

Novel Stroke Cards for Neurology Clerkship Students Improves Medical Education

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Background

Stroke remains a leading cause of death worldwide despite the development of vital therapies (Figure 1).^[1] Stroke education remains a critical component of medical education for all medical students regardless of their intended specialty.^[2] The acquisition of knowledge has transitioned to competency-based learning, requiring faculty to assess if trainees have obtained critical knowledge.^[3]

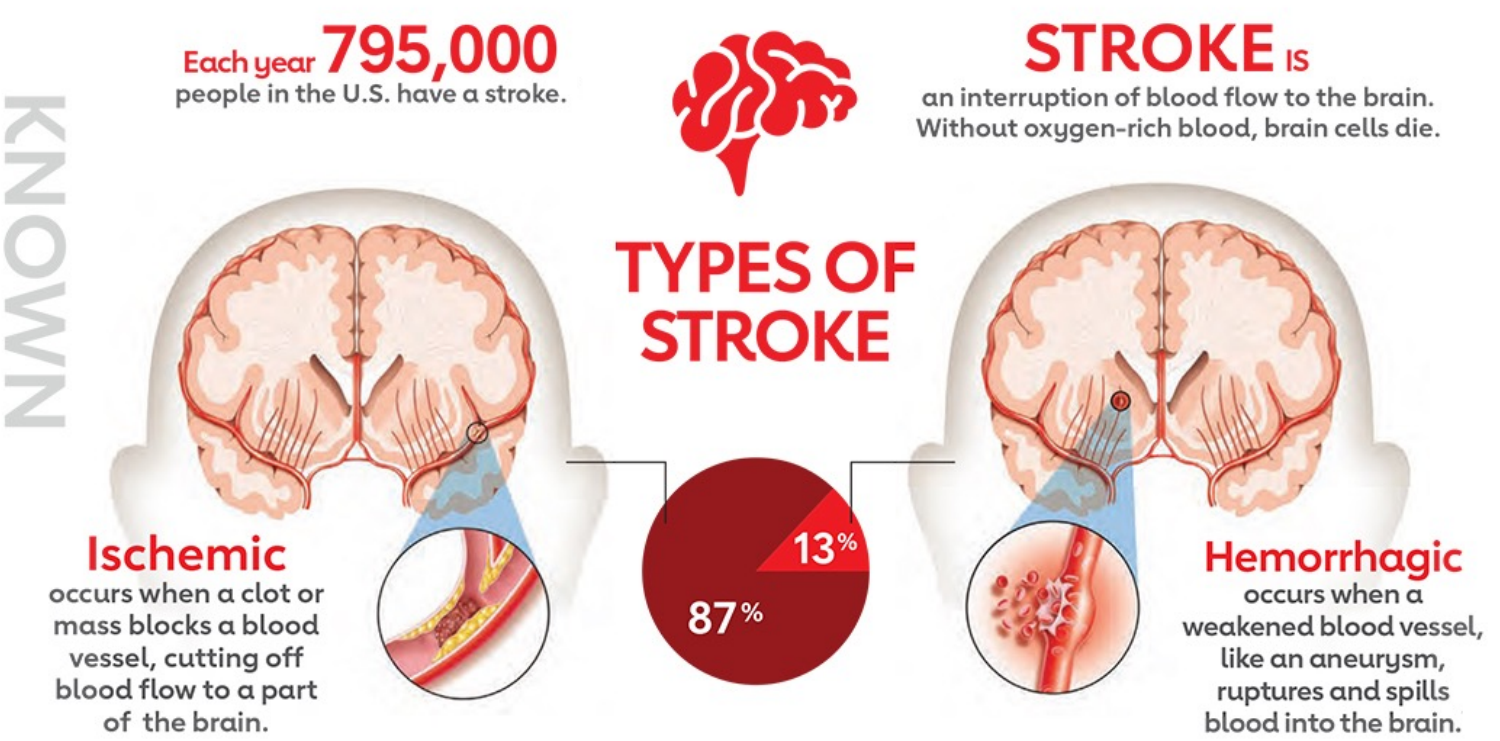
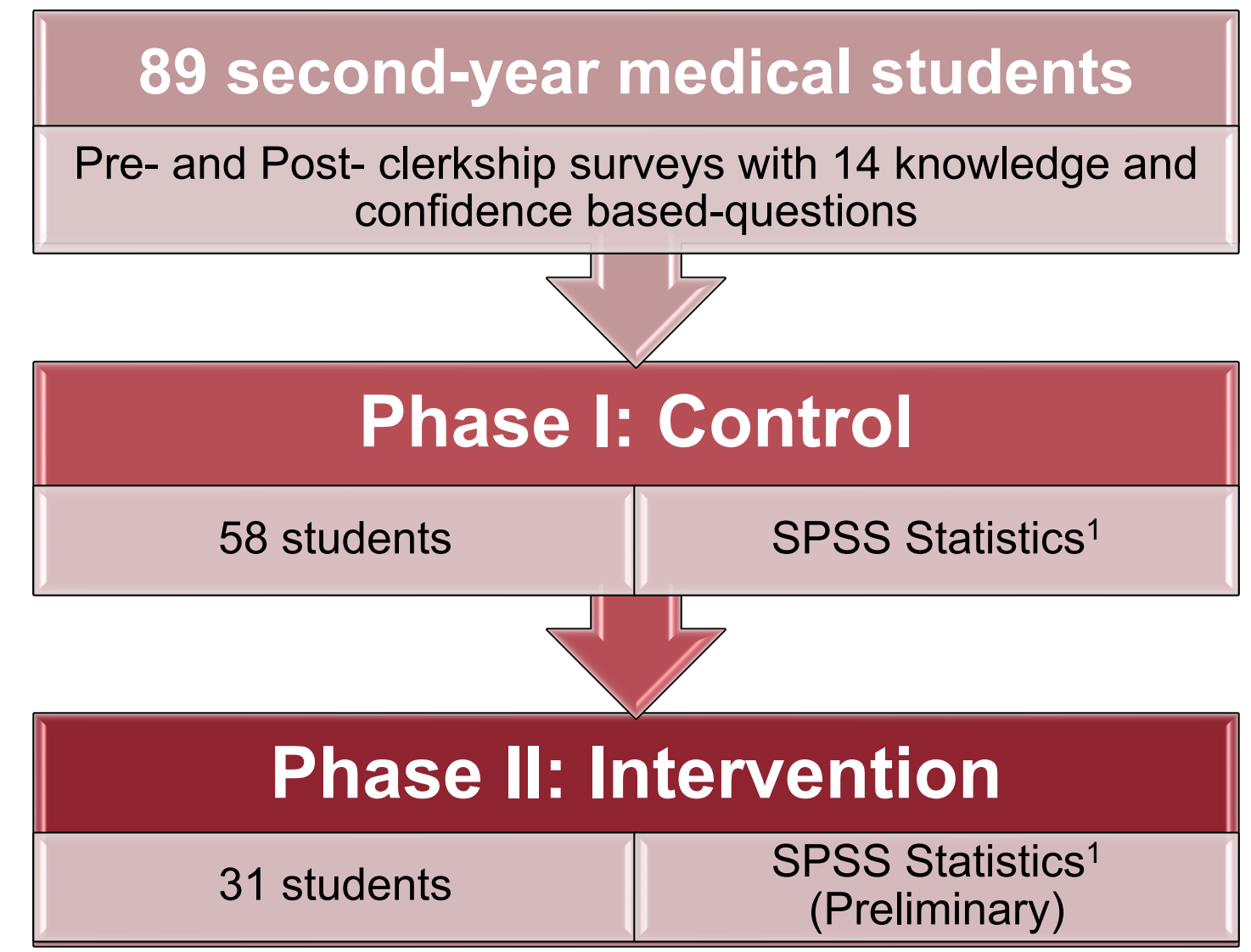


Figure 1. Stroke types, obtained from the American Stroke Association®.

For neurology, trainees benefit from in-person education with the incorporation of problem-based learning.^[4] Although stroke education varies by institution, part of the intended learning occurs during a stroke code through observation of the team's actions and evaluation of the patient.^[5] However, many trainees do not have the opportunity to ask questions during an acute stroke to solidify their understanding in the moment. We hypothesize that implementing stroke cards with standard questions for trainees to answer during a stroke code will improve knowledge acquisition by replacing passive learning with active learning.

