3-9, 2025



**Alexandra Muench, PsyD**  
**University of Pennsylvania**

# Background



# What is fatigue?



# According to the dictionary:

- “A weariness or exhaustion from labor, exertion, or stress”



# What about cancer-related fatigue (CRF)?

“Cancer-related fatigue is a distressing, persistent, subjective sense of physical, emotional, and/or cognitive tiredness or exhaustion related to cancer treatment that is not proportional to recent activity and interferes with usual functioning”

-National Comprehensive Cancer Network



## Let's break that down...

Cancer-related fatigue is a

1. distressing, persistent, subjective sense of
2. physical, emotional, and/or cognitive tiredness or exhaustion related to cancer treatment that is
3. not proportional to recent activity and
4. interferes with usual functioning



# Different beasts

## Fatigue

- A well-known laboratory model of fatigue



from

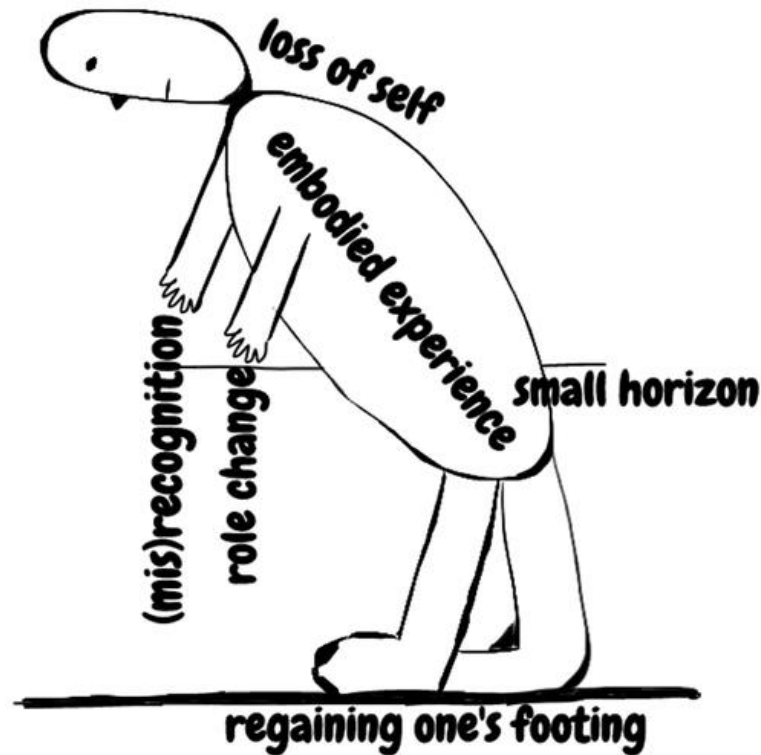


subjective  
nal,  
s or  
cer  
**proportional**  
erferes  
e

# How is CRF experienced?

Meta-ethnography of 16 qualitative studies

Six overarching themes



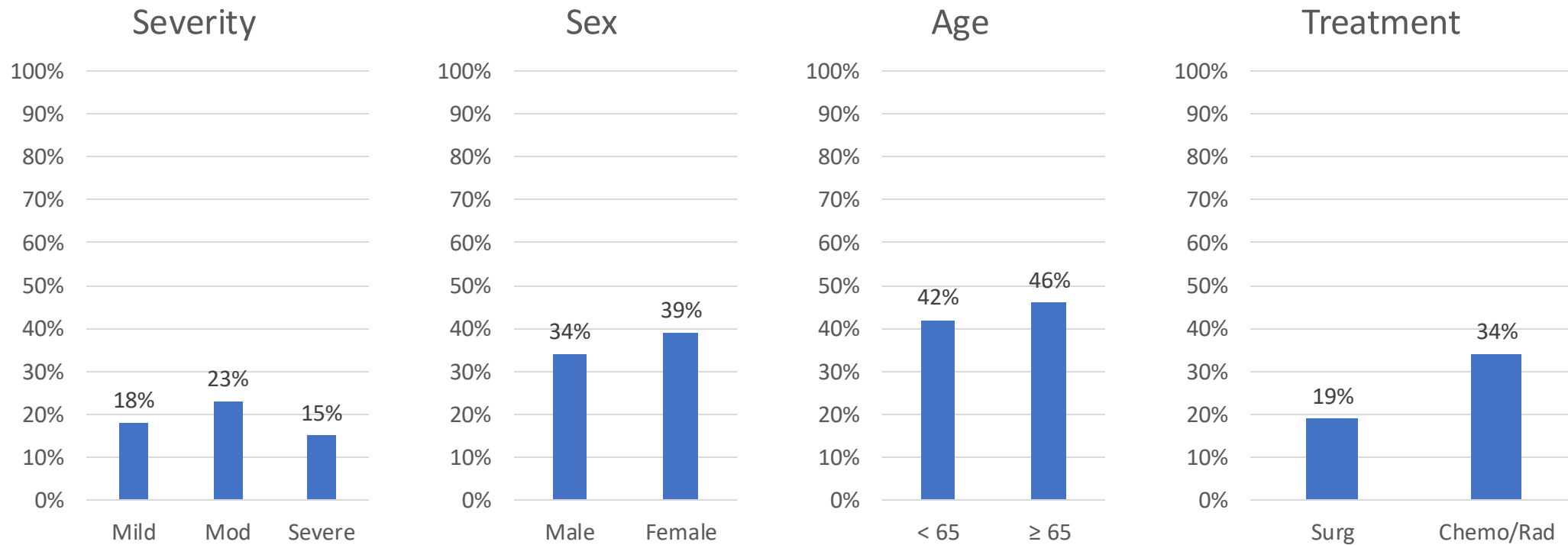
Bootsma et al., *Psychooncology*,  
2020



# How common is CRF?

- Short answer: very common
- About 52% of patients across 84 studies
  - Most common side effect of cancer treatment
  - Can also be a symptom of cancer itself
  - Often rated as most distressing

