

# Sarcopenia and Body Composition as Predictors of CAR-T Cell Therapy Outcomes in Hematologic Malignancies: A Systematic Review and Pooled Analysis

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## BACKGROUND

Sarcopenia and cancer-related cachexia are prevalent in hematologic malignancies; however, their impact on chimeric antigen receptor T-cell (CAR-T) therapy outcomes remains incompletely characterized. Given heterogeneity in study design and sarcopenia assessment methods, we conducted a systematic review and pooled analysis to evaluate the association between sarcopenia, body composition, and CAR-T cell therapy outcomes in hematologic malignancies.

## METHODS

PubMed, Embase, Cochrane, Google Scholar, and ClinicalTrials.gov were searched through May 2026 using sarcopenia, body composition, cachexia, nutritional status, CAR-T, and hematologic malignancy terms. Studies reporting body composition or nutritional measures and CAR-T outcomes were included. Of 1,795 records identified, 8 met inclusion criteria after screening.

## CONCLUSIONS

Sarcopenia and nutritional depletion are prevalent among CAR-T recipients and consistently predict inferior efficacy outcomes and prolonged hospitalization. Standardized pre-CAR-T body composition assessment may improve risk stratification prior to CAR-T therapy and identify patients who could benefit from nutritional or physical rehabilitation intervention.

## RESULTS

•8 studies, 1,459 patients — DLBCL, MM, and other hematologic malignancies; 4 CT-based (SMI), 4 nutritional markers (PNI, albumin, weight loss).

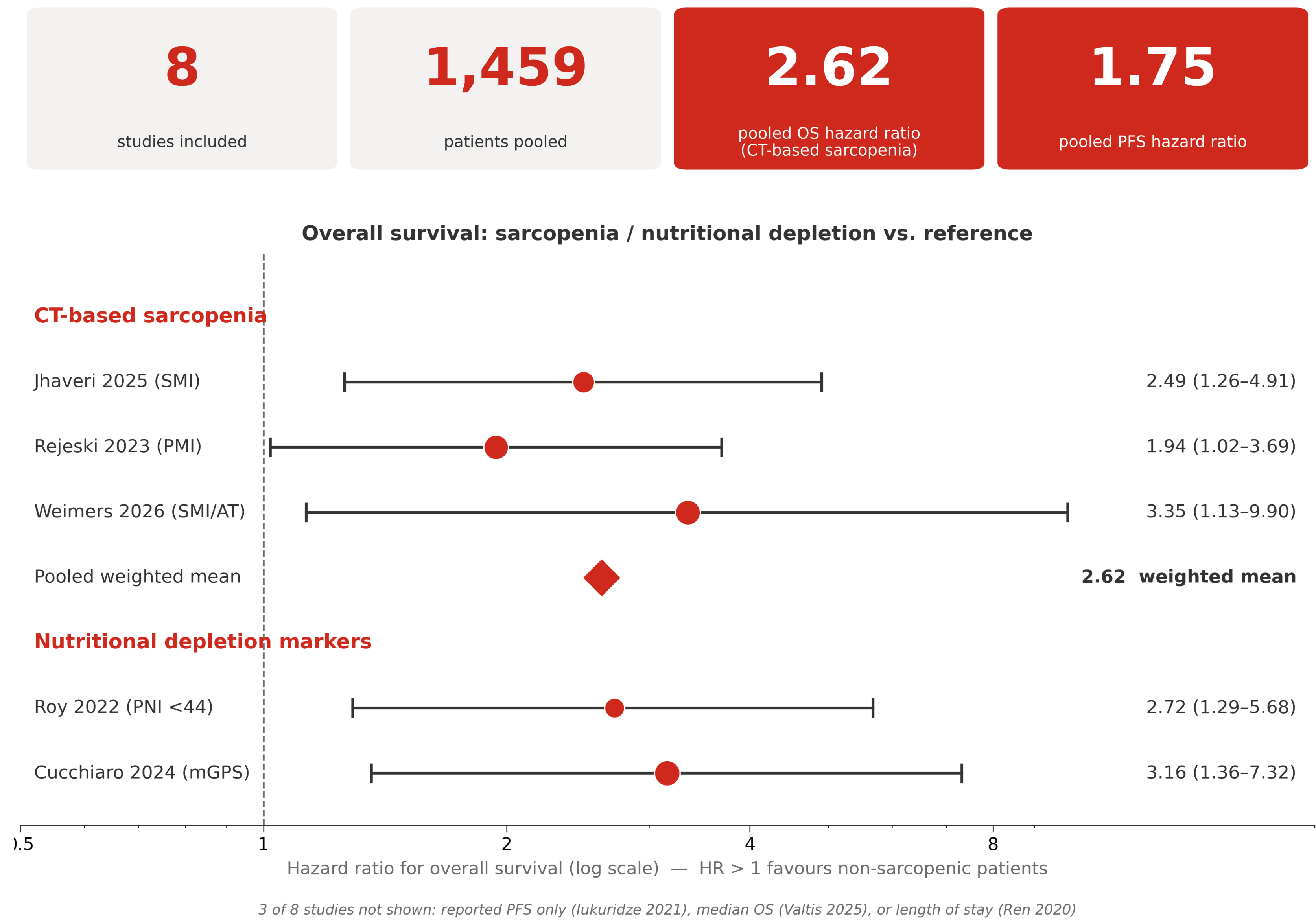
•Sarcopenia prevalence 28–39% in CT-based cohorts.

