

Quality of Life after CAR T-cell Therapy (Chimeric Antigen Receptor)

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

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CAR-T Cell Therapy: Longitudinal Quality of Life

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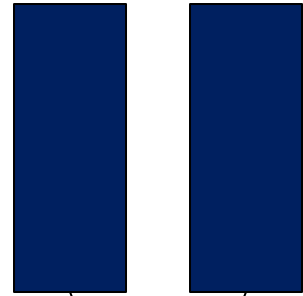
Outline

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- The basics of CAR-T cell Therapy
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- The patient journey during CAR-T cell therapy
- 
- Psychosocial experience of patients undergoing CAR-T cell therapy
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- CAR-T Cell therapy: living with immense prognostic uncertainty
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- Early recovery and long-term effects after CAR-T cell Therapy
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- Survivorship and beyond

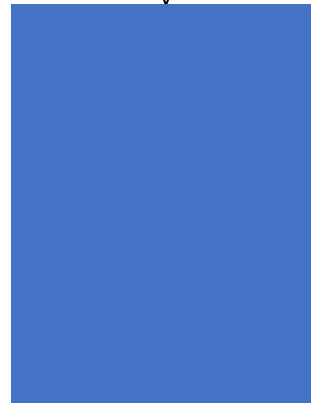
CAR-T Overview

- Chimeric antigen receptor (CAR)-T cell therapy: A form of immunotherapy that uses the cells of the immune system to treat cancer
- 6 FDA approved products to treat lymphomas, leukemias, and multiple myeloma
- > 100 clinical trials in both solid and blood cancers

Chimeric antigen receptor (CAR)

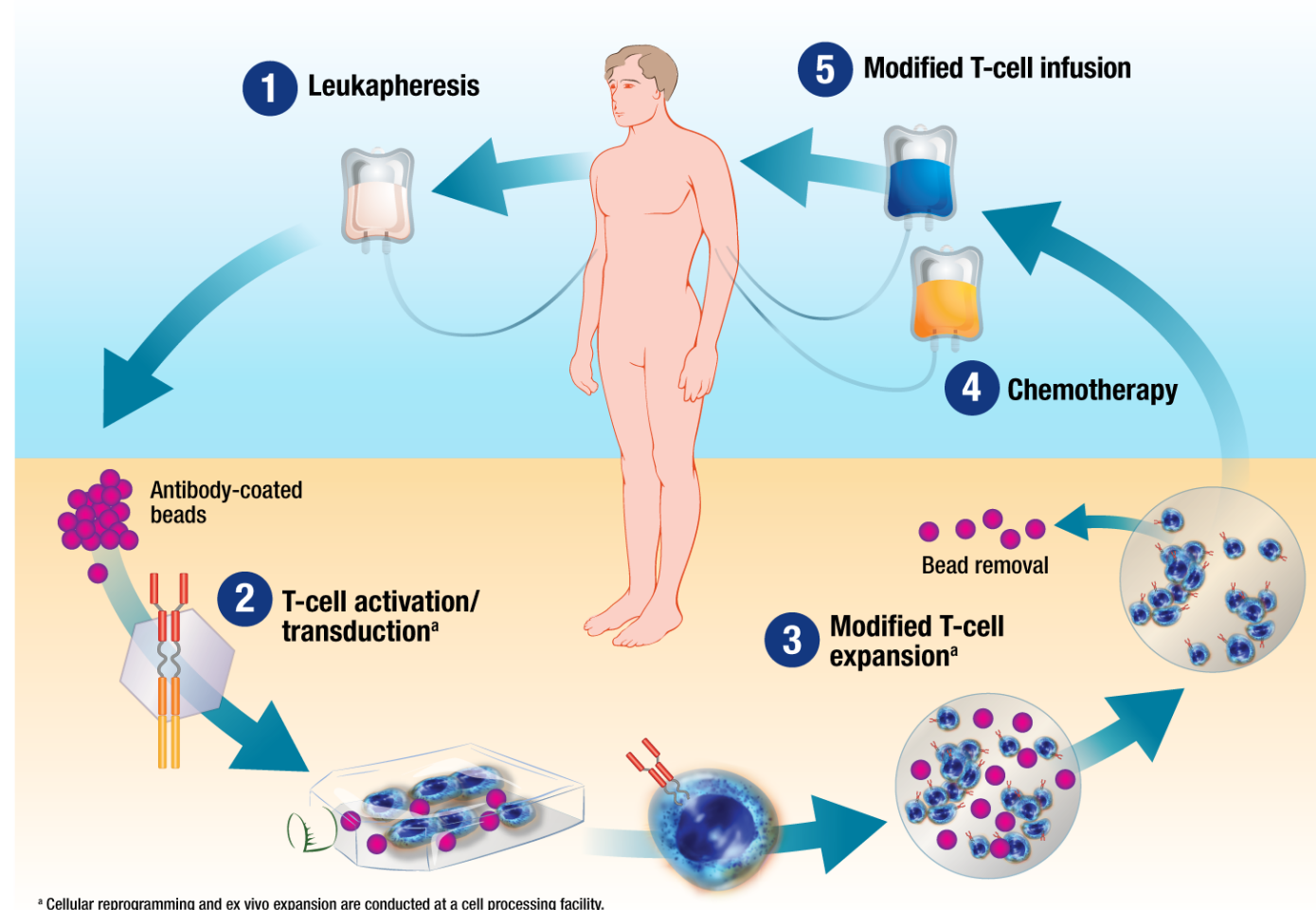


Genetically engineered antigen-binding domain (like a latch to bind cancer cells)



Normal T-cell

CAR-T Overview

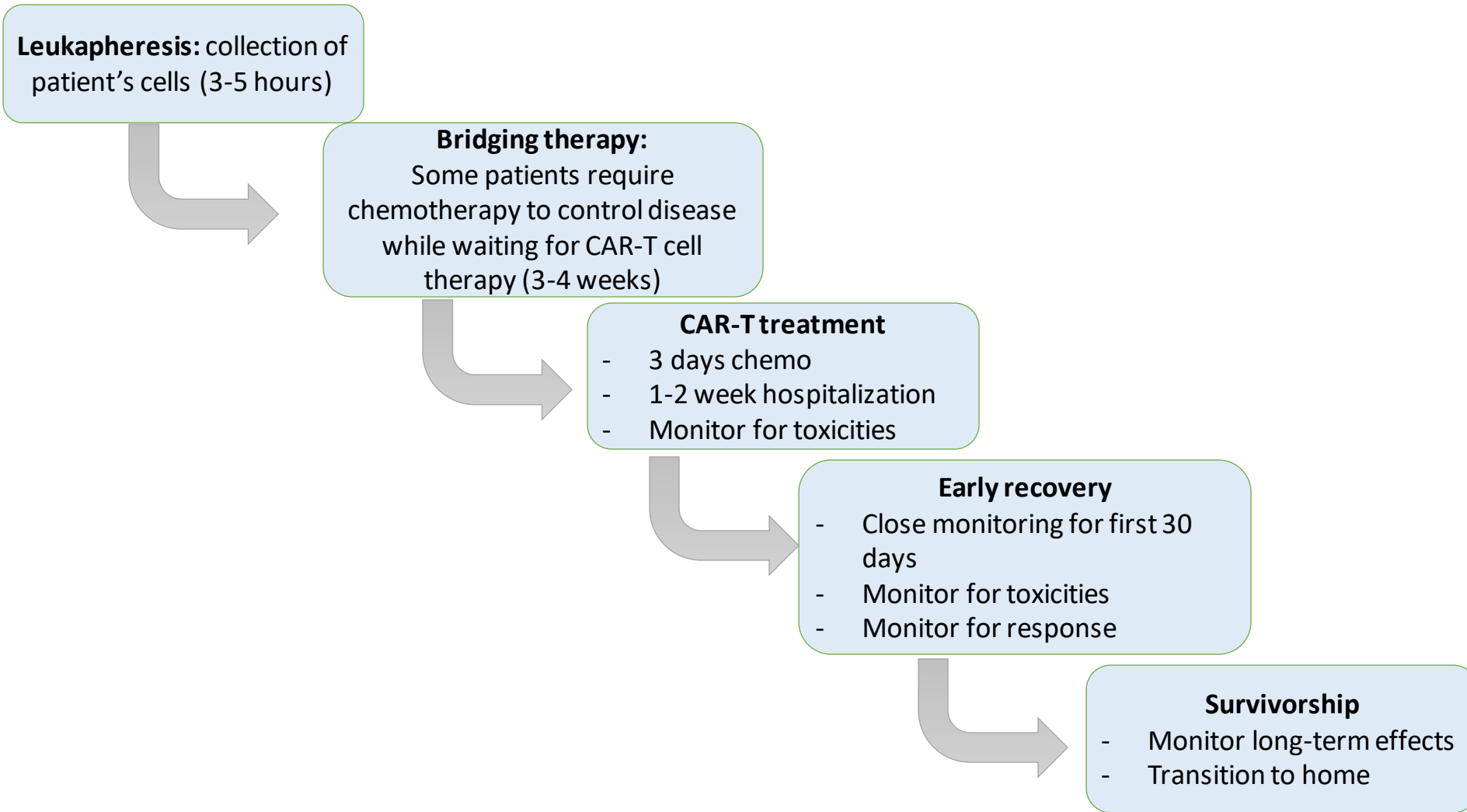


Courtesy of Marcela Maus

CAR-T Overview

- CAR-T cell therapy is currently approved to treat patients with relapsed/refractory blood cancers such as lymphoma and multiple myeloma
- Aggressive lymphomas: often eligible after 1 or 2 prior treatments
- Indolent lymphomas, leukemias and multiple myeloma: usually eligible after multiple prior treatments

