



Prognostic value of IMPeTUs criteria in multiple myeloma: a systematic review and meta-analysis

Biruk Demisse Ayalew, MD¹, Moosa Mubarika², Shree Rath³, Hania Haque⁴, Rahul Falodia⁵, Abdul Ghaffar Majeed⁶, Zineddine Belabaci⁷, Umm-e-Aimen⁸, Shiwani Keswani⁹, Muhammad Areeb Ul Haq¹⁰, Fatima Imran¹⁰, Muhammad Saif Ullah¹⁰, Kalab Yigermal Gete^{11,12}, Prof. Dr. Giorgio Treglia¹³

1 Department of Internal Medicine, St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia. **2** Nishtar Medical University, Multan, Pakistan. **3** All India Institute of Medical Sciences Bhubaneswar, Bhubaneswar, India. **4** Jinnah Sindh Medical University, Karachi, Pakistan. **5** All India Institute of Medical Sciences, Jodhpur, Jodhpur, India. **6** Quaid-e-Azam Medical College, Bahawalpur, Pakistan. **7** Faculty of Medicine, Djillali Liabes University, Sidi Bel Abbes, Algeria. **8** Punjab Medical College, Faisalabad, Pakistan. **9** Mayo Clinic, Scottsdale, Arizona, USA. **10** Allama Iqbal Medical College, Lahore, Pakistan. **11** School of Medicine, College of Medicine and Health Sciences, Bahir Dar University, Bahir Dar, Ethiopia. **12** EPIC Health Systems, Addis Ababa, Ethiopia. **13** Division of Nuclear Medicine, Ente Ospedaliero Cantonale (EOC), Bellinzona and Lugano, Switzerland; Faculty of Biomedical Sciences, University of Lugano, Lugano, Switzerland.

INTRODUCTION

Multiple myeloma (MM) staging misses spatial disease burden. The Italian Myeloma criteria for PET Use (IMPeTUs) standardize ¹⁸F-FDG PET/CT reading, but their prognostic evidence is fragmented. We pooled it across newly diagnosed (NDMM) and relapsed/refractory (RRMM) disease.

METHODS

- PRISMA 2020; PubMed, Embase, Scopus, Cochrane
- Adults with MM; PET read with IMPeTUs
- Overall (OS) and progression-free (PFS) survival
- Random-effects pooling: **frequentist** and **Bayesian**
- Risk of bias assessed with QUIPS

RESULTS

Pooled hazard ratio (HR) **2.38** (95% confidence interval [CI] 1.33–4.24; p = 0.003), highest in RRMM (**3.48**) and for OS (**3.31**).

CONCLUSION

IMPeTUs-based PET/CT abnormalities independently predict poorer survival in MM, most strongly in relapsed/refractory disease. Heterogeneity was high ($I^2 = 80.3\%$), so prospective validation is needed.