Methods



¹ SPSS Statistics:

- All Questions → Power analysis performed
- Confidence Questions → Value assigned + Paired T test
- Knowledge Questions → McNemar's test or unpaired t-test

Figure 2. Research design for Pre- and Post-survey analysis of Michigan medical students (N=89) rotating on their Neurology clerkship from 2019-2022. The stroke card was only implemented during Phase II. The data was analyzed in IBM SPSS® Statistics 28 software.

Results

Confidence Questions

All students in Phase I and Phase II showed improvement in their confidence level for assessing and treating acute strokes both pre- and post-clerkship (Figure 3). The stroke card intervention was not associated with a significant difference in perceived confidence for stroke management among students.

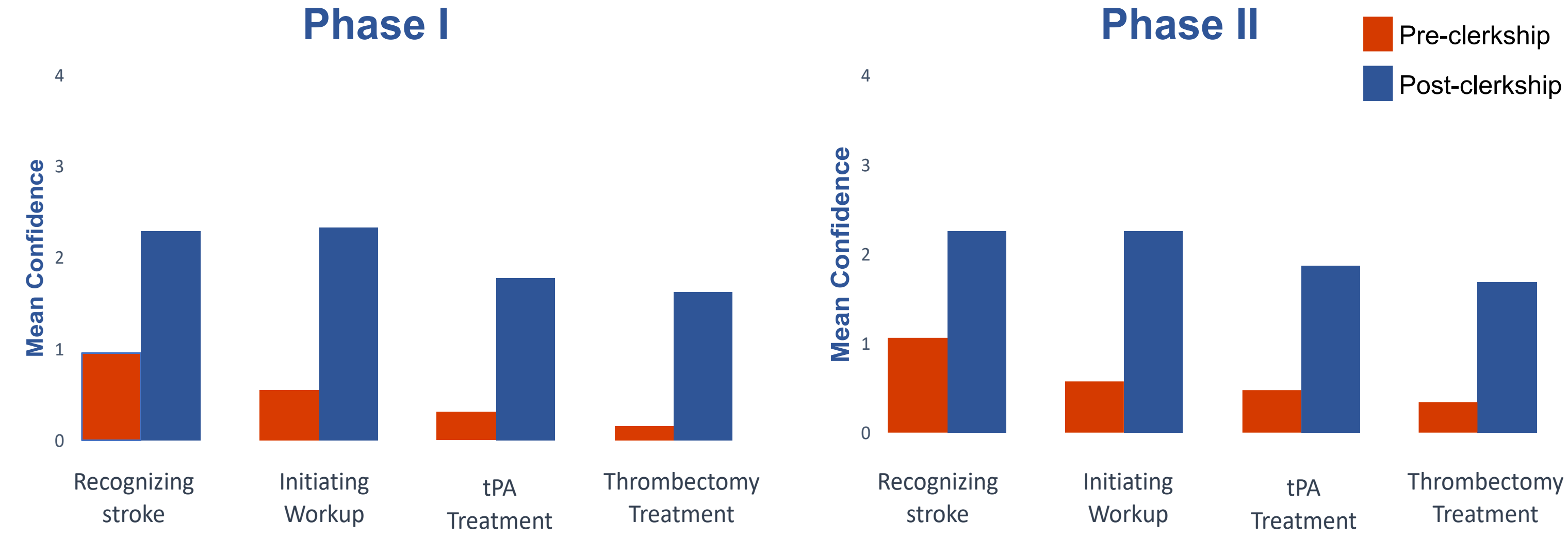


Figure 3. Comparison of confidence regarding stroke management between pre-clerkship (red) and post-clerkship (blue) survey responses.

Knowledge-Based Questions

Students showed improved understanding of stroke symptoms ($p < .001$), treatment with tissue plasminogen activator (tPA) and thrombectomy ($p < .001$) and understanding the definition of a patient's last known well ($p < .065$) (Figure 4).