Patient Journey



CAR-T Toxicities



Symptoms of Cytokine Release Syndrome (CRS)

Fever	Low oxygen
Chills	Low blood pressure
Muscle aches	Joint aches
Fatigue	Headache
Loss of appetite	Organ injury

CAR-T Toxicities



Symptoms of Neurologic Toxicity

Confusion	Somnolence
Trouble with speech or language	Agitation
Trouble with writing	Seizure
Tremors	Brain swelling

Other CAR-T Toxicities

- Low blood counts
- Low immunoglobulin (proteins that help body defend against infections) levels
- Infections
- Second cancers (rare)

Lange et al. Cancer Med, 2019; Lange et al. Ann Oncol, 2019; Basinski et al. BBMT, 2010;
Hoogland et al. Brain Behav Immun, 2019

Symptoms During CAR-T

Disease Symptoms	Moderate to Severe
Pain	42.9%
Difficulty swallowing	14.3%
Cough	9.5%
Shortness of breath	9.5%
Neuropathy	4.8%
Abdominal bloating	4.8%
Itching	4.8%
Light-headedness	4.8%

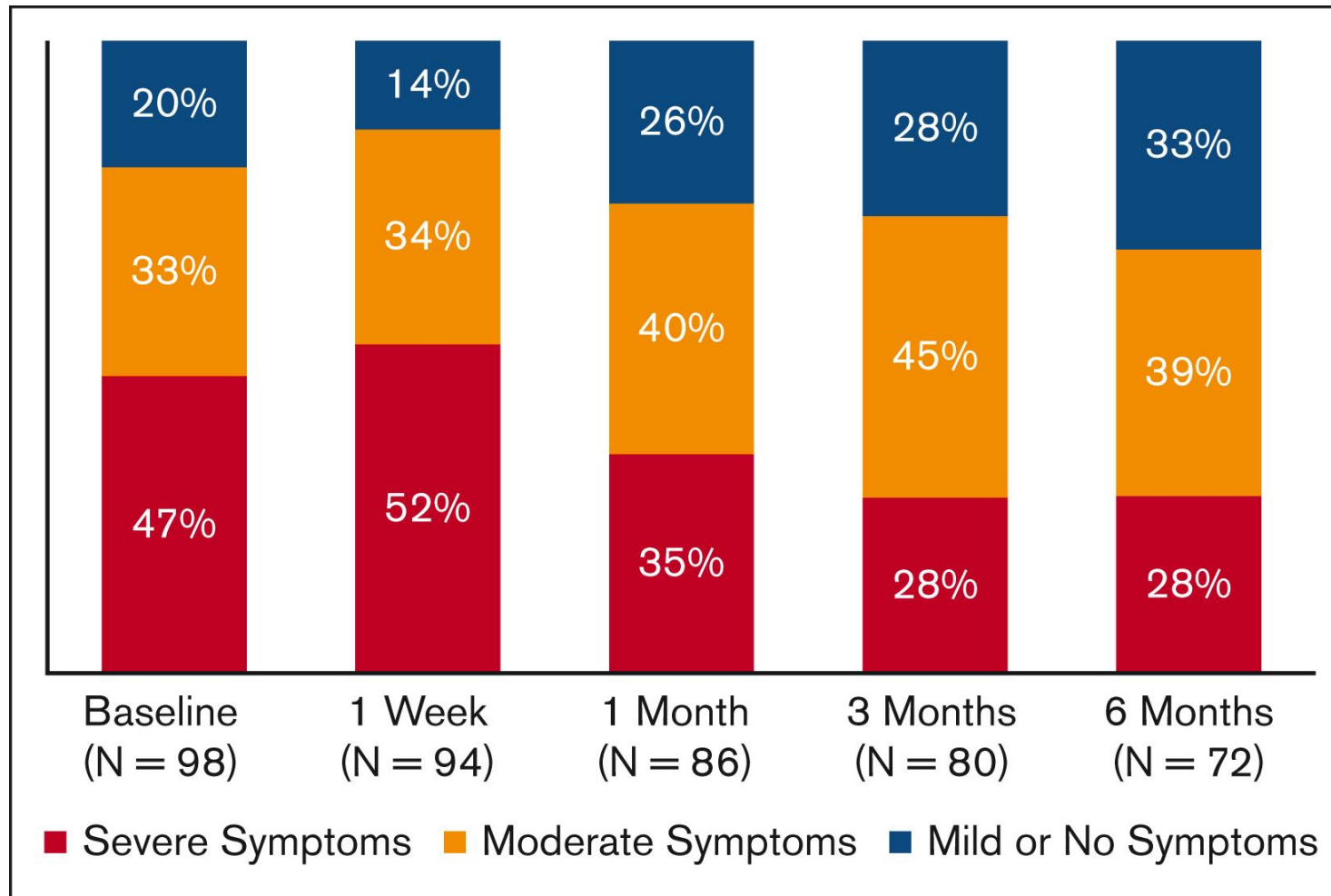
Whisenant, et al. Seminars in Oncology Nursing 2021

Symptoms During CAR-T

CAR-T Symptoms	Moderate to Severe
Fatigue	61.9%
Lack of appetite	28.6%
Headache	28.6%
Chills	28.6%
Feeling confused	23.8%
Memory loss	14.3%
Pain	9.5%
Vomiting	9.5%
Light-headedness	9.5%
Diarrhea	9.5%

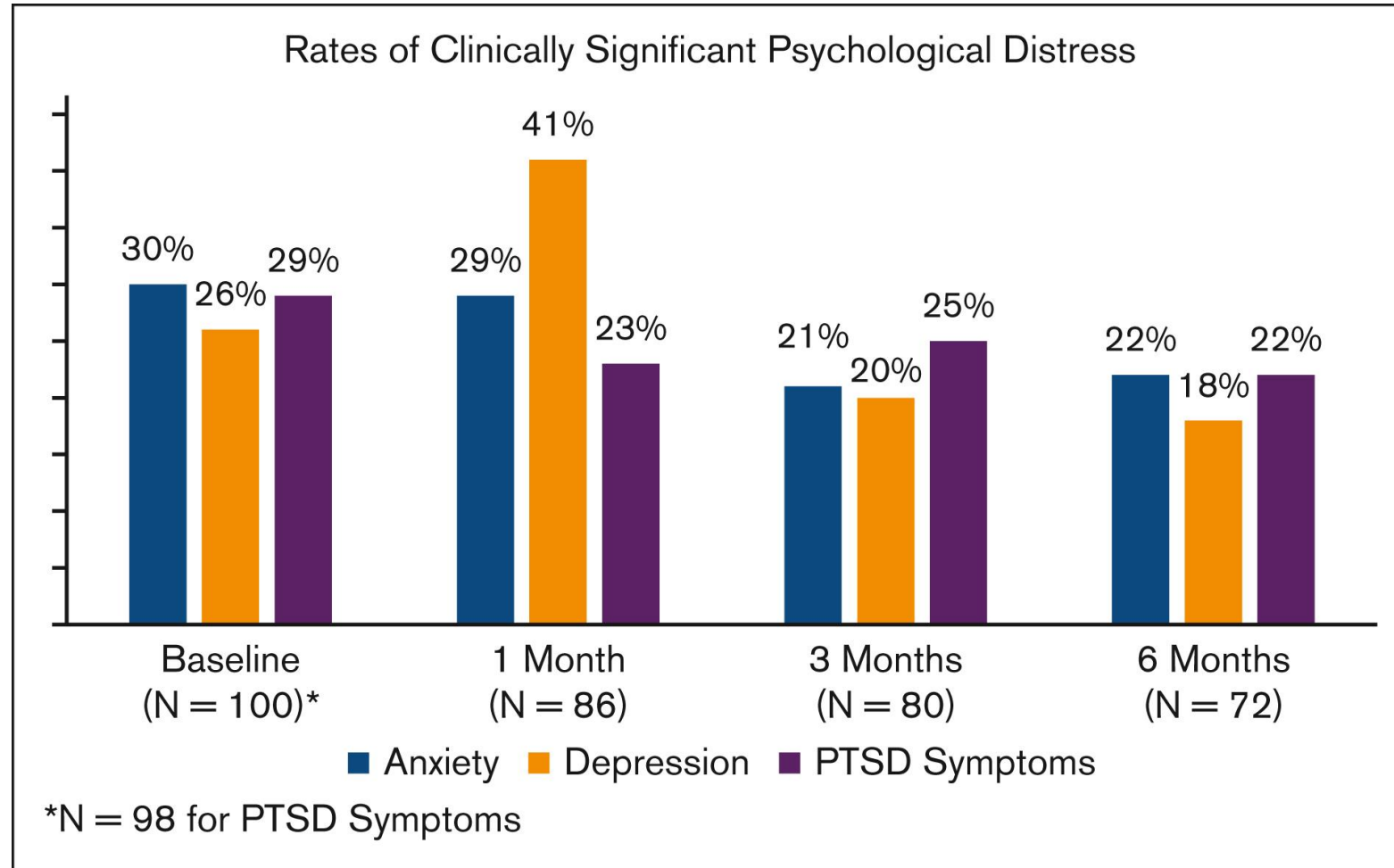
Whisenant, et al. Seminars in Oncology Nursing 2021

