# Profiling Adverse Events in Multiple Myeloma: Insights from Clinical Trials via Large Language Models

Hunki Paek, Kyeryoung Lee, Surabhi Datta, Liang-Chin Huang, Josh Higashi, Nneka Ofoegbu,,
Long He, Bin Lin, Jingqi Wang, Xiaoyan Wang
Intelligent Medical Objects, IL, USA

CO14

## Introduction

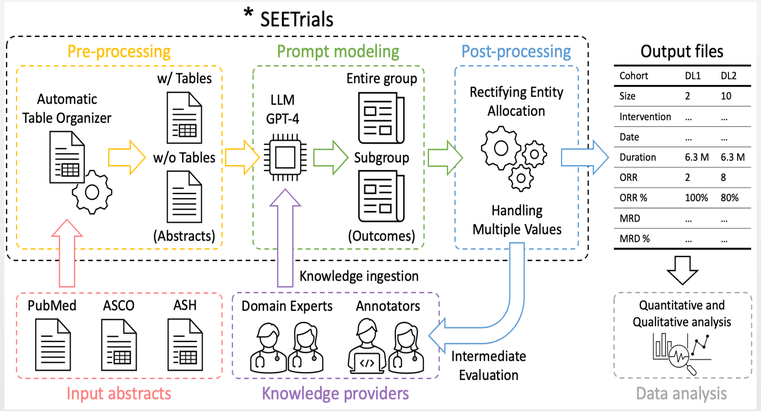
**Background:**

- Multiple Myeloma (MM) treatments are rapidly evolving, necessitating up-to-date analysis of adverse events.
- Extracting data manually from large sets is challenging.
- A comprehensive analysis of adverse events in MM treatment is crucial for advancing patient care..

**Objective:**

- Leveraging LLMs to automate data extraction, facilitating large-scale quantitative analysis of trial outcomes.

## Methodology




***SEETrials**: **S**afety & **E**fficacy **E**xtraction in Oncology Clinical **Trials**

### Characteristics overview of abstracts included

| | Total | phase 1 | phase 1/2 | phase 2 | phase 3 | Not mentioned |
|---|---|---|---|---|---|---|
| **CAR-T** | 130 | 40 | 16 | 26 | 5 | 43 |
| **BsAbs** | 63 | 19 | 18 | 10 | 6 | 10 |
| **ADC** | 38 | 10 | 9 | 10 | 2 | 7 |
| **CELMoD&Others** | 14 | 6 | 4 | 0 | 3 | 1 |
| **Total** | 245 | 75 | 47 | 46 | 16 | 61 |

CAR-T, chimeric antigen receptor T cell; BsAbs, Bispecific antibody; ADC, antibody drug conjugate; Cereblon E3 ligase modulator therapy, CELMoD.

## Results

### Performance Metrics of the SEETrials System

| | | STRICT | | | RELAXED | | |
|---|---|---|---|---|---|---|---|
| Phase | No. of Abstracts | Precision | Recall | F1-score | Precision | Recall | F1-score |
| 1 | 36 | 0.939 | 0.929 | 0.934 | 0.978 | 0.984 | 0.981 |
| 1/2 | 23 | 0.982 | 0.970 | 0.976 | 0.989 | 0.995 | 0.992 |
| 2 | 17 | 0.976 | 0.963 | 0.969 | 0.985 | 0.995 | 0.990 |
| 3 | 7 | 0.948 | 0.936 | 0.942 | 0.988 | 0.987 | 0.988 |
| N/A | 17 | 0.947 | 0.923 | 0.935 | 0.965 | 0.980 | 0.972 |
| **Total** | **100** | **0.958** | **0.944** | **0.951** | **0.981** | **0.988** | **0.985** |

## Results

### Comparative Landscape of Safety Entities Across CAR-T, BsAbs, and ADC therapies

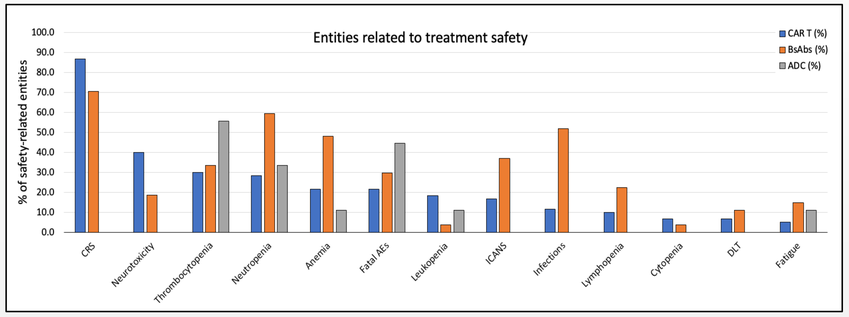



Figure 1. This visual summary illustrates the percentages of abstracts with each safety-related entities across CAR-T, BsAbs, and ADC therapies, providing a comprehensive overview of their comparative clinical profiles.