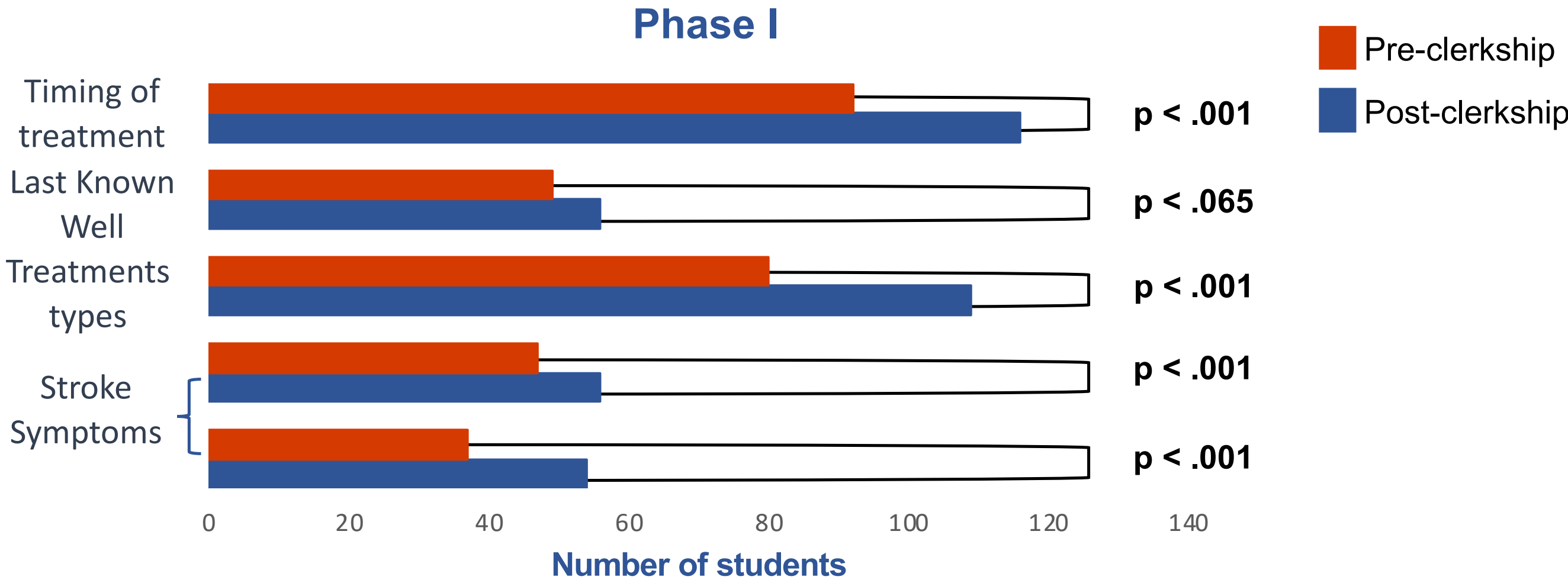


Figure 4. Comparison of knowledge-based questions between pre-clerkship (red) and post-clerkship (blue) survey responses in Phase I.

Table 1. Comparison of percent correct between four Phase I and Phase II post-survey knowledge-based questions.

Question	Phase I, N=58 (%)	Phase II, N=31 (%) ^B	P value
Is shortness of breath a stroke symptom?	54 (93)	27 (87)	.351
Is chest pain a stroke symptom?	56 (97)	27 (87)	.092
Two acute treatments for stroke? ^A	111 (96)	59 (95)	.743
What is the last known well?	56 (97)	31 (100)	.301
Timing of tPA and thrombectomy? ^A	96 (83)	55 (89)	.363

^A Combined answers for two separate questions (2N)

^B Data is preliminary.

Abbreviation: tPA, tissue plasminogen activator.

Discussion

Student Stroke Knowledge Retention

Although there was a general increase in knowledge and confidence among students in Phase II, in this preliminary review of the data, no statistically significant difference has been demonstrated in understanding stroke concepts with the usage of stroke cards. However, stroke cards are a simple way to increase student engagement during stroke encounters. There is a continued need to increase active learning to emphasize concepts for stroke procedures and treatment (Figure 5).

