

CISNET Multiple Myeloma Model Characteristics: Key Similarities and Differences Date: 2025/04/23

Model comparison	Models		
	WUMM-DES ¹	WUMM-CM ²	YUMM ³
Type of model	Discrete event simulation	Compartmental model	Microsimulation
Population model	Yes	Yes	Yes
Natural history	State transition	State transition	State transition
MGUS	Yes	Yes	Yes
Smoldering MM	No	No	No
MM	Yes	Yes	Yes
Death	All-cause	All-cause and MM-specific	All-cause
Method of construction	Time to event	Longitudinal, Bayesian likelihood, state transition	Longitudinal, state transition
Data sources	NHANES, VHA, CDC, SEER-Medicare, SEER, published data (including clinical trials and meta-analysis)	NHANES, SEER, published data (including clinical trials and meta-analysis)	NHANES, VHA, CDC, SEER-Medicare, SEER, published data (including clinical trials and meta-analysis)
Demographics	Age, race/ethnicity, sex	Age, race/ethnicity, sex	Age, race/ethnicity, sex
Subgroup	Non-Hispanic Black females and males Non-Hispanic White females and males	Non-Hispanic Black, non-Hispanic White, females, and males	Non-Hispanic Black females and males Non-Hispanic White females and males
Risk factors	Age, race/ethnicity, sex	Age, race/ethnicity, sex	Age, race/ethnicity, sex
MGUS prevalence	Calibrated to 1999-2004 MGUS prevalence	Calibrated to 1999-2004 MGUS prevalence	Calibrated to 1999-2004 MGUS prevalence
MM incidence	Calibrated to 2010 SEER MM incidence	Calibrated to 2010 SEER MM incidence	Validated each year using 2013-2017 SEER MM incidence
Treatment	Yes	No	Yes
Diagnosis	No	No	No
Relapse and refractory	No	No	Yes
Survival			
No MGUS/MM	Calibrated to CDC life tables	Calibrated to CDC life tables	Calibrated to CDC life tables
MGUS	Hazard increase	Hazard increase	Hazard increase
MM	SEER MM survival	SEER MM survival	SEER MM survival
Parametric assumptions	Yes	No	Yes
Simulation	Microsimulation	Macrosimulation	Microsimulation
Variation	Individual-level	Aggregate level	Individual-level
Preclinical duration	Yes	Yes	No
Starting age	20 years	Birth	40 years

Model outputs	MGUS/MM incidence and prevalence, preclinical duration, life expectancy, life years lost, population difference	MGUS/MM incidence and prevalence, preclinical duration, life expectancy, life years lost, population difference	MGUS/MM incidence and prevalence, population difference
Calibration	Optimization	Bayesian	Optimization
Trend fitting	No	Yes	No
Tested platform	Windows, iOS	Windows, iOS	Windows
Programming	MATLAB	R, C++	R

¹WUMM-DES: Washington University Natural History of Multiple Myeloma Model – Discrete Event Simulation

²WUMM-CM: Washington University Natural History of Multiple Myeloma Model – Compartmental Model

³YUMM: Yale University Natural History of Multiple Myeloma Model

*Monoclonal gammopathy of undetermined significance, MGUS; multiple myeloma, MM; Surveillance, Epidemiology, and End Results, SEER; Centers for Disease Control and Prevention, CDC; National Health and Nutrition Examination Study, NHANES; Veteran Health Administration, VHA