Physical Symptoms During and After CAR-T



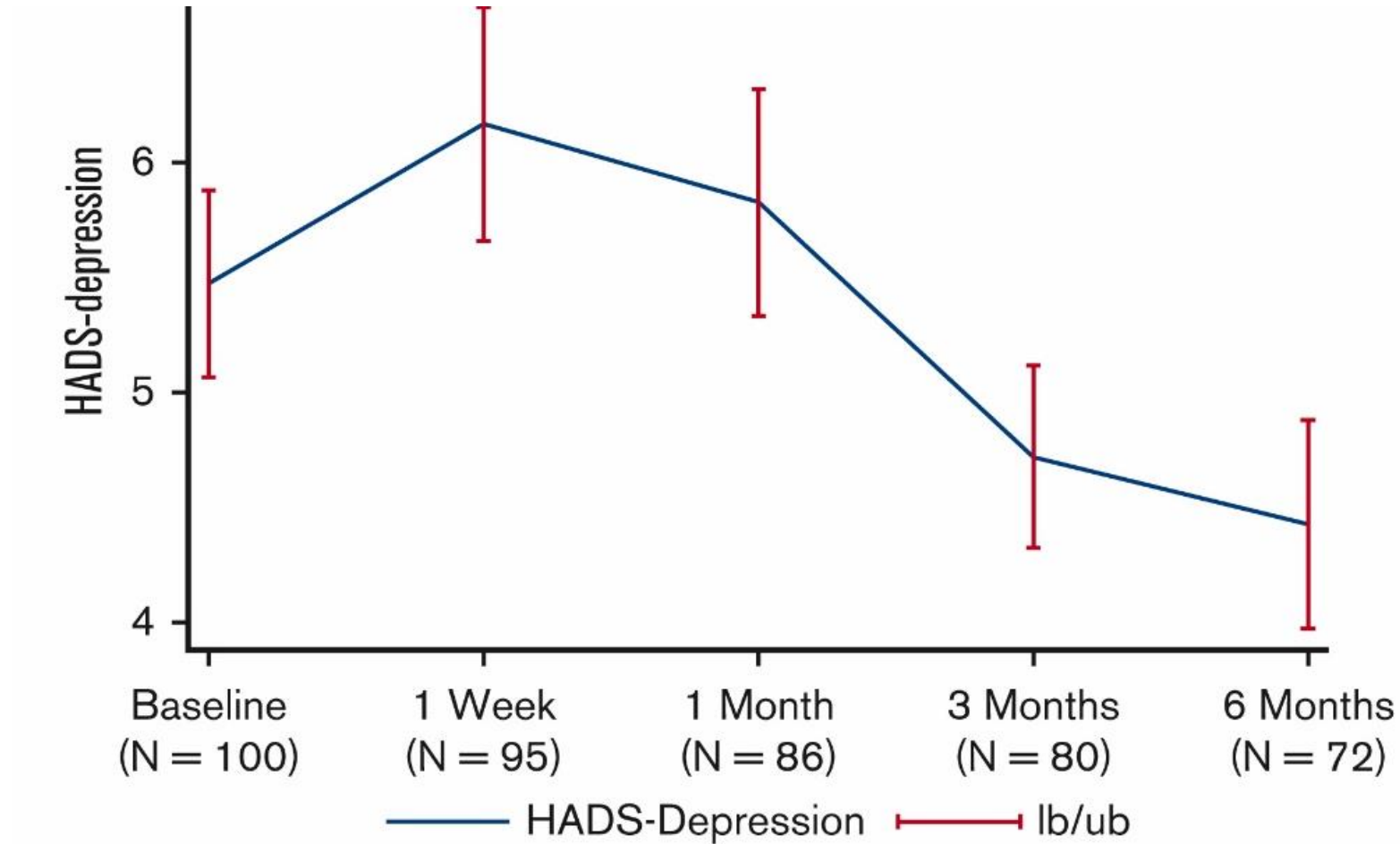
Johnson, et al. Blood Adv. 2023.

Psychological Symptoms Over Time



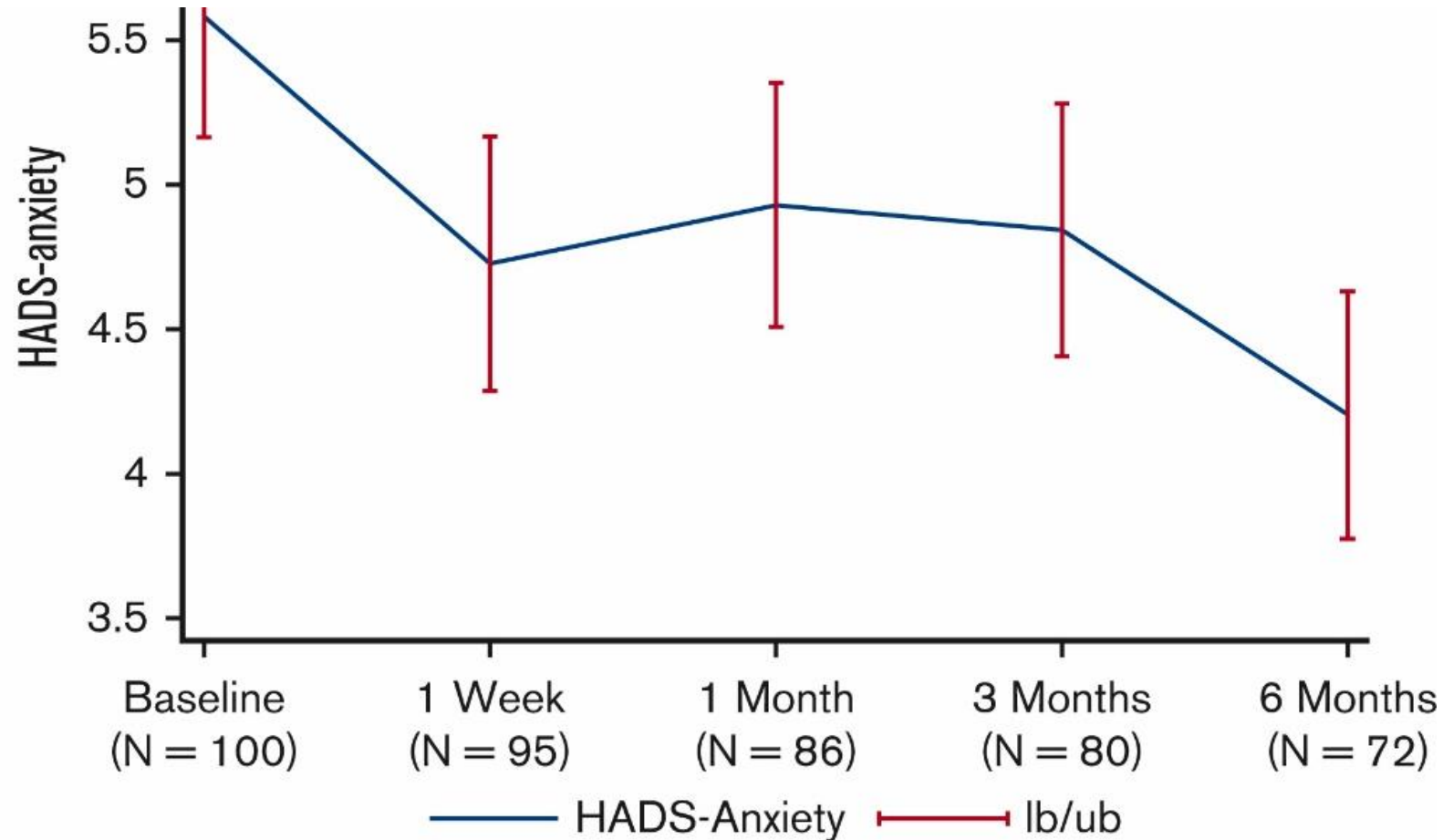
Johnson, et al. Blood Adv. 2023.

