CISNET Gastric Model Characteristics: Key Differences and Similarities **Date: 2025/03/28**

Model Attribute	Harvard-GC	GSiMo	MISCAN-GC
Model type	Microsimulation	Microsimulation	Microsimulation
Timeframe/Cycles	Annual	Monthly	Continuous
Model type	Population model (1875 to 2020)	1940 birth cohort	1940 birth cohort
Starting cohort population	Birth	18-year-old individuals	Birth
Number simulated	1e7	5,000,000 for each race and sex subgroup	1e7
Subgroups	Non-Hispanic White; Non-Hispanic Black Hispanic; Non-Hispanic American Indian/Alaska Native (AI/AN); Non-Hispanic Asian/Pacific Islander (API); Non-Hispanic Two or more races (Multi)	Non-Hispanic White; Non-Hispanic Black	Non-Hispanic White; Non-Hispanic Black
Nativity	US born, Foreign born	All combined	All combined
Sex	Males Females	Males Females	Males Females
Natural history			
Gastric cancer histological subtypes	Adeno_Intestinal; Adeno_Diffuse; MALT; Lymphoma (non-MALT); GIST; NET; Other	Adeno_Intestinal; Adeno_Diffuse	Adeno_Intestinal; Adeno_Diffuse
Gastric cancer location	Cardia, Noncardia	Noncardia	Noncardia
Intestinal metaplasia subtypes	Combined	Combined	Focal vs. Extensive
Dysplasia subtypes	Combined	Combined	Combined
Risk factors	*H. pylori,* smoking, residual factors	*H. pylori*	*H. pylori*
Transitions among health States (specify by histological subtype if possible)	Constant probabilities, except for age-specific probabilities for dysplasia to invasive cancer, and time-dependent (year) probabilities for healthy to gastritis (adenocarcinoma) or healthy to pre-cancer (non-adenocarcinoma)	Age and sex-specific monthly transition probabilities with RR effect due to HP status, (HP positive transitions are race dependent), duration dependent survival probabilities	Competing events. Age-specific transition times of IM and dysplasia.
"Point of no return" (regression)	No regression	No regression	No regression
Clinical detection of invasive cancer	Based on SEER incidence data	Based on SEER incidence data	Based on SEER incidence data
Cancer mortality	Detected CA	Detected CA	Detected CA
Calibration			
Calibration targets – precancerous lesions	Age-specific intestinal metaplasia (IM) prevalence among Hispanic, East Asian, Other in 2009-2013 and 2015-2019	Systematic review - Age, sex, *H.pylori* specific	Systematic review - Age, sex, *H.pylori* specific

Calibration targets – cancer incidence	SEER 1975-2019 (SEER 9, 13, 22) - total GCs; proportion of total cases by site and histology, accounting for the considerable uncertainty around these bounds based on expert input; age-, sex-, race/ethnicity-specific	SEER – 1975-2019 Non-Cardia Intestinal+Diffuse+NOS adenocarcinomas based on histology codes; sex-specific; Non-Hispanic Whites/Blacks with SEER Imputed stage distribution by age	SEER – noncardia intestinal type adenocarcinomas based on histology codes; sex-specific; Non-Hispanic Whites
Calibration targets – stage distribution, survival	SEER 2004-2015, 2018-2019 (SEER 17); age-, sex-, race/ethnicity-, site-, and histology group-specific	SEER – noncardia adenocarcinomas based on histology codes; sex-specific, SEER Stage distribution; Non-Hispanic Whites/Black,	SEER – noncardia intestinal type adenocarcinomas based on histology codes; sex-specific; Non-Hispanic Whites
Calibrated parameter sets	Multiple parameter sets (50-100)	Single	Single
Search algorithm	Simulated annealing	Simulated annealing	Genetic algorithm
Risk factor inputs			
H. pylori	Demographic generator/ NHANES data; sex-, race/ethnicity- and nativity-specific	Hp Force of Infection generator for 1940-44 birth cohort	Generated prevalences by Hp generator for 1940 birth cohort
Smoking	Demographic generator; sex-, race/ethnicity- and nativity-specific	N/A	N/A
Risk factor assumptions			
H. pylori	Increases risk of transition at all points in the precancerous process	Increases risk of transition at all points in the precancerous process	Increases the risk of developing AG. Increases the speed of progressing in all precursor states.
Smoking	Increases risk of developing IM and DYS (adenocarcinoma) or pre-cancer (non-adenocarcinoma)	N/A	N/A
Residual	Increases risk of developing gastritis (adenocarcinoma) or pre-cancer (non-adenocarcinoma)	N/A	N/A
Competing mortality	Demographic generator; sex-, race/ethnicity- and nativity-specific	Demographic generator; sex-, race/ethnicity specific	Observed.
H. pylori eradication			
Gastric cancer histological subtypes affected	Intestinal+Diffuse+MALT	Intestinal+Diffuse	Intestinal+Diffuse
Gastric cancer locations affected	Cardia+Non-Cardia	Non-Cardia	Non-cardia
Removal of precancerous lesions			
Gastric cancer histological subtypes affected	Intestinal+Diffuse	Intestinal+Diffuse	Intestinal+Diffuse
Gastric cancer locations affected	Cardia+Non-Cardia	Non-Cardia	Non-cardia

Surveillance, Epidemiology, and End Results (SEER); Mucosa-Associated Lymphoid Tissue (MALT); Gastrointestinal Stromal Tumor (GIST); Neuroendocrine Tumor (NET)