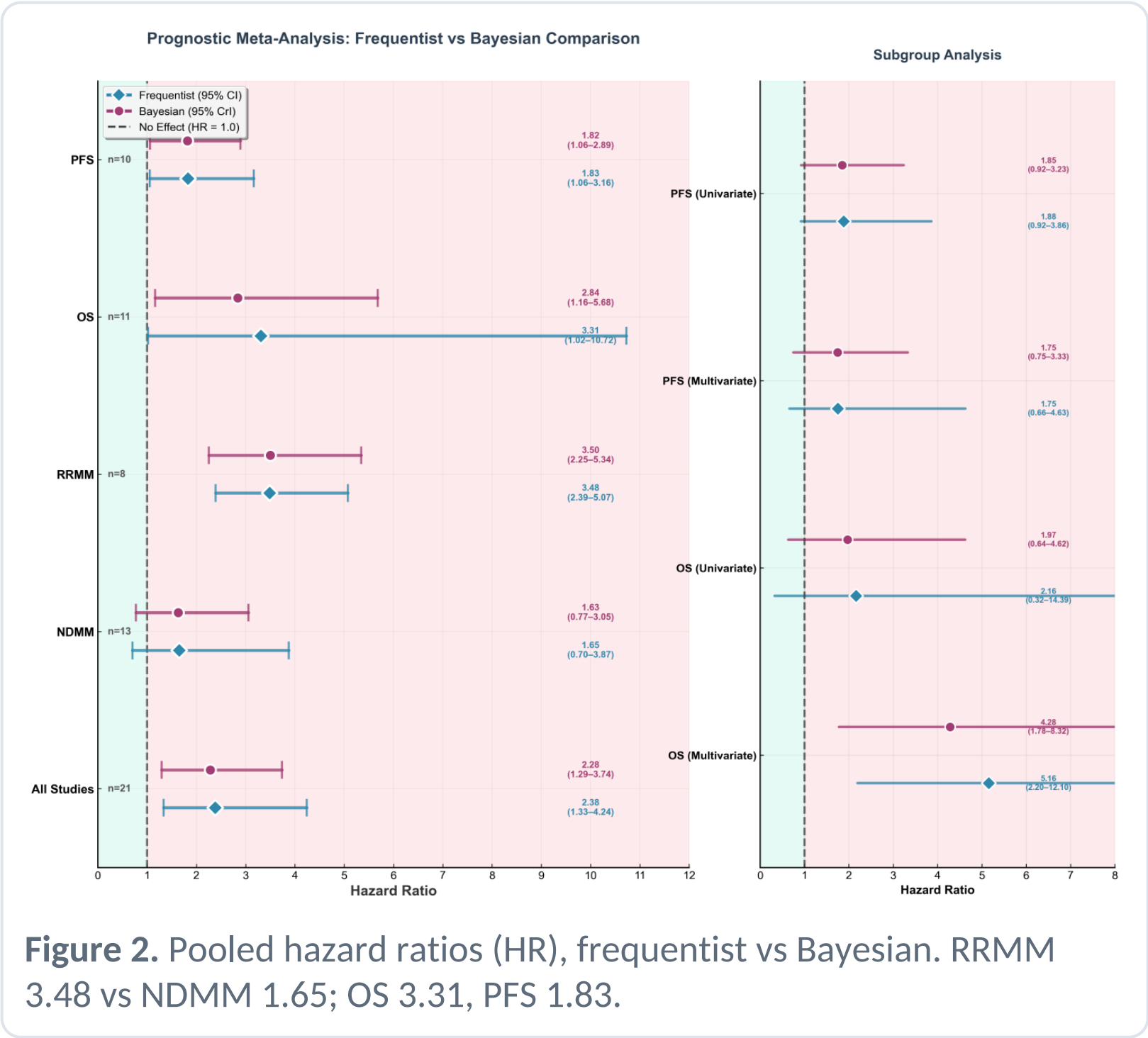


Figure 2. Pooled hazard ratios (HR), frequentist vs Bayesian. RRMM 3.48 vs NDMM 1.65; OS 3.31, PFS 1.83.