Depression Symptoms Over Time



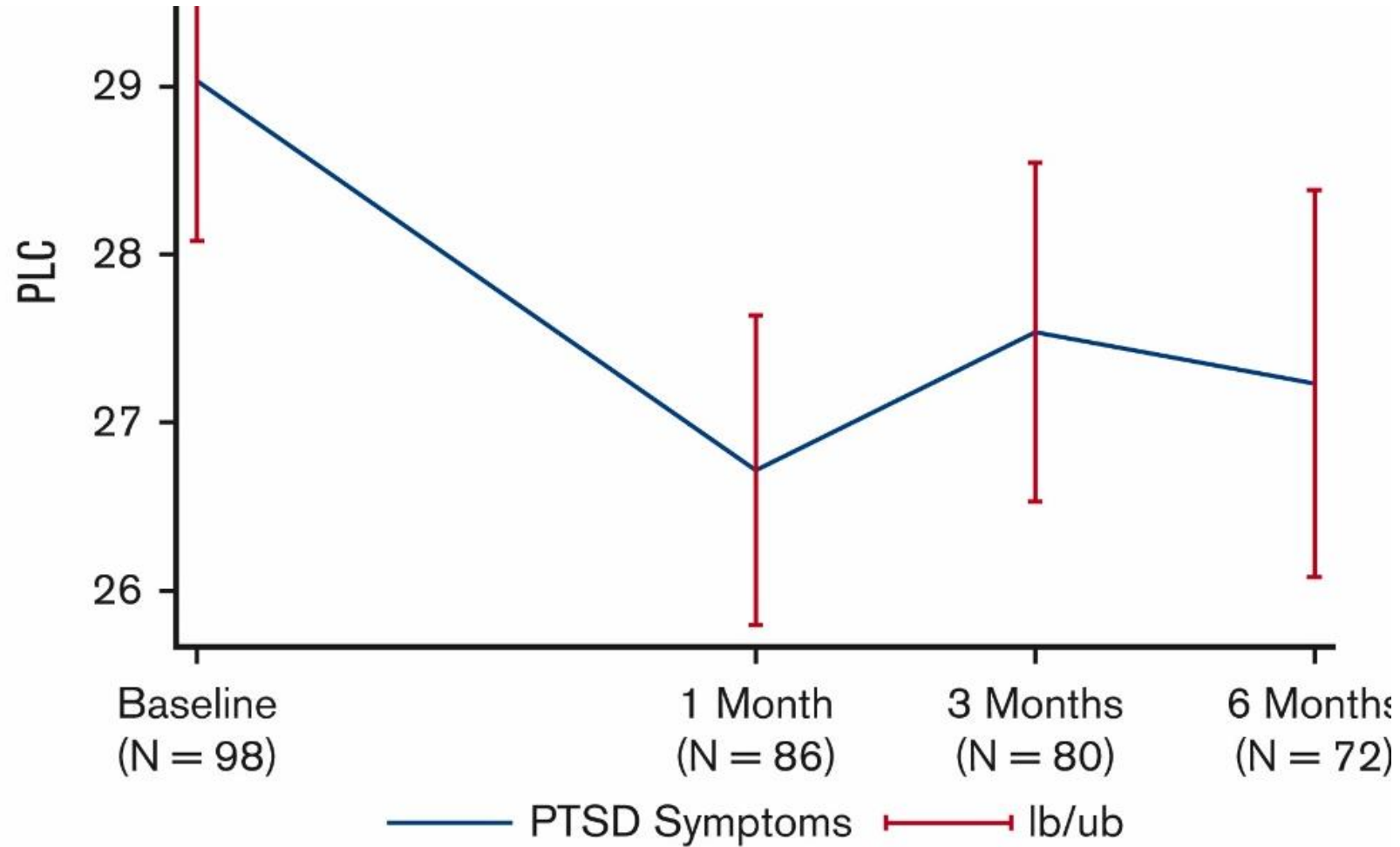
Johnson, et al. Blood Adv. 2023.

Anxiety Symptoms Over Time



Johnson, et al. Blood Adv. 2023.

PTSD Symptoms Over Time



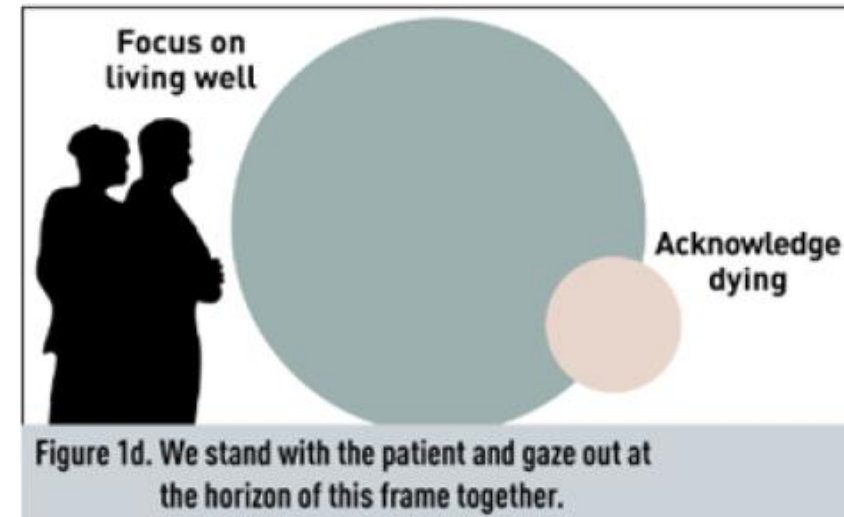
Johnson, et al. Blood Adv. 2023.

Prognostic Uncertainty: What Does the Future Hold?



- Increase in prognostic uncertainty in oncology with novel therapies, especially CAR-T cell therapy
- How to focus on living well and acknowledge risks?

You can't do anything. You can't plan anything, so you never know how long you are going to live. You might live another 20 years. It might be cured, but still the level of uncertainty is painful



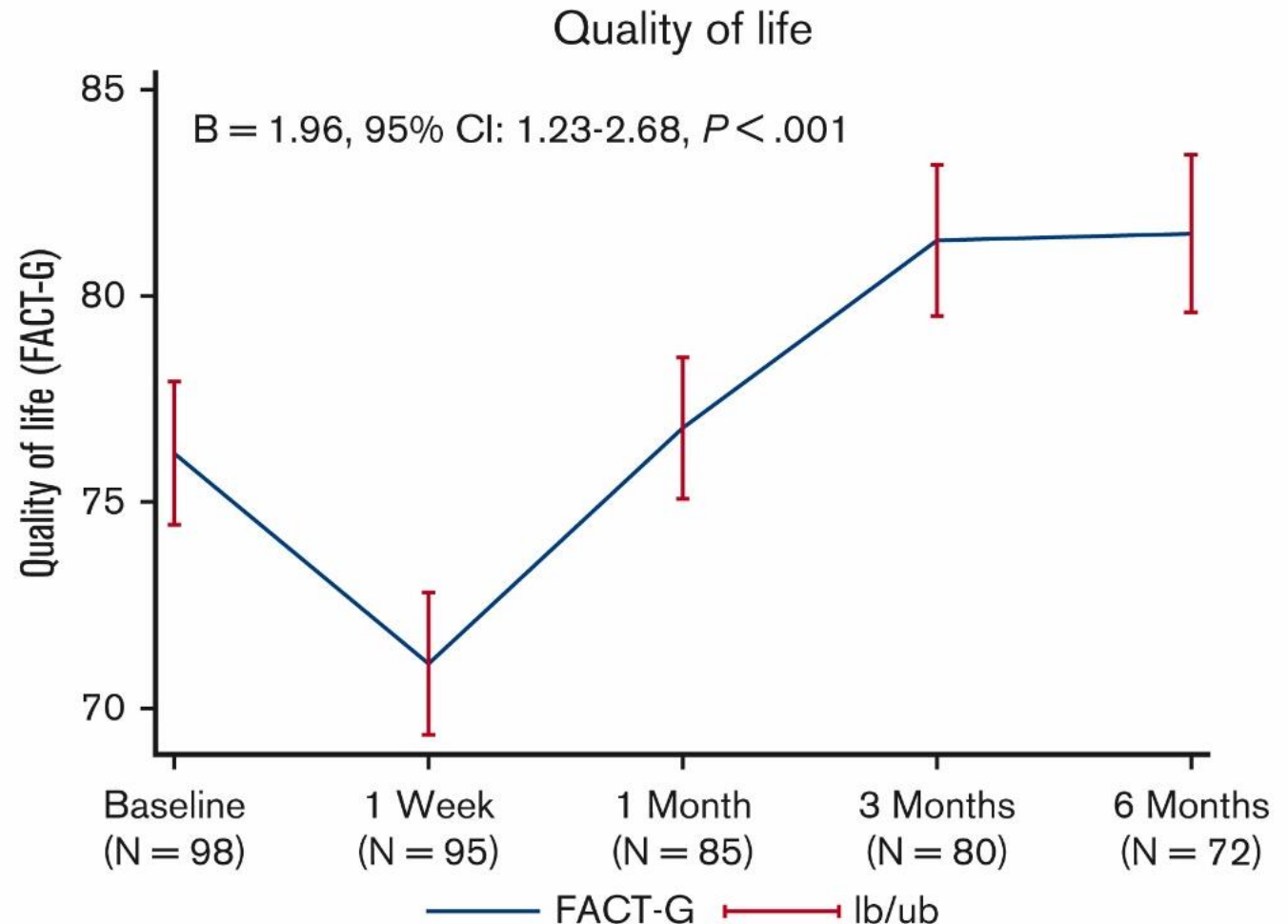
Jacobsen, J Palliat Med 2018; Lai-Kwon, J Cancer Survivorship 2021

Early Recovery after CAR-T

- Patients typically followed closely at CAR-T center until day 30-60
- Close monitoring for CRS and neurotoxicity during the first 30 days
- Often living away from home during first 30 days after CAR-T
- Residual physical and functional limitations early after treatment
- Fatigue common and persistent up to 6 months post-CAR-T
- Risk of infections after treatment (viral is biggest risk)