•CT-based sarcopenia → inferior OS in 3 of 4 studies (weighted mean HR 2.62) and PFS (HR 1.75). (*see forest plot*)

•Nutritional depletion → inferior outcomes: low PNI OS HR 2.72; pre-CAR-T weight loss → lower complete remission (OR 0.39).

•CRS/ICANS associations inconsistent across studies.

•Sarcopenia/malnutrition linked to prolonged hospitalization (3 studies)



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## REFERENCES

- Jhaveri K, Thapa R, Ercan D, Saha A, Noble J, Singh P, et al. Sarcopenia and skeletal muscle loss after CAR T-cell therapy in diffuse large B-cell lymphoma. Clin Cancer Res. 2025;31(13):2756.
- Iukuridze A, Berano Teh J, Ramos J, Vera TC, Lee K, Bhandari R, et al. Sarcopenia is a clinically relevant and independent predictor of health outcomes after chimeric antigen receptor T-cell therapy for lymphoma. Blood. 2021;138(Suppl 1):2502. doi:10.1182/blood-2021-149784.
- Rejeski K, Cordas dos Santos DM, Parker NH, Bücklein VL, Winkelmann M, Jhaveri KS, et al. Influence of adipose tissue distribution, sarcopenia, and nutritional status on clinical outcomes after CD19 CAR T-cell therapy. Cancer Immunol Res. 2023;11(6):707–19. doi:10.1158/2326-6066.CIR-22-0487.
- Wiemers TC, Rade M, Grieb N, Ferle M, Dermendzhiev T, Fandrei D, et al. Body composition predicts poor outcomes and reveals immunometabolic dysfunction via single-cell profiling in anti-BCMA CAR T-treated myeloma. HemaSphere. 2026;10(3):e70314. doi:10.1002/hem3.70314.
- Roy I, Smilnak G, Burkart M, Hamilton E, Thorp K, Miyata S, et al. Cachexia is a risk factor for negative clinical and functional outcomes in patients receiving chimeric antigen receptor T-cell therapy for B-cell non-Hodgkin lymphoma. Br J Haematol. 2022;197(1):71–5. doi:10.1111/bjh.18054.
- Cucchiaro B, Davies NA, Weekes CE, O'Reilly M, Roddie C, Slee A. Malnutrition and cachexia are associated with poor CAR T-cell therapy outcomes including survival. Clin Nutr ESPEN. 2024;62:206–15. doi:10.1016/j.clnesp.2024.05.020.
- Valtis YK, Devlin S, Shouval R, Rejeski K, Corona M, Luna De Abia A, et al. Cancer cachexia and weight loss before CAR T-cell therapy for lymphoma are independently associated with poor outcomes. Blood Adv. 2025;9(1):151–61 (Epub 2024 Dec 31). doi:10.1182/bloodadvances.2024014555.
- Ren T, Kerr A, Oyesanmi O, Muddasir S. Impact of malnutrition on the length of stay for hospitalized chimeric antigen receptor T-cell (CAR-T) therapy patients in the United States (2020). Cureus. 2024;16(10):e72400. doi:10.7759/cureus.72400.