In response to concerns over raising Comprehensive Stroke Center (CSC) annual volume requirements to a minimum of 35 SAH patients and setting specific volume requirements for clipping and coiling procedures (10 clipping and 20 coiling procedures), The Joint Commission elected to postpone implementation of the new requirements in order to complete a more thorough review of the relevant scientific literature and analyze procedure volume data from certified stroke centers.

The findings from this work suggest that insufficient evidence currently exists to support the proposed increase in patient and procedure volumes. A number of studies\textsuperscript{1,2,3} have examined the volume-outcome relationship by dividing hospitals into quartiles or quintiles, and they have clearly demonstrated that centers in the highest volume group outperform centers in the lowest volume group. These statistically significant differences, however, have not been observed across groups in the middle. For example, although we can conclude that centers with greater than 36 annual SAH cases typically have better outcomes than centers with 1-9 SAH patients, we are less certain about centers that treat 10-18 or 19-35 SAH patients.\textsuperscript{1} More importantly, while the research literature clearly supports a volume-outcome relationship in the care for patients with subarachnoid hemorrhage (SAH), the underlying factors that explain this relationship are not well established.

Researchers studying the volume outcome relationships have noted that the benefits associated with treatment in high volume centers are likely to be associated with factors that include the availability of endovascular treatments, subspecialty surgeons and neurointensivists and neurointensive care units, as well as many other care processes and types of personnel that may contribute to better outcomes.\textsuperscript{1} It is possible, therefore, that among the CSCs, which uniformly have these essential resources, the volume-outcome relationship for SAH is less than what has been published. Better outcomes for SAH patients at high-volume centers may be due to both better medical and surgical treatment. For example, higher volume centers were more likely to have angioplasty treatments available, and facilities with available angioplasty achieved better outcomes for SAH patients than facilities without angioplasty.\textsuperscript{4}

A growing number of studies over the last five years have documented the significant increase in the use and benefits of endovascular treatment for both ruptured and unruptured aneurysms.\textsuperscript{5,6,7,8} In order to assess current stroke volumes and clipping/coiling procedure practices, The Joint Commission sent an electronic survey to all certified CSCs and Primary Stroke Centers (PSCs) on November 18, 2014 (77 CSCs, 1128 PSC). The survey was closed on January 23, 2015 with a total of 48 CSCs responding (62.3%) and 493 PSCs responding (43.7%). Survey respondents were similar to non-respondents in terms of teaching status, geographic location and ownership type (although for-profit institutions were slightly under-represented among respondents).

Across the 48 responding CSCs, centers reported an annual average of 654 ischemic stroke patients per site (range 258 – 1569), and an average of 92 SAH patients per site (range 27 – 282). Responses associated with clipping and coiling procedures indicated that, across the 48 responding CSCs, the average annual volume was 36 procedures (range 1 – 147), and the average volume for coiling was 80 (range 23 - 275). These figures are combined for ruptured and non-ruptured aneurysm treatment.
Among the most striking findings from the survey, was the degree of practice variation observed for clipping and coiling procedures across the facilities. Differences in the proportion of clipping to coiling appeared unrelated to a facility’s stroke patient volume (See Figure). Among CSCs, the proportion of clipping to coiling in relation to all procedures ranged from a high of 67% clip versus 33% coil, to a low of 1% clip to 99% coil. This dramatic variation in practice, coupled with the evolving research literature related to the trend toward increasing endovascular treatment, makes it difficult to support establishing any firm volume requirement for a specific procedure type.

![Annual Stroke Patient Volume Relative to Clipping and Coiling Procedure Volumes](image)

*Figure: Each dot represents one of a total of 155 facilities with at least 1 annual coiling and 1 annual clipping procedure (n=48 CSC, n=107 PSC); the size of each dot represents the relative annual volume of stroke patients treated by each facility.*

Based on the literature review and the findings from the stroke center survey, The Joint Commission has concluded that implementation of higher volume requirements is premature and that current volume requirements for the CSC program should remain in place (i.e., a minimum average volume of 20 subarachnoid hemorrhage (SAH) patients and a minimum of 15 combined clipping/coiling procedures in combination with at least 25 intravenous tissue plasminogen activator (tPA) treatments for patients with ischemic stroke annually). Additional research is ongoing, however, and program volume requirements will be reevaluated as new evidence emerges over the course of the next year.
REFERENCES