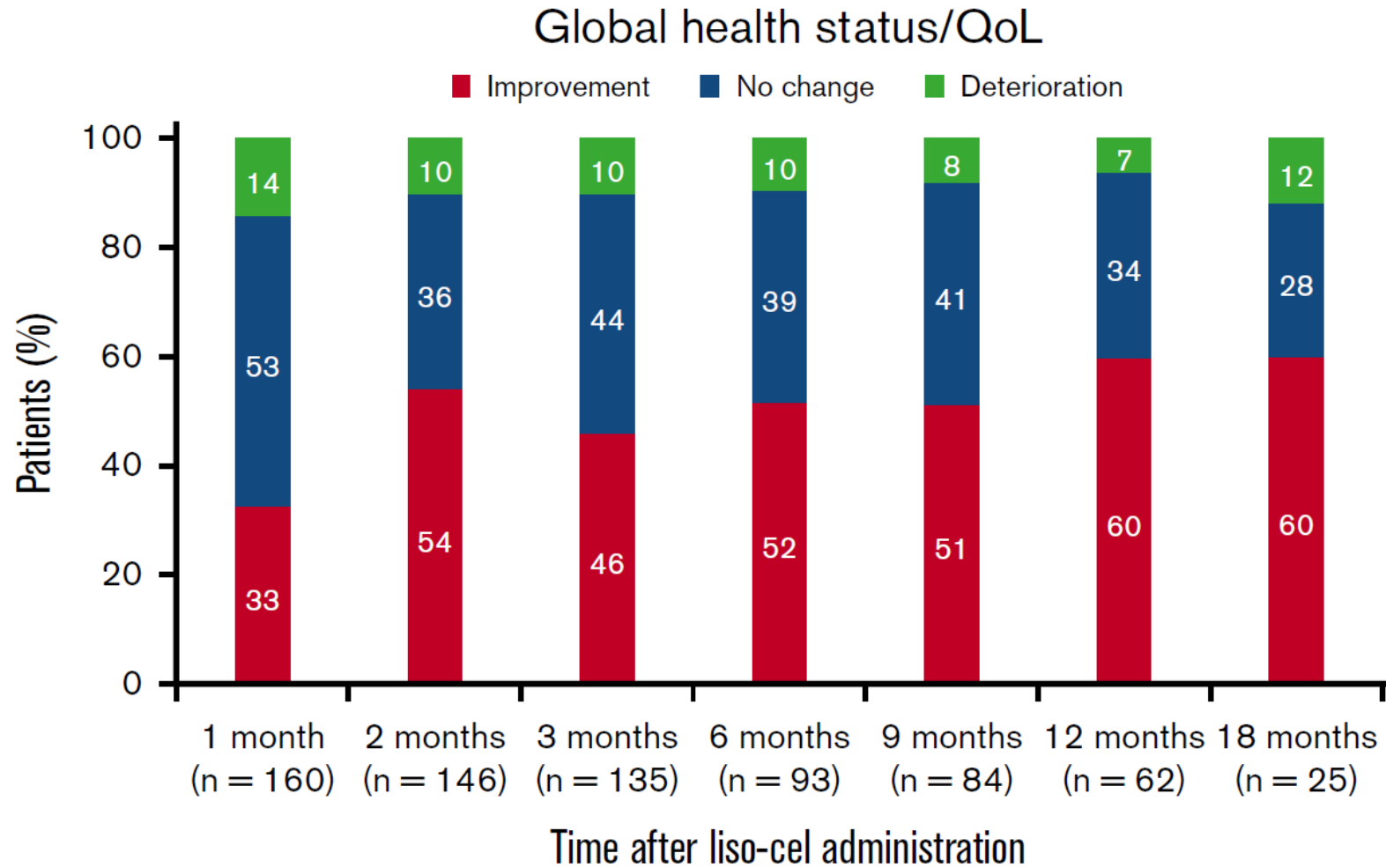
Quality of Life (QOL) During and After CAR-T

- QOL measured over time (higher is better)
- On average improving by 3-6 months after CAR-T and similar to US population average
- No group of patients were associated with negative QOL trajectory



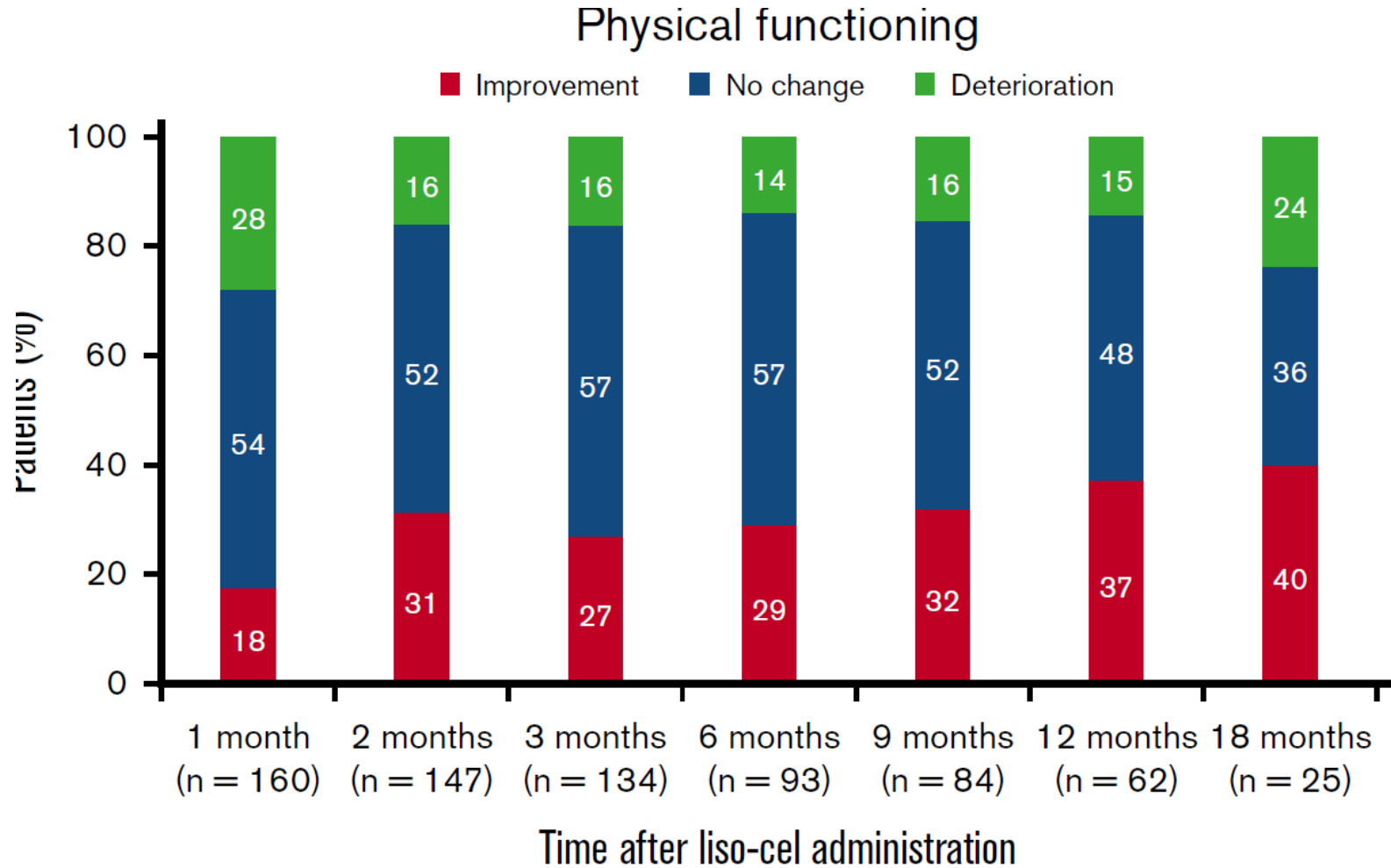
Johnson, et al. Blood Advances 2023.

