Supplementary Table 1. Age-standardized annual distribution and secular trends of TOAST etiologic subtypes among recurrent ischemic stroke admissions, Korean Stroke Registry 2018–2023

TOAST subtype	2018 (n=2,950)	2019 (n=3,449)	2020 (n=3,414)	2021 (n=3,915)	2022 (n=4,955)	2023 (n=5,500)	OR/year (hospital-clustered GEE, age-adjusted) (95% CI)	*P* for trend (hospital-clustered GEE, age-adjusted)
Large-artery atherosclerosis	38.1	37.1	40.1	37.0	34.5	34.8	0.96 (0.95–0.98)	<0.001
Small vessel occlusion	15.6	16.8	15.1	16.4	17.2	18.3	1.04 (1.02–1.06)	<0.001
Cardioembolism	21.8	21.2	20.6	20.7	23.0	22.0	1.02 (1.00–1.03)	0.098
Other determined	4.3	4.2	3.7	3.9	3.3	3.9	0.96 (0.92–1.00)	0.049
Undetermined	20.1	20.7	20.5	21.9	22.1	21.0	1.02 (1.00–1.03)	0.106

Age-standardized annual proportions were directly standardized to the age distribution of the overall 2018 Korean Stroke Registry analytic cohort using 10-year age strata (19–29, 30–39, …, ≥80 years) for descriptive display. Trend ORs were estimated using subtype-specific, population-averaged GEE logistic regression models, with each TOAST subtype modeled versus all other subtypes. Hospitals were specified as clusters with an exchangeable working correlation structure. Calendar year (2018–2023) was modeled as a continuous predictor, and 10-year age strata were included for age adjustment. The OR represents the change in odds of the corresponding subtype per 1-year increment. *P* for trend denotes the Wald test *P*-value for the calendar-year coefficient.
TOAST, Trial of Org 10172 in Acute Stroke Treatment; OR, odds ratio; GEE, generalized estimating equation; CI, confidence interval.

Supplementary Table 2. Effect modification of secular trends in TOAST etiologic subtypes by sex and age group among recurrent ischemic stroke admissions, Korean Stroke Registry 2018–2023

TOAST subtype	*P* for interaction (Year×Sex)	*P* for interaction (Year×Age group)
Large-artery atherosclerosis	0.542	0.473
Small vessel occlusion	0.966	0.154
Cardioembolism	0.381	0.585
Other determined	0.350	0.732
Undetermined	0.676	0.331

Interaction *P*-values were obtained from subtype-specific, population-averaged GEE logistic regression models, with each TOAST subtype modeled versus all other subtypes. Hospitals were specified as clusters with an exchangeable working correlation structure. Calendar year (2018–2023) was modeled as a continuous predictor. Models included main effects for calendar year, sex, and age group, together with the relevant interaction terms. The Year×Sex interaction was tested using a Wald test of the 1-df interaction term; the Year×Age-group interaction was tested using a joint Wald test of the 2-df interaction terms for prespecified age groups: 19–49, 50–64, and ≥65 years.
TOAST, Trial of Org 10172 in Acute Stroke Treatment; GEE, generalized estimating equation.