# How common is CRF?



Ma et al., *Int J Nurs Stud*, 2020



# Why does CRF happen?

**Bottom line: we don't really know for sure**

Some things that may contribute:

Systemic inflammation

Anemia

Depression

Sleep disturbance

Physical inactivity

Higher BMI

Pain

Type of Transplant (autoSCT vs. alloSCT)

Infection

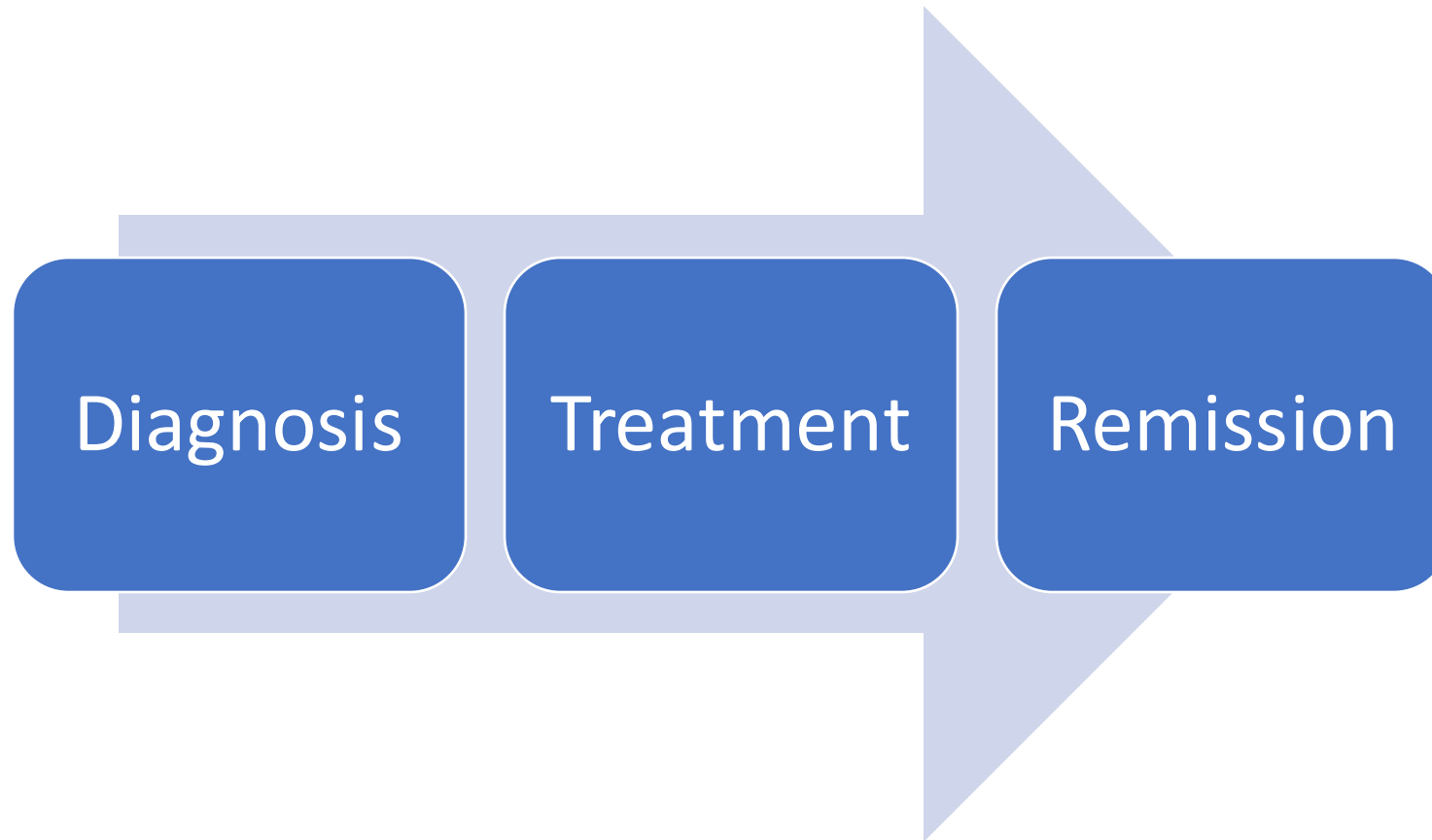
Difficulty breathing

Problems with organs

Coping strategies and expectations

Cancer treatments

# When does CRF happen?

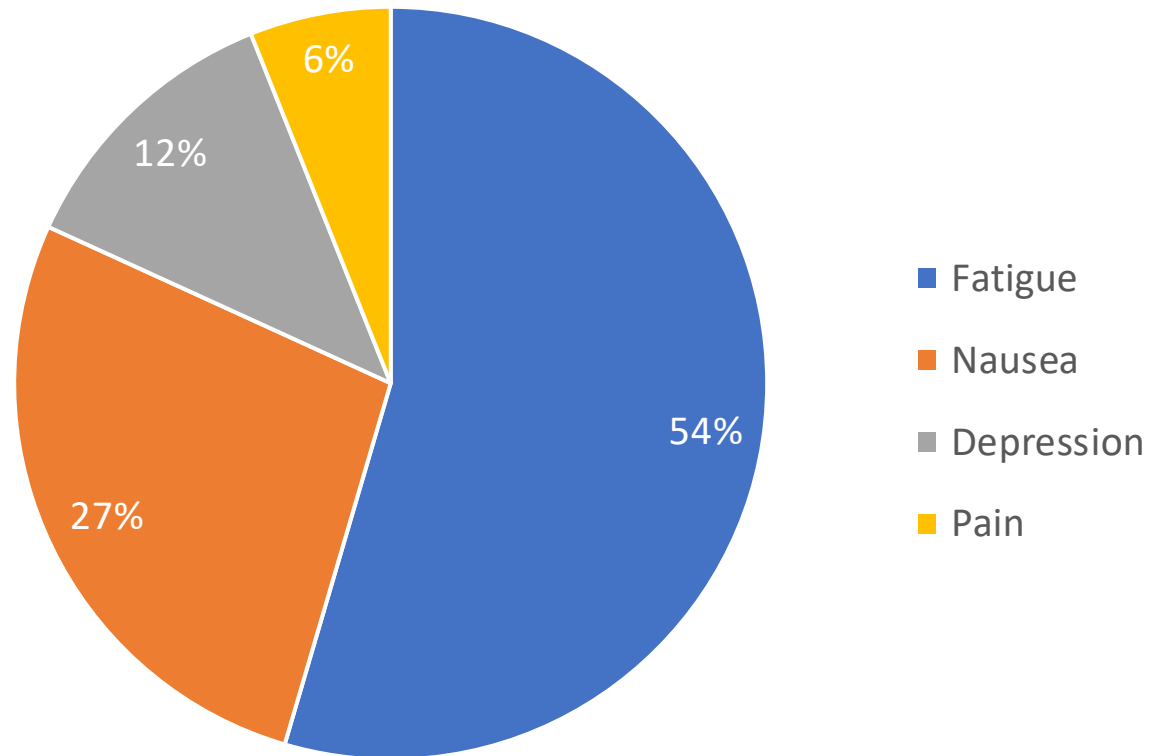


# How long does CRF last?



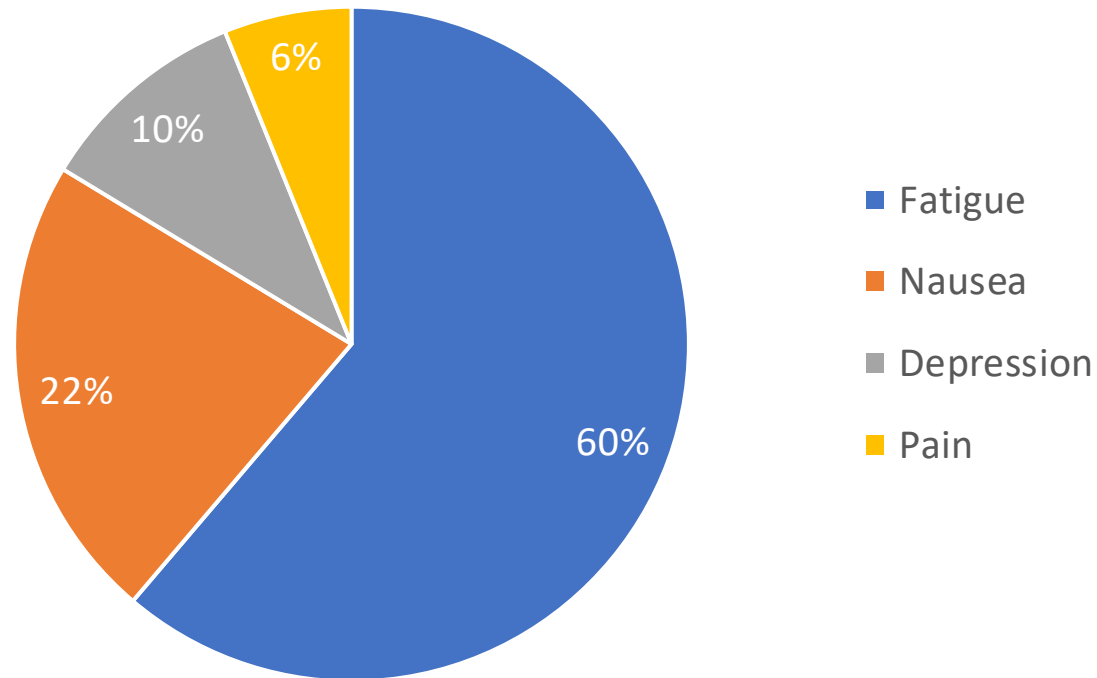
# How long does CRF last?

% of patients who ranked each symptom as lasting the longest



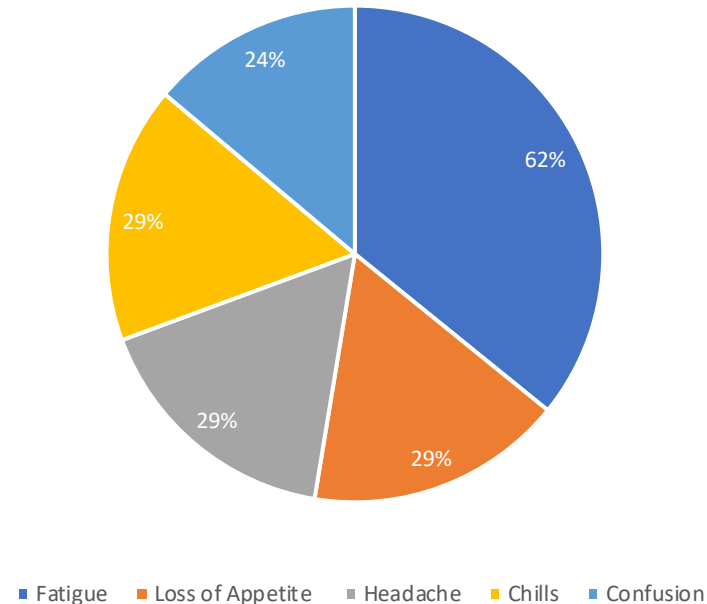
# What impact does CRF have?

% of patients who said the symptom impacts everyday life the most



# What impact does CRF have?

**% of CAR-T patients who said the symptom impacts everyday life the most**





So, what can be done about CRF?



# Patient/Family Education and Counseling



- Education about fatigue, especially if undergoing fatigue-inducing treatments (e.g., RT, CT)
- Fatigue not necessarily sign that treatment not working or that disease progressing
- Fatigue can be a consequence of treatment
- May benefit from nutrition consult with a registered dietician

# General Strategies

- Energy conservation
- Maintain a diary
- Distraction
- Daytime naps < 30 minutes, in-bed, before 3pm
  - “Nappuccino” – Drink a small coffee prior to napping

# Pharmacologic Interventions



Some evidence psychostimulants and corticosteroids can help

# Non-pharmacologic interventions



## 1. Physical Activity



## 2. Psychosocial Interventions



## 3. Bright light therapy

# Physical Activity

- 72 studies (5367 patients) in active treatment or follow-up.
- Moderate effect of exercise in reducing CRF compared to control group.
- Exercise type does not matter.
- Tailored – may benefit from physical therapy or other exercise program.



