TEMPORAL TRENDS IN INCIDENCE, MORTALITY, AND MORTALITY-TO-INCIDENCE RATIOS FOR ACUTE LYMPHOBLASTIC LEUKEMIA IN THE UNITED STATES AND EUROPE: A 30-YEAR STRATIFIED ANALYSIS

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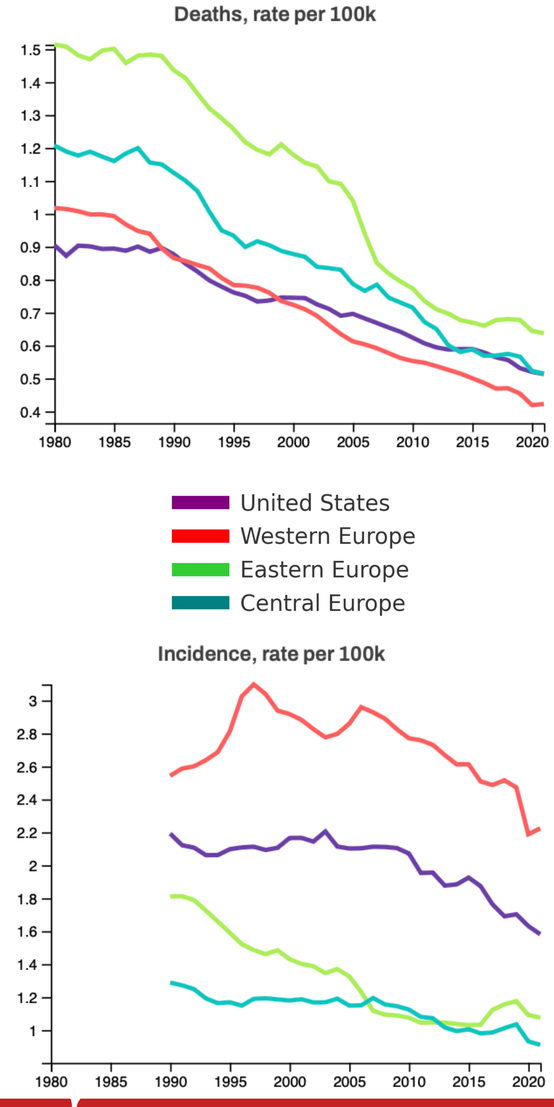
Introduction

- Acute lymphoblastic leukemia (ALL) outcomes vary by age, sex, and region.
- Despite advances, disparities remain between the United States (US) and Europe.
- This study evaluates 30-year temporal trends in incidence, mortality, and MIR, stratified by sex and age, across different European regions and the US.

Methods

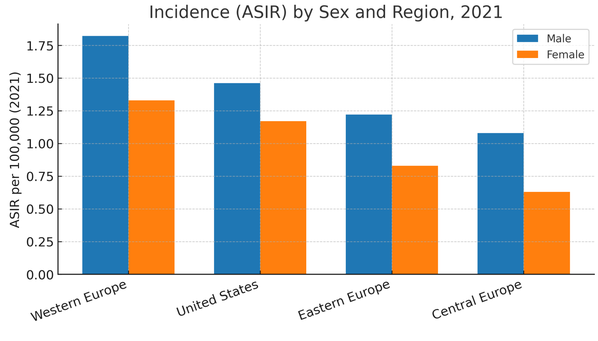
Data Source: Global Burden of Disease (GBD) 2021.
Population: US, Western Europe (WE), Central Europe (CE), Eastern Europe (EE).
Period: 1991–2021.
Metrics:
Age-standardized incidence rate (ASIR)
Age-standardized mortality rate (ASMR)
Mortality-to-incidence ratio (MIR, 2021 as survival proxy)
Analyses:
Annual percentage change (APC) in ASIR and ASMR. Stratification by sex and age group.

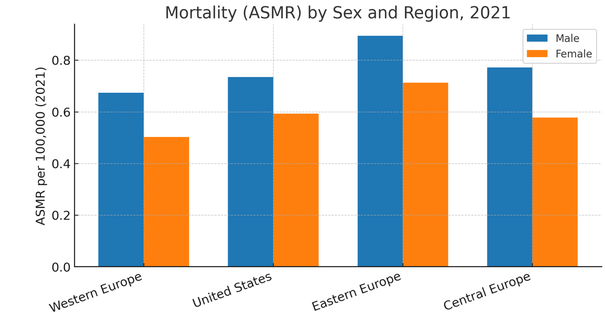
Results



Results

- Overall Trends (1991–2021):
  - ALL incidence and mortality declined across all regions.
  - Steepest decline in Eastern Europe (ASIR APC –1.34%; ASMR APC –1.43%).
- Mortality-to-Incidence Ratio (MIR, 2021):
  - Lowest: Western Europe (0.374), U.S. (0.505).
  - Highest: Central (0.793), Eastern Europe (0.789).
- Sex Disparities (2021):
  Male mortality exceeded female mortality across all regions:
  WE: 0.674 vs. 0.503 (+34.0%)
  CE: 0.772 vs. 0.578 (+33.6%)
  EE: 0.894 vs. 0.713 (+25.3%)
  U.S.: 0.735 vs. 0.593 (+24.0%)
  Male incidence also higher, greatest gap in CE (1.08 vs. 0.63, +72.6%).
  MIRs slightly lower in males than females.
- Age Distribution:
  Mortality: U-shaped → highest in <5 years and >75 years.
  Incidence: Bimodal → peak in <5 years (highest in WE), decline in young adults, rise again after age 60.
  EE and CE showed higher age-specific incidence compared to US and, at times, WE.





Summary

- ALL incidence and mortality have **declined over 30 years**, but **regional disparities persist**.
- **CE and EE** face poorer survival (high MIRs).
- **Males** consistently show greater disease burden.
- Children <5 and older adults >75 remain the most vulnerable.
- Urgent need for **region-specific, age- and sex-sensitive strategies** to improve outcomes and reduce inequities globally.