Early Recovery after Liso-cel (Breyanzi) CAR-T for Lymphoma



Patrick DL, et al. Blood Advances 2021

Early Recovery after Liso-cel (Breyanzi) CAR-T for Lymphoma



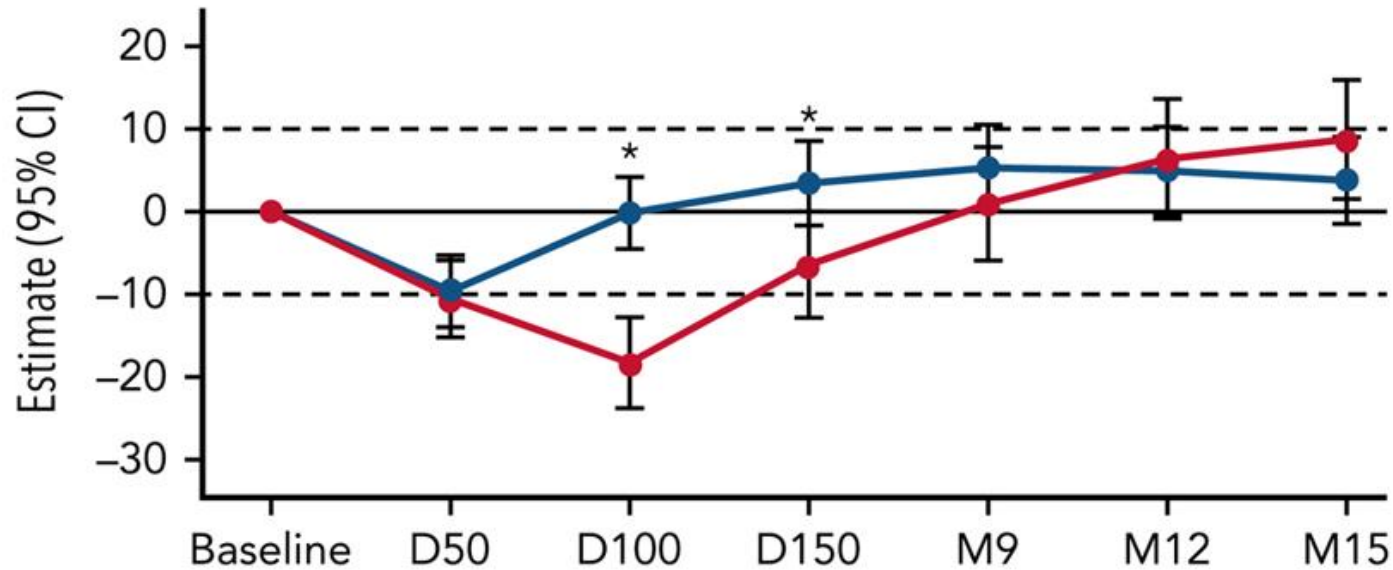
Patrick DL, et al. Blood Advances 2021

Quality of Life with CAR-T Compared to Chemotherapy in Lymphoma

CAR-T in Blue versus Chemo in Red



EORTC QLQ-C30 global health status/QoL



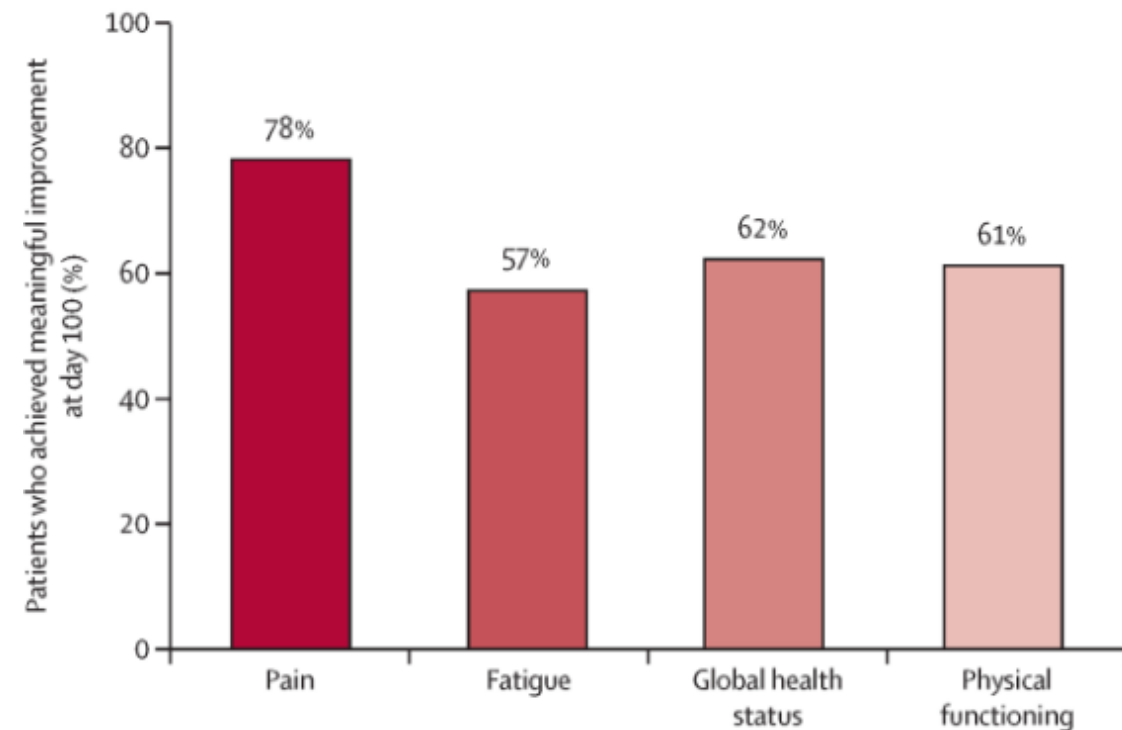
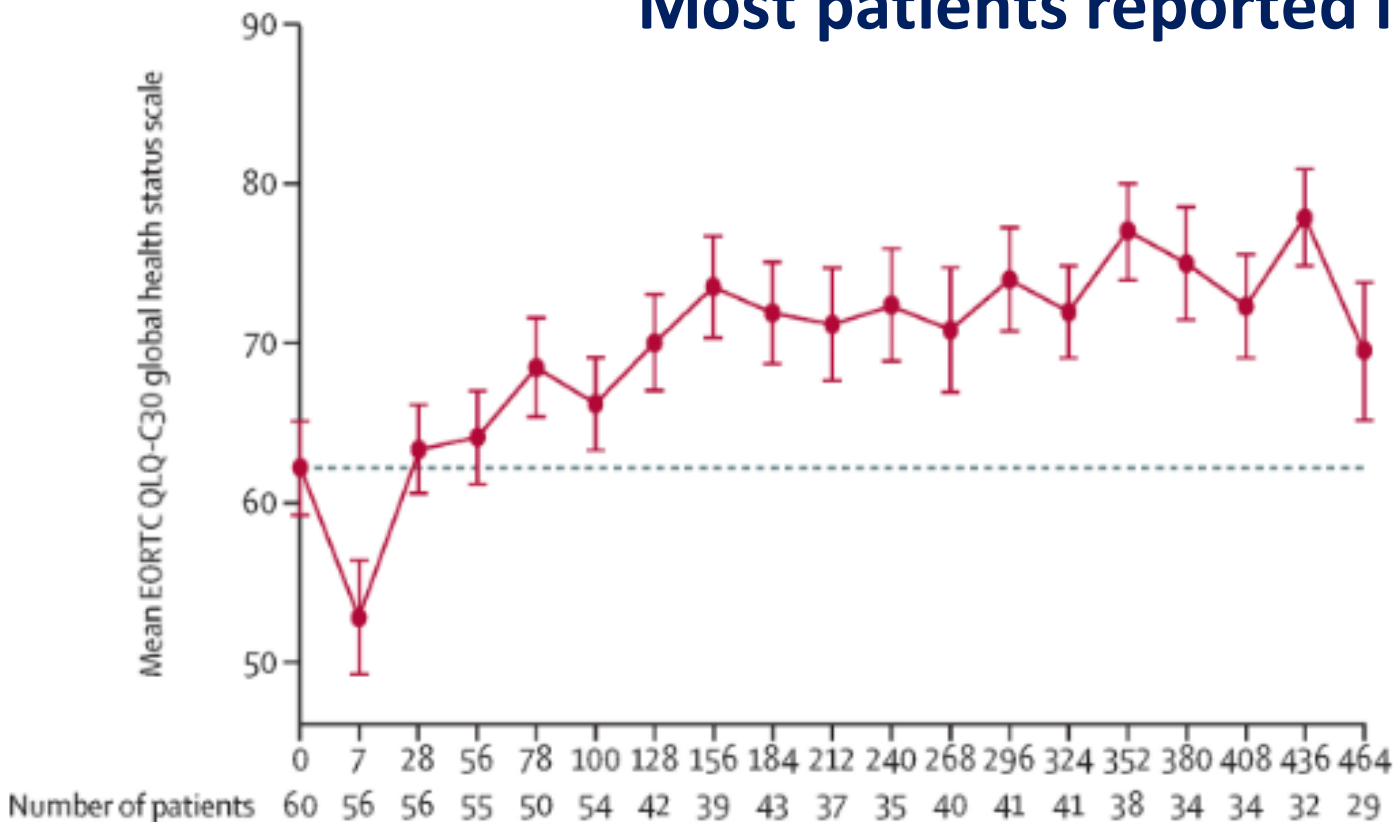
Axi-cel	165	163	146	110	88	79	67
SOC	130	125	62	56	40	33	26

Isawy et al. Blood 2022. Abramson, et al. Blood 2022.