# Bright Light Therapy

- Commonly used to treat seasonal affective disorder
- Systematic exposure to bright light may normalize circadian rhythms
- Pilot studies show that it may prevent/treat fatigue in cancer patients and survivors.

# What does bright light therapy look like?

- 30 minutes each morning upon awakening
- 4 to 8 weeks
- Bright light (broad spectrum)
- Small lamp, 45-degree angle, arm length away
- Light goggles are another option





# The Bottom Line

- CRF is real and is different from regular fatigue
- Common, severe, impactful, and long-lasting
- Causes and mechanisms are unknown
- There are a variety of tools available to treat or help with the management of CRF

# CBT-I: The Gold Standard



# Penn Sleep & Cancer Clinic/Pilot Study



# Penn Sleep & Cancer Clinic

- Collaboration with Perelman Center and Dept of Psychiatry
  - Began in February of 2024.
- Provided CBT-I and CRF management to patients diagnosed with cancer and cancer survivors.
  - Treatment outcomes were assessed with the ISI, BFI, & SE%
- Provided information and education to oncology teams on identifying insomnia and fatigue in the context of cancer.
- Providers were encouraged to refer patients with insomnia and/or CRF
- Referrals were sent via the EMR.
- Majority of sessions were conducted via telehealth.

## Reach and Retention

- Reach, defined as the number of patients referred/the number of patients scheduled for an intake.
- Retention, defined as the number of patients who completed treatment/the total number of scheduled patients.

| March 2024-February 2025 | Total Number of Patients Referred          | Total Number of Patients Who Completed Intake | Percent |
|--------------------------|--------------------------------------------|-----------------------------------------------|---------|
| Reach                    | 78                                         | 44                                            | 56%     |
|                          |                                            |                                               |         |
|                          | Number of Patients Who Completed Treatment | Total Number of Scheduled Patients            |         |
| Retention                | 26                                         | 44                                            | 59%     |

## Pre/Post Data

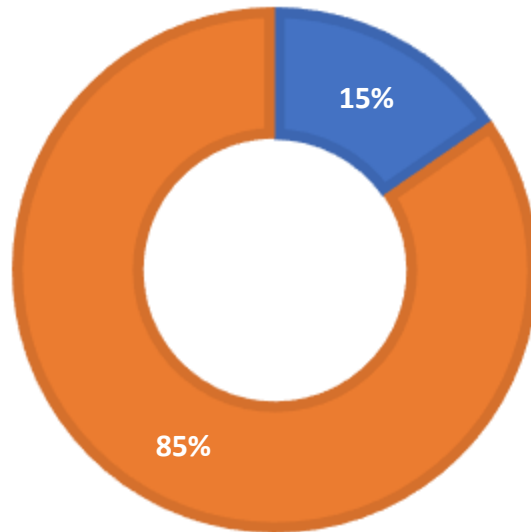
- Of the 44 patients who completed treatment, 13 subjects are included in the present descriptive analysis (means, SD):
  - Patients who were not included did not have pre/post data or received fatigue management (1-2 sessions), not CBT-I.
- The subsequent slides include data on:
  - Demographic Information
  - Pre/Post ISI, BFI, and SE% data