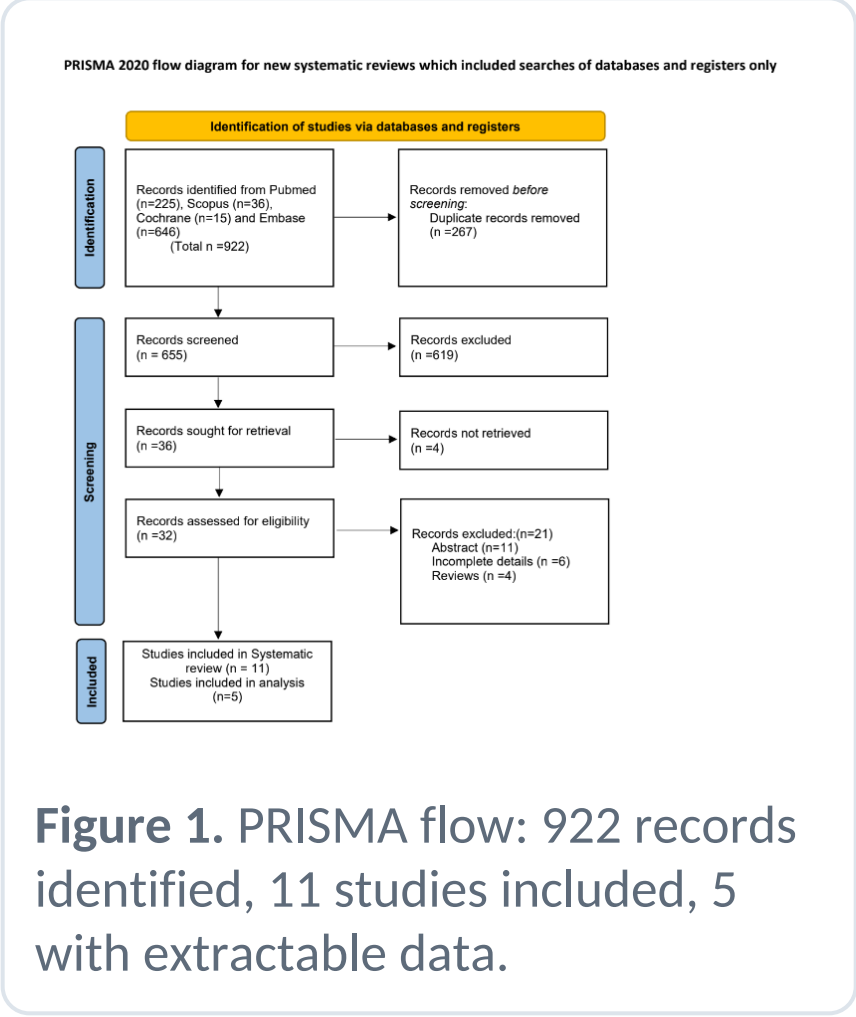


Figure 1. PRISMA flow: 922 records identified, 11 studies included, 5 with extractable data.

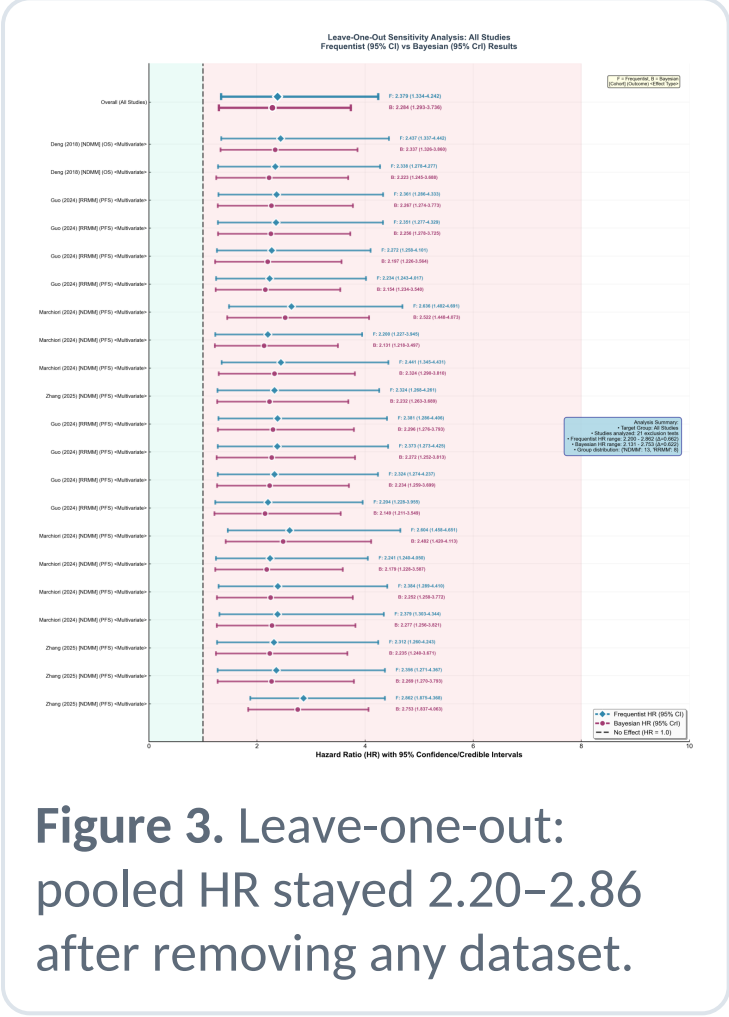


Figure 3. Leave-one-out: pooled HR stayed 2.20-2.86 after removing any dataset.