Early Recovery after Cilta-cel (Carvykti) CAR-T for Myeloma

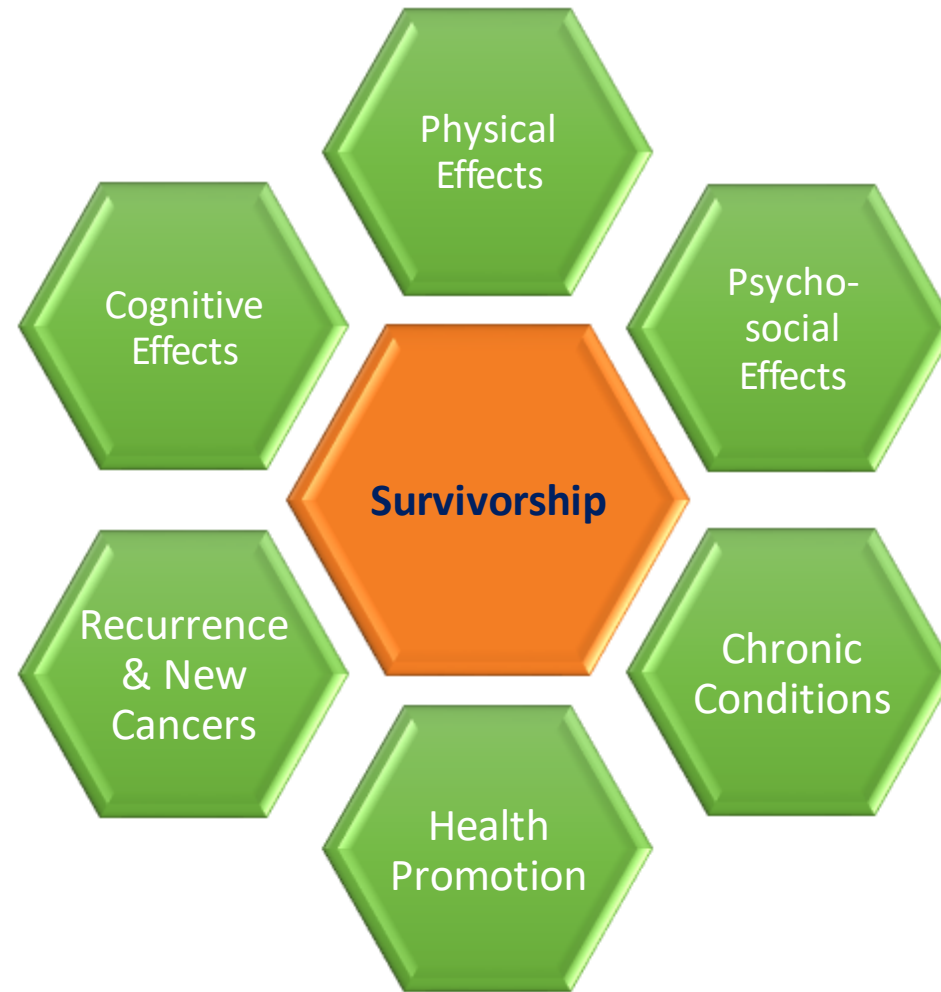


Most patients reported improvement at day 100

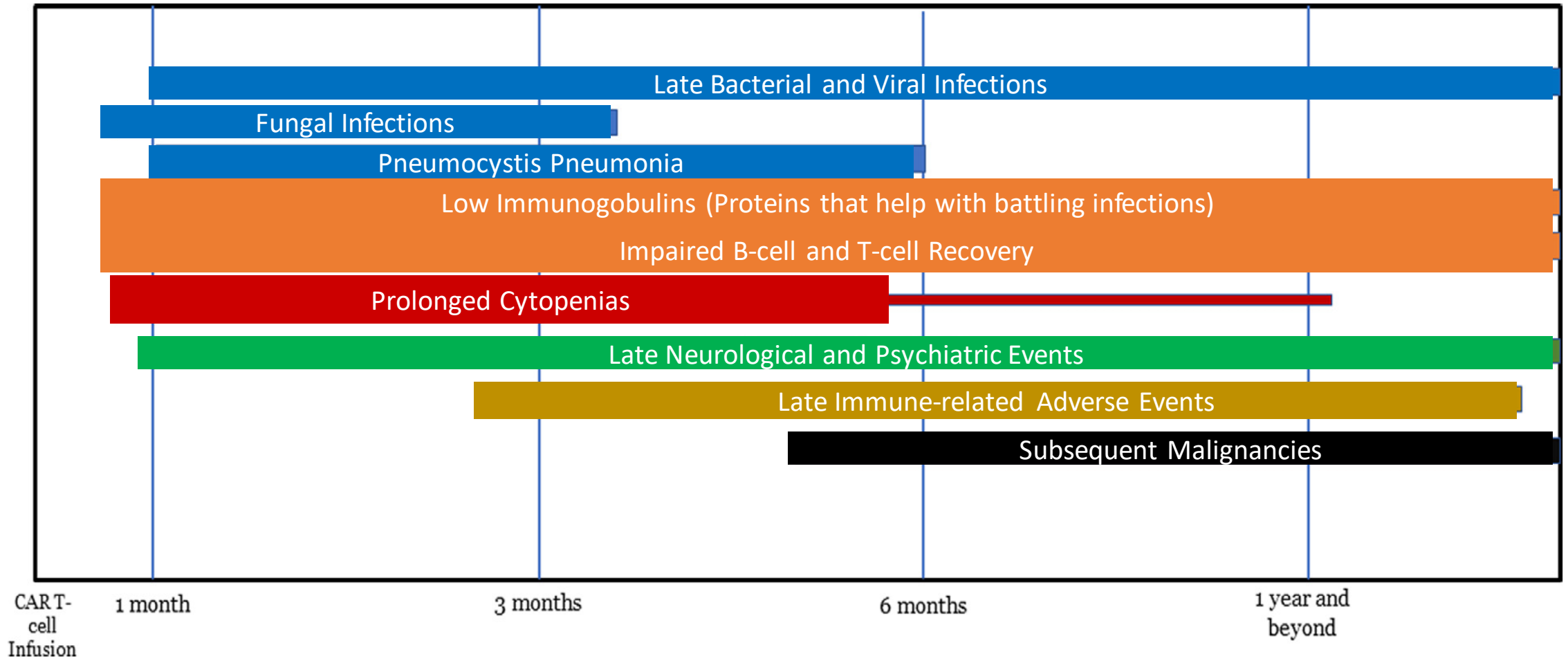


Martin, et al. Lancet Haematology 2022

Survivorship after CAR-T

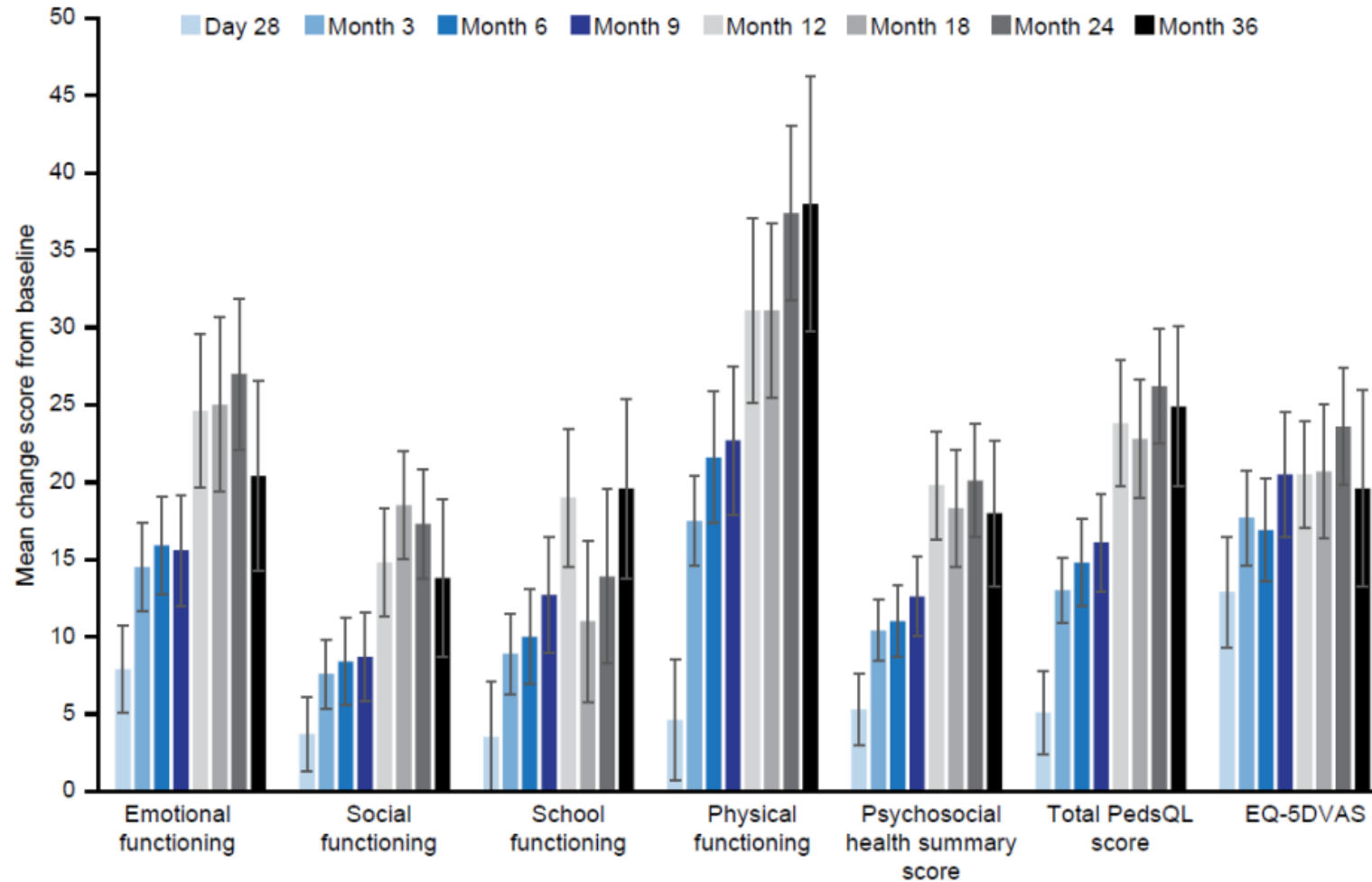


Survivorship Concerns



Chakraborty et al. BBMT, 2020

Long Term Quality of Life After CAR-T for Leukemia in Pediatrics and Young Adults