# Demographics

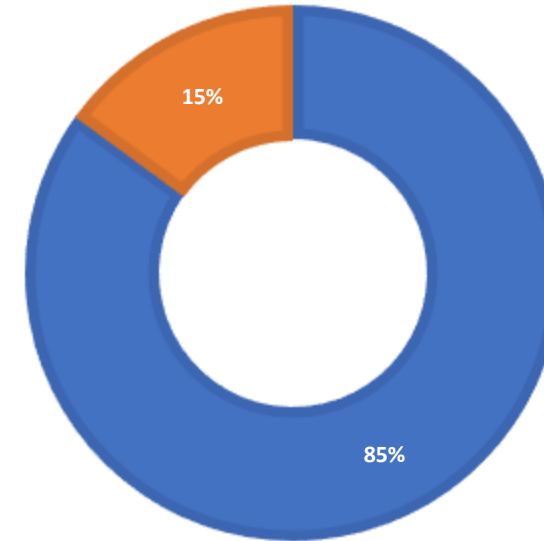
## GENDER

■ Male ■ Female



## RACE/ETHNICITY

■ White ■ Black



**Mage = 61.7 years, SDage = 14.7**

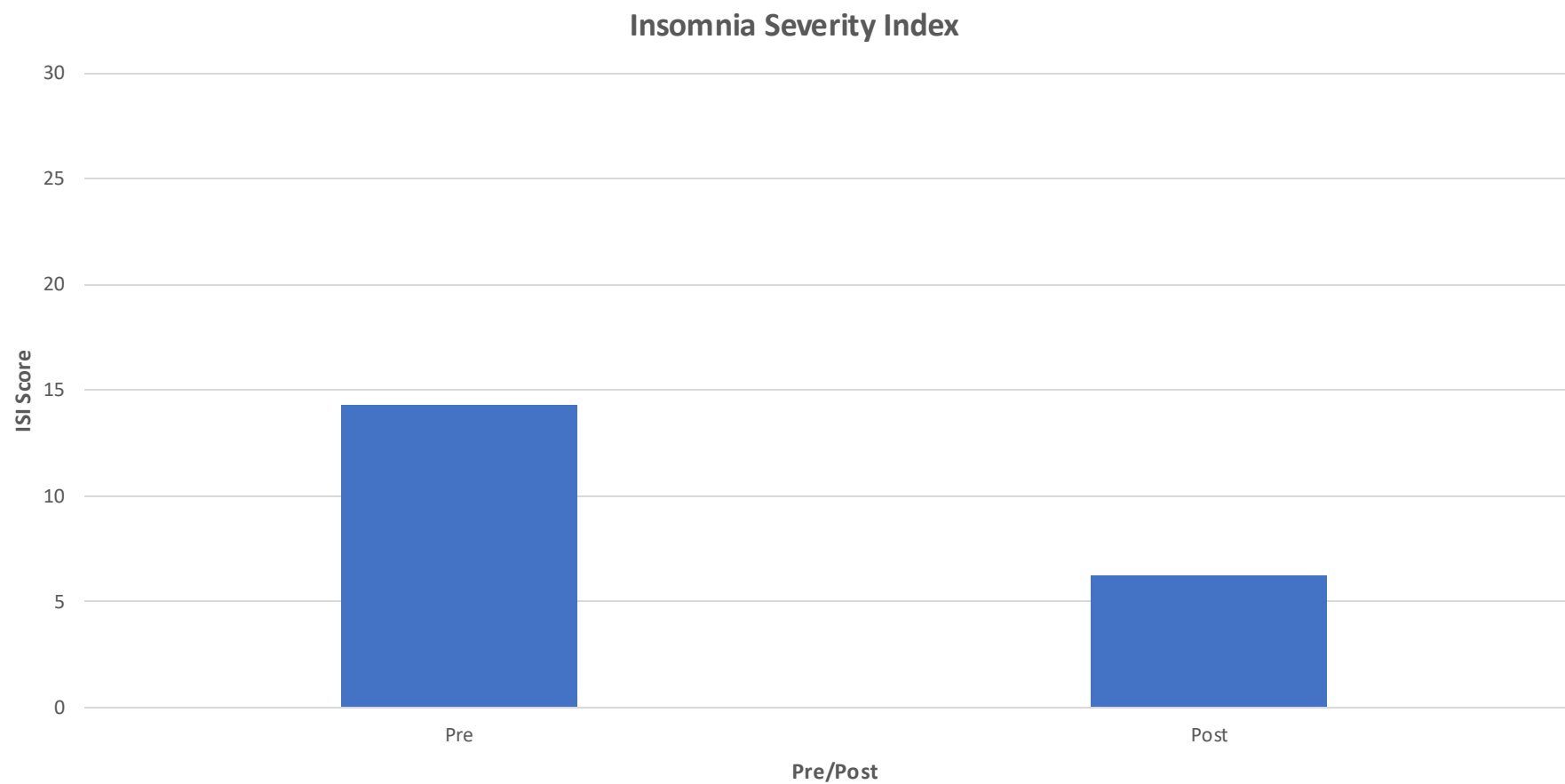
# Pre/Post Data

| Pre/Post CBT-I<br>in Cancer<br>(N=13) | Pre ( $\bar{x}$ ) | SD   | Post ( $\bar{x}$ ) | SD  | Percent Change | Effect Size |
|---------------------------------------|-------------------|------|--------------------|-----|----------------|-------------|
| ISI                                   | 14.3              | 2.4  | 6.2                | 2.9 | 56%            | 3.0         |
| BFI                                   | 4.4               | 2.1  | 2.2                | 2.1 | 50%            | 1.0         |
| SE%                                   | 75.7              | 10.7 | 91.9               | 4.8 | 21%            | -1.9        |

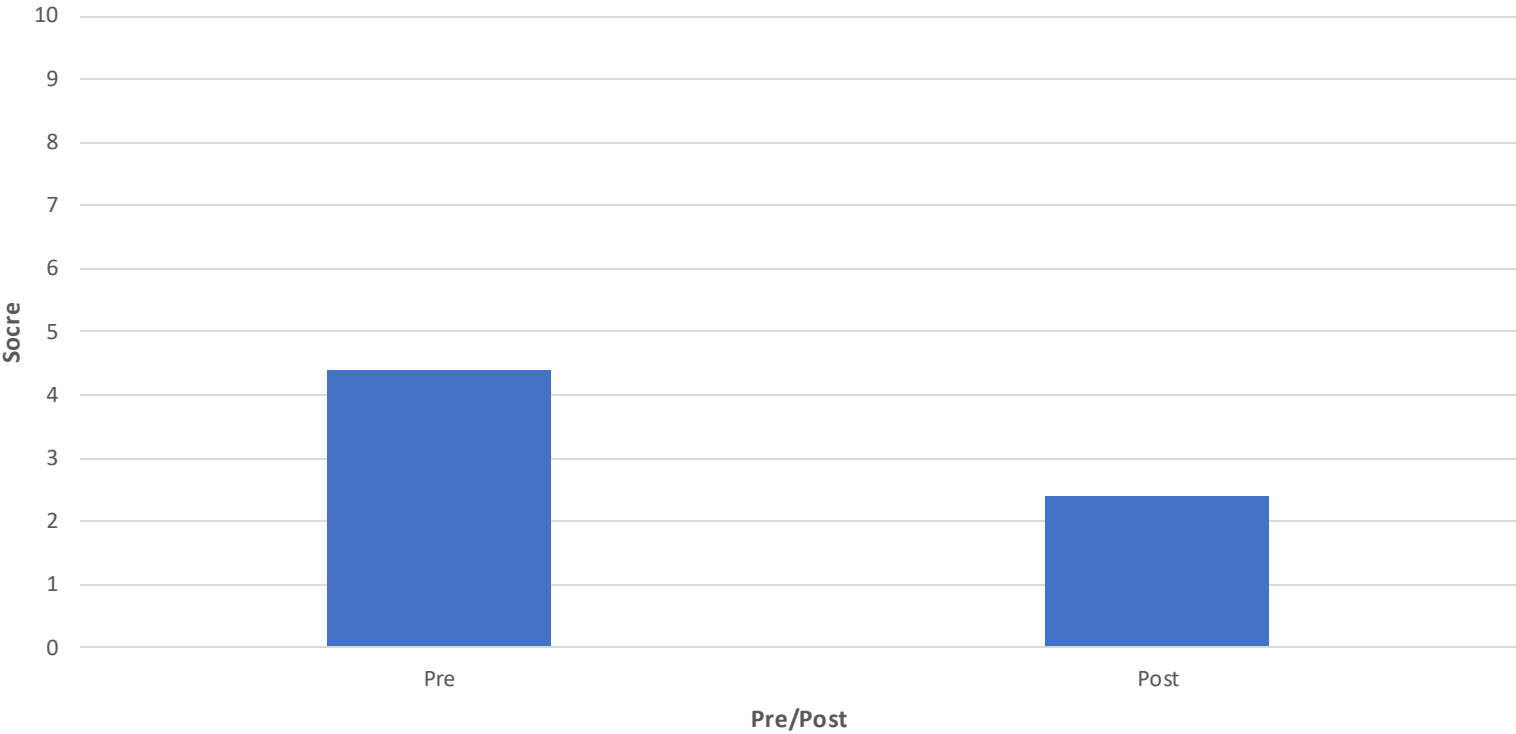
Mean number of sessions of CBT-I was 6.8.

