

## Supplementary methods

### Participating hospitals

The data covered 18 hospitals in Taiwan's different administrative districts; these districts together contain >65% of the total population. The enrolled hospitals included seven medical centers and 11 community hospitals, and the corresponding principal investigators were all members of Taiwan Stroke Society (Supplementary Table 1) and participants of the BTS-Stroke activity, where they received training in the measurement of quality and safety from trained neurologists, study nurses, and stroke case managers. The details of the training and data collection process involved in the BTS-Stroke activity has been reported previously.<sup>6</sup> Individual patient-level information was de-identified before analysis. This study was approved by the National Taiwan University Hospital Research Ethics Committee, No. 202004035RINA.

### Quality metrics for stroke care

The original BTS-Stroke quality metrics were established in 2010. It included 14 performance measures and safety indicators. These indicators are the percentage of (1) patients presenting with stroke symptoms for <2 hours who have a door-to-computed tomography time  $\leq 25$  minutes; (2) patients who arrived at the participating hospital <2 hours after symptom onset who use an intravenous tissue plasminogen activator (IV-tPA; IV-tPA for early arrival); (3) patients with acute ischemic stroke (AIS) who receive IV-tPA treatment; (4) patients who arrived <2 hours after symptom onset who have a door-to-needle time  $\leq 60$  minutes; (5) patients who underwent IV-tPA treatment who developed symptomatic intracerebral hemorrhage (ICH); (6) patients with AIS who receive intraarterial thrombolysis; (7) patients who use antithrombotic medication use  $\leq 48$  hours upon admission (early antithrombotic use); (8) patients who undergo dysphagia screening before any oral intake; (9) patients with atrial fibrillation who are prescribed oral anticoagulants at discharge; (10) patients with a lipid-lowering drug prescription for low-density lipoprotein  $\geq 100$  mg/dL at discharge (lipid-lowering drug use); (11) patients with an antithrombotic prescription at discharge (antithrombotic use at discharge); (12) patients who are evaluated for stroke rehabilitation services (rehabilitation evaluation); (13) patients (and/or caregivers) who undergo stroke education (stroke education); and (14) patients with stroke who have a 30-day mortality. Since 2015, endovascular thrombectomy (EVT) has become the standard treatment for patients with AIS with large vessel occlusion. Therefore, we replaced intraarterial thrombolysis with EVT and added metric 15: symptomatic ICH after EVT (Supplementary Table 2). Stroke severity, represent-

ing by National Institutes of Health Stroke Scale (NIHSS), was not included in the BTS-Stroke activity. Nevertheless, we collected patients' NIHSS score according to four strata as <4, 4 to 10, 11 to 20, and >20.

All quality metrics were reviewed on a monthly basis in each participating hospital. Furthermore, the total number of monthly stroke admissions (including those of AIS, transient ischemic attack and hemorrhagic stroke) were recorded. Since the BTS-Stroke activity mainly focused on the AIS-related quality metrics, we further recorded number of AIS admission. The study period was January 1 to March 31, 2020, and the control period was January 1 to March 31, 2019.

### COVID-19 statistics

Coronavirus disease 2019 (COVID-19) statistics were collected from the bulletins and press releases of the Central Epidemic Command Center (CECC), a specialized task force under Taiwan's Centers for Disease Control. We collected the daily numbers of confirmed cases (reported from home quarantine and enhanced surveillance).

### Statistical analysis

The mean daily stroke and AIS admissions were calculated from data on their monthly counterparts (monthly figures/number of days of the month). The changes over the 3 consecutive months were estimated using a generalized estimating equation. The difference in the mean values between different study periods were compared using Poisson regression and expressed as incidence rate ratios and their 95% confidence intervals.

All quality metrics were represented as percentages (%). Because the denominator in these percentages may change according to which patients are covered by any given quality metrics, both the numerator and denominator are reported in the results. When appropriate, the chi-square test or Fisher's exact test was used to compare quality metrics between the study and control periods. Logistic regression analysis was used to calculate the odds ratios for quality of care between the 2 periods, and the penalized maximum likelihood (Firth method) was used for parameter estimation to determine the likelihood of rare outcomes.<sup>7</sup>

In brief, we first compared the first quarters of 2019 and 2020 with respect to the mean numbers of daily stroke admission of stroke and the quality-metric percentages. Prespecified subgroup analyses were performed for medical centers and community hospitals. Because the number of confirmed COVID-19 cases increased substantially in mid-March, we considered March 2020 as the most affected month (i.e., the main outbreak phase). Thus, we further compared data for March

2020 with those of January to February 2020 (i.e., the early outbreak phase) and the first quarter of 2019 (i.e., the control

phase), respectively. All statistical analyses were performed using SAS version 9.4 (SAS Institute Inc., Cary, NC, USA).