### Analysis of Adverse Events entities across Phases and Therapies

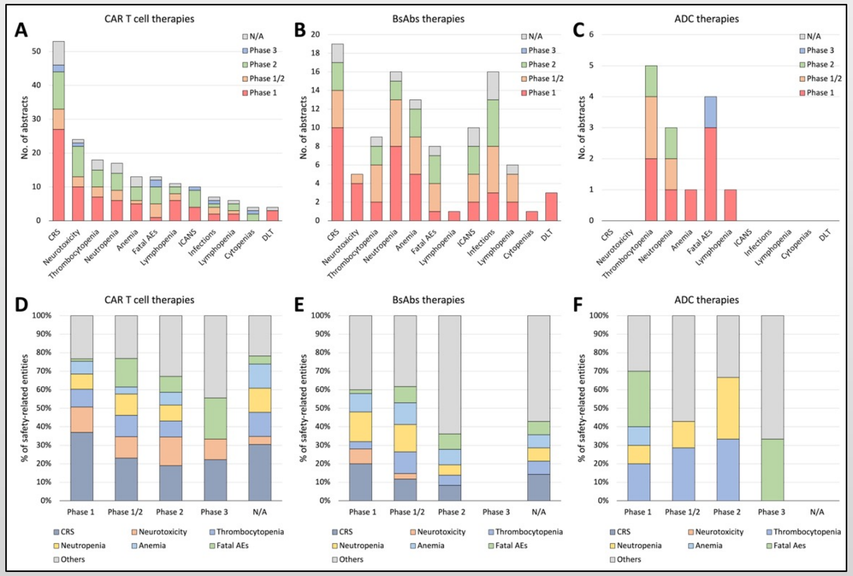



Figure 2. A detailed breakdown of abstract numbers with each safety-realty entity (A, B, C) and percentages of each entity out of all mentioned entities (D, E, F) is presented, categorizing clinical trials into phases 1, 1/2, 2, and 3. A and B: CAR-T cell therapies. C and D: BsAbs therapies. E and F: ADC therapies.

## Results

### Combined Meta-analysis and subgroup analysis

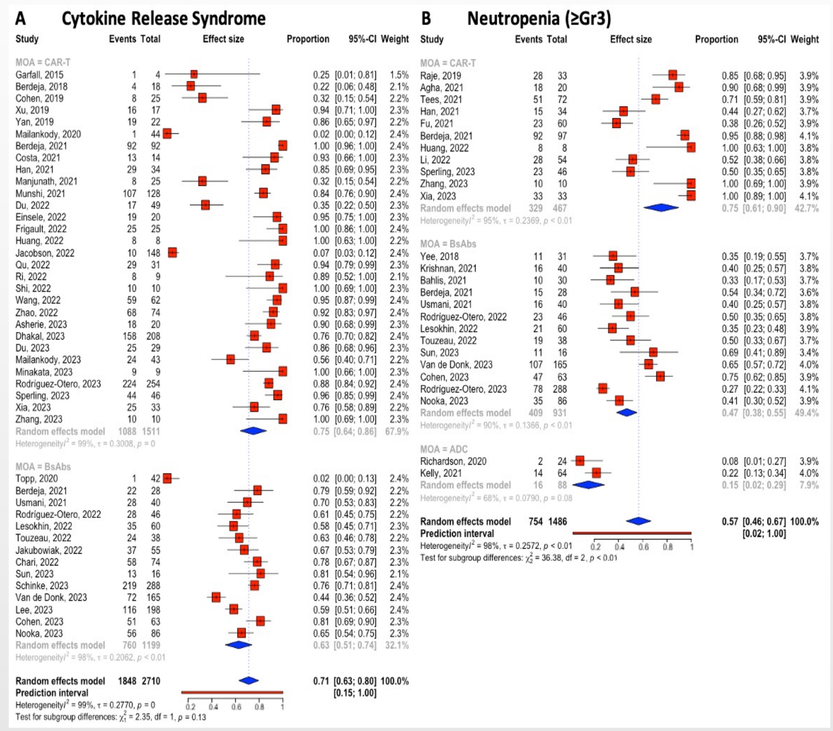



Figure 3. Combined Meta-analysis and subgroup analysis of cytokine release syndrome and neutropenia (≥Gr3) based on the mechanism of action (MOA) of treatments. A. Cytokine Release Syndrome. B. Neutropenia (≥Gr3). CAR-T, chimeric antigen receptor T cell; BsAbs, Bispecific antibody; ADC, antibody drug conjugate.

## Conclusion

**Our SEETrials**

- Achieved high accuracy and generalizability to diverse drug modalities and disease domains.
- Enable to streamline large-scale dataset analysis on adverse events.
- Advance clinical trial research by ensuring timely and accurate data extraction of adverse events and providing crucial insights for health economics and outcomes research.