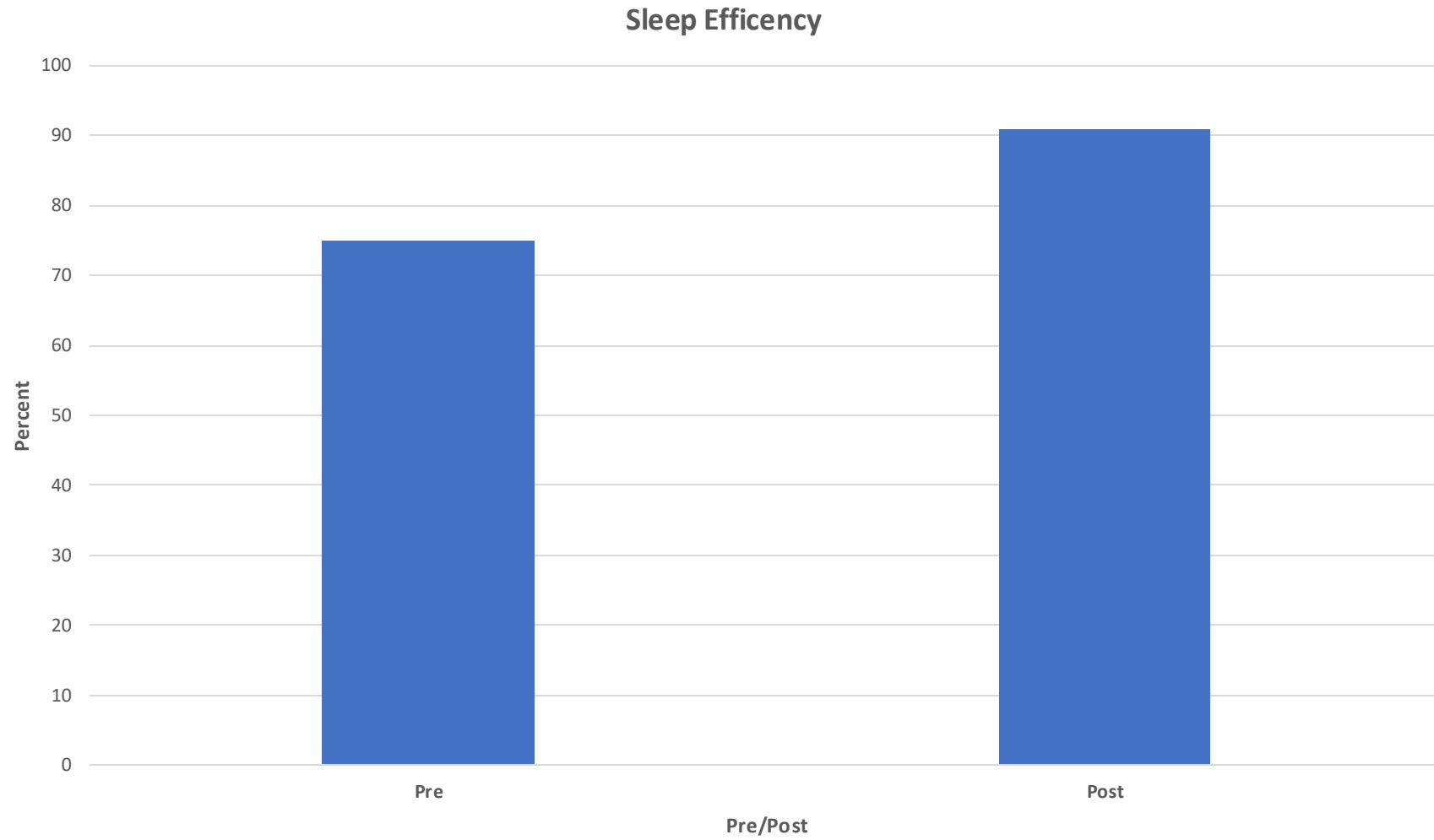




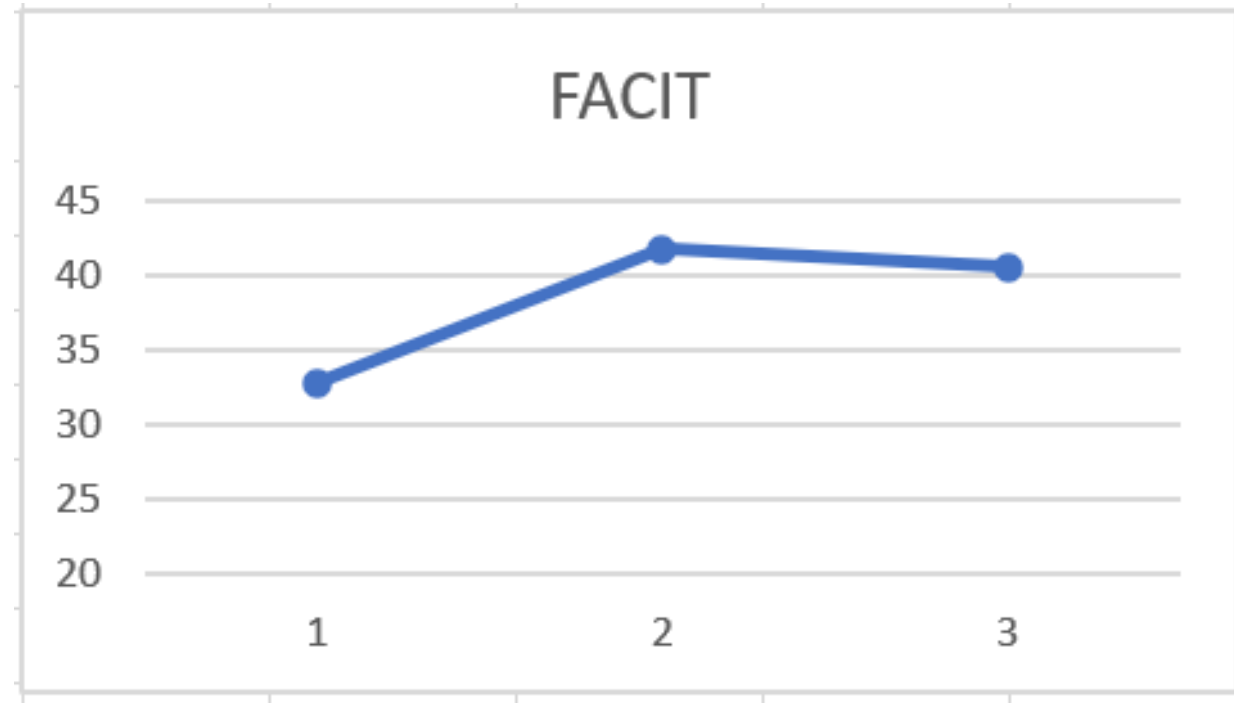
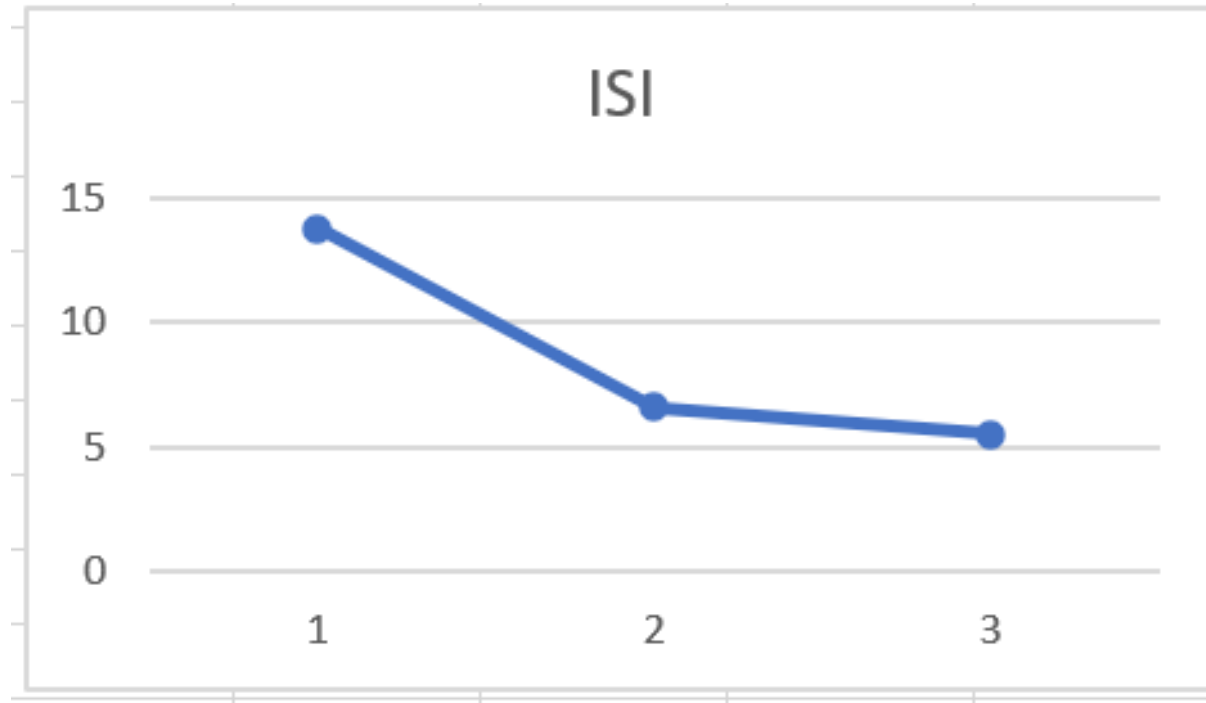


Brief Fatigue Inventory





# Insomnia & Fatigue in Breast Cancer



- This preliminary analyses suggest that clinical gains via CBT-I are robust and sustained for both insomnia & fatigue outcomes.
- Will be replicated in other cancers, such as leukemias, lymphomas, and multiple myeloma.