Laetsch, et al. Journal of Clinical Oncology 2023

Survivorship Concerns

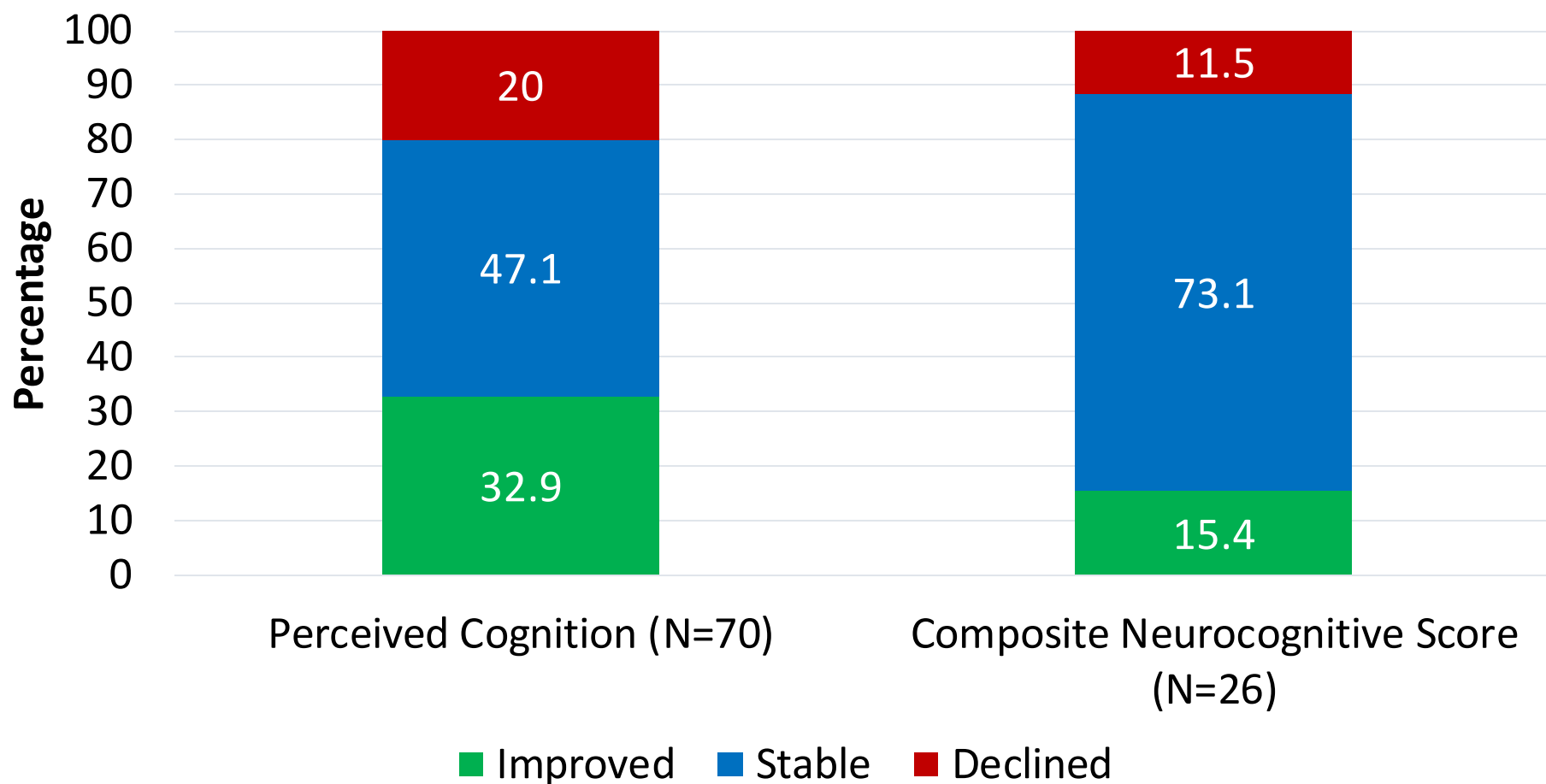
- Compared to general population, CAR-T survivors at 1-5 years post-CAR-T were *not* different in mean:
 - Quality of life scores
 - Physical health
 - Mental health
- 37.5% reported cognitive difficulties

Ruark et al. Transplant Cell Ther, 2019

Neurocognitive Outcomes 6 Months After CAR-T



- No difference in average scores 6 months after CAR-T compared to baseline
- No response to CAR-T was associated with worse neurocognitive outcomes

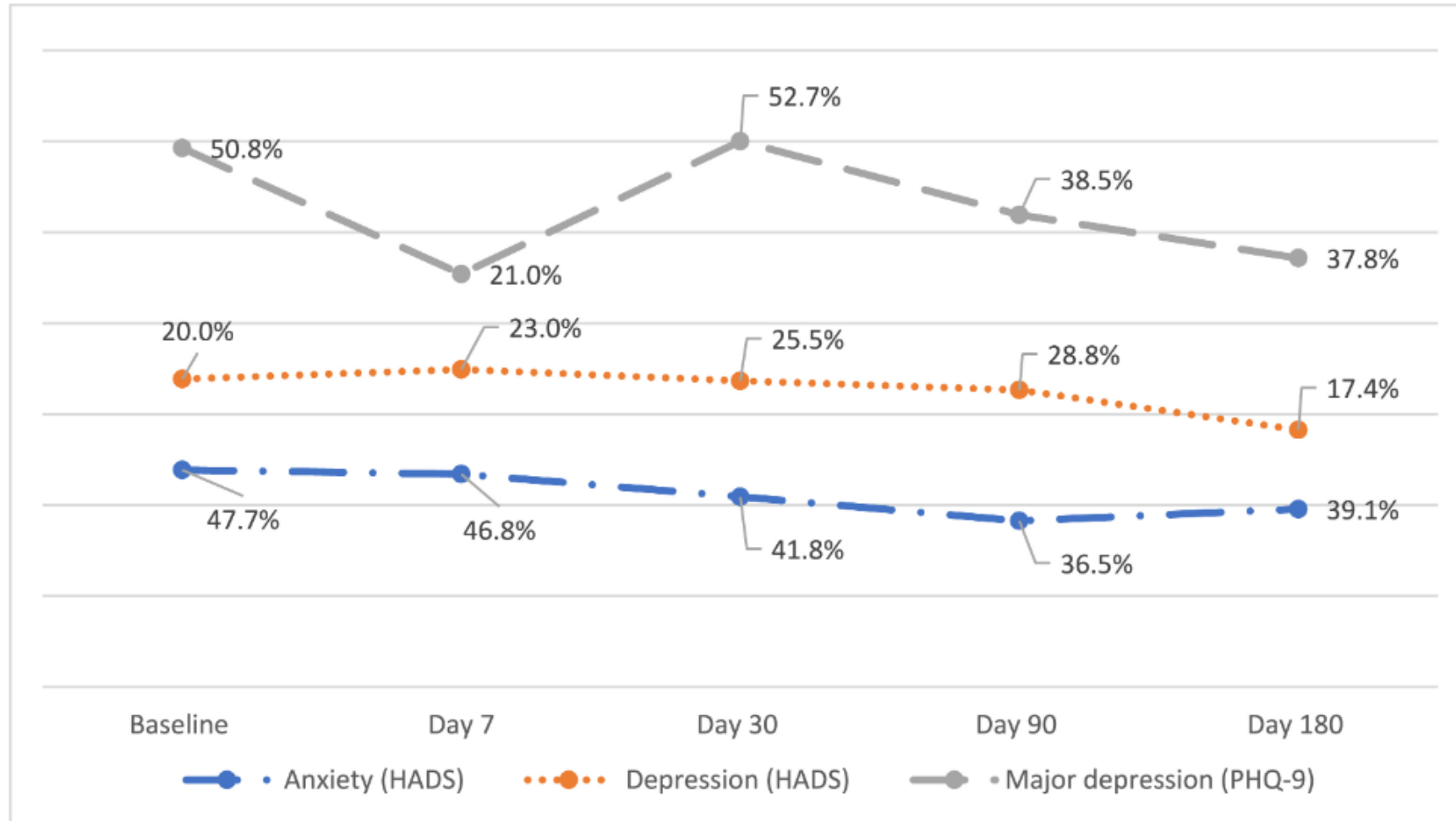


Barata et al. [Unpublished]

Effect on Caregivers

- Caregivers provide majority of care for CAR-T recipients
- Caregivers monitor for toxicities early in the recovery period
- Caregivers have a stressful job
- Chronic caregiving especially in the context of CAR-T
- Immense caregiving burden
- Impact on relationships
- Impact on caregiver health
- Financial burden is immense

Effect on Caregivers



Barata et al. Transplant Cell Ther. 2024.

Conclusions



- Generally, quality of life and symptom burden improve over time after CAR-T across blood cancers
- Quality of life decreases by two weeks after CAR-T but, on average, improves by 3-6 months after CAR-T
- CAR-T survivors have quality of life similar to the general population
- Physical and psychological symptoms improve, though can persist for a subset of patients
- Cognitive outcomes long-term appear good, based on research to date
- Caregivers of patients receiving CAR-T experience significant psychological symptoms



Questions?



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