# Future Directions

- Expansion of Services
  - Increase accessibility of services, including to underserved populations
- Research & Innovation
  - More research is needed on novel treatment approaches to CRF, especially in transplant and CAR-T
- Training & Education
  - Enhance provider training in BSM to improve integration in oncology care
- Long-Term Impact
  - Assess the sustained benefits of treatment and explore the role of sleep interventions in cancer survivorship and recurrence prevention

# Thank You



## Penn Medicine



Gary Freedman, MD



Michael Perlis, PhD



Penn Medicine  
Radiation Oncology

Deseray McCoy, Admin

Mark Seewald, CRC

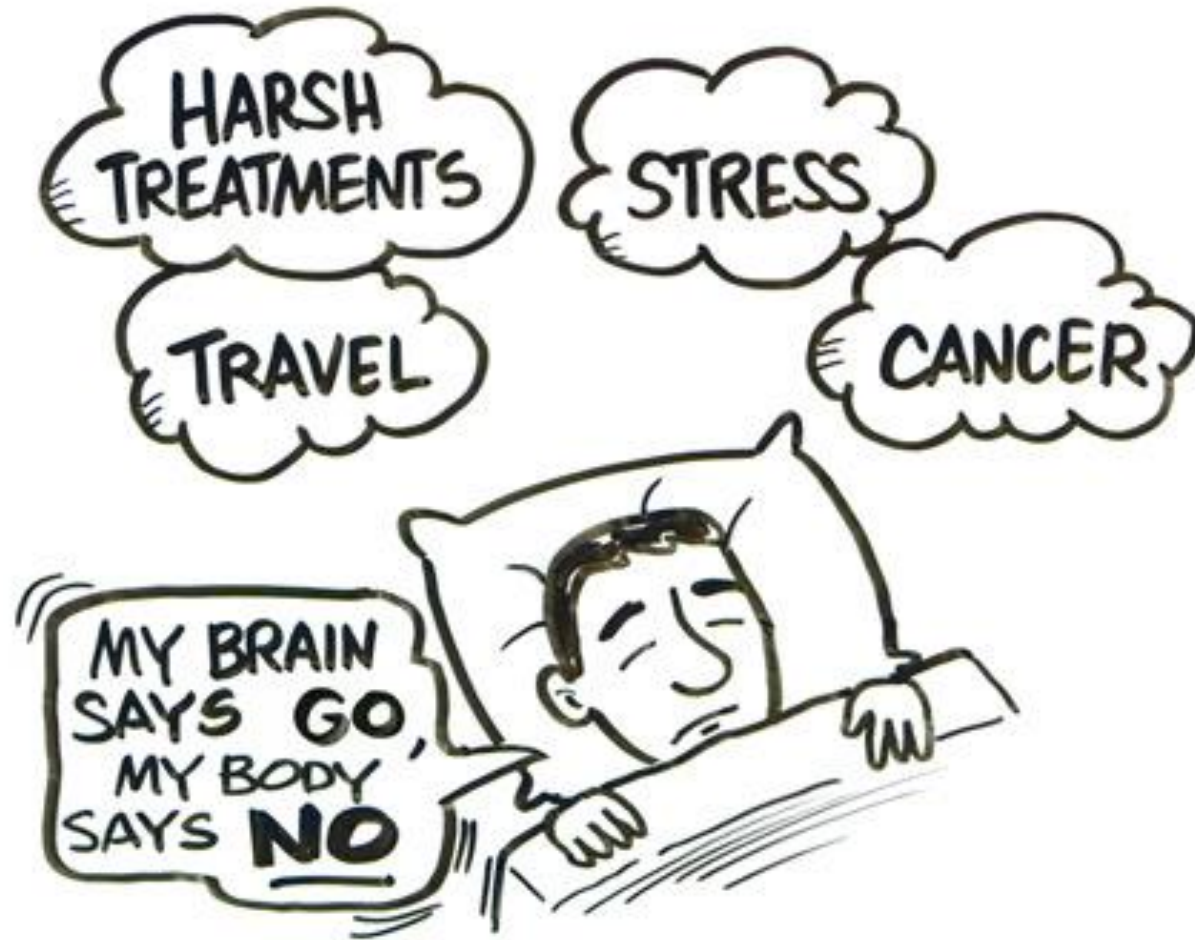
Perelman Oncology  
Services

All the amazing  
patients!



BMT INFONET

2025 SURVIVORSHIP SYMPOSIUM



Thank you for listening!

Contact: [amuench@penntmedicine.upenn.edu](mailto:amuench@penntmedicine.upenn.edu)



# References

- Bootsma, T. I., Duijveman, P., Pijpe, A., Scheelings, P. C., Witkamp, A. J., & Bleiker, E. M. (2020). Unmet information needs of men with breast cancer and health professionals. *Psycho-oncology*, 29(5), 851-860.
- Ma, Y., He, B., Jiang, M., Yang, Y., Wang, C., Huang, C., & Han, L. (2020). Prevalence and risk factors of cancer-related fatigue: a systematic review and meta-analysis. *International Journal of Nursing Studies*, 111, 103707.
- Sidana, S., Thanarajasingam, G., Griffin, J., Thompson, C. A., Burtis, M., Warsame, R., ... & Dueck, A. C. (2019). Patient experience of chimeric antigen receptor (CAR)-T cell therapy vs. stem cell transplant: longitudinal patient reported adverse events, cognition and quality of life. *Blood*, 134, 794.
- Whisenant, M. S., Srour, S. A., Williams, L. A., Subbiah, I., Griffin, D., Ponce, D., ... & Wang, X. S. (2021, December). The unique symptom burden of patients receiving CAR T-cell therapy. In *Seminars in oncology nursing* (Vol. 37, No. 6, p. 151216). WB Saunders.
- Curt, G. A., Breitbart, W., Cella, D., Groopman, J. E., Horning, S. J., Itri, L. M., ... & Vogelzang, N. J. (2000). Impact of cancer-related fatigue on the lives of patients: new findings from the Fatigue Coalition. *The oncologist*, 5(5), 353-360.
- Bowles, S. V., & Bartone, P. T. (Eds.). (2017). *Handbook of military psychology: Clinical and organizational practice*. Springer.
- Tomlinson, D., Diorio, C., Beyene, J., & Sung, L. (2014). Effect of exercise on cancer-related fatigue: a meta-analysis. *American journal of physical medicine & rehabilitation*, 93(8), 675-686.



# Questions?



**Alexandra Muench, PsyD**  
**University of Pennsylvania**



# Let Us Know How We Can Help You



**Visit our website:** [bmtinfonet.org](http://bmtinfonet.org)

**Email us:** [help@bmtinfonet.org](mailto:help@bmtinfonet.org)

**Phone:** 888-597-7674 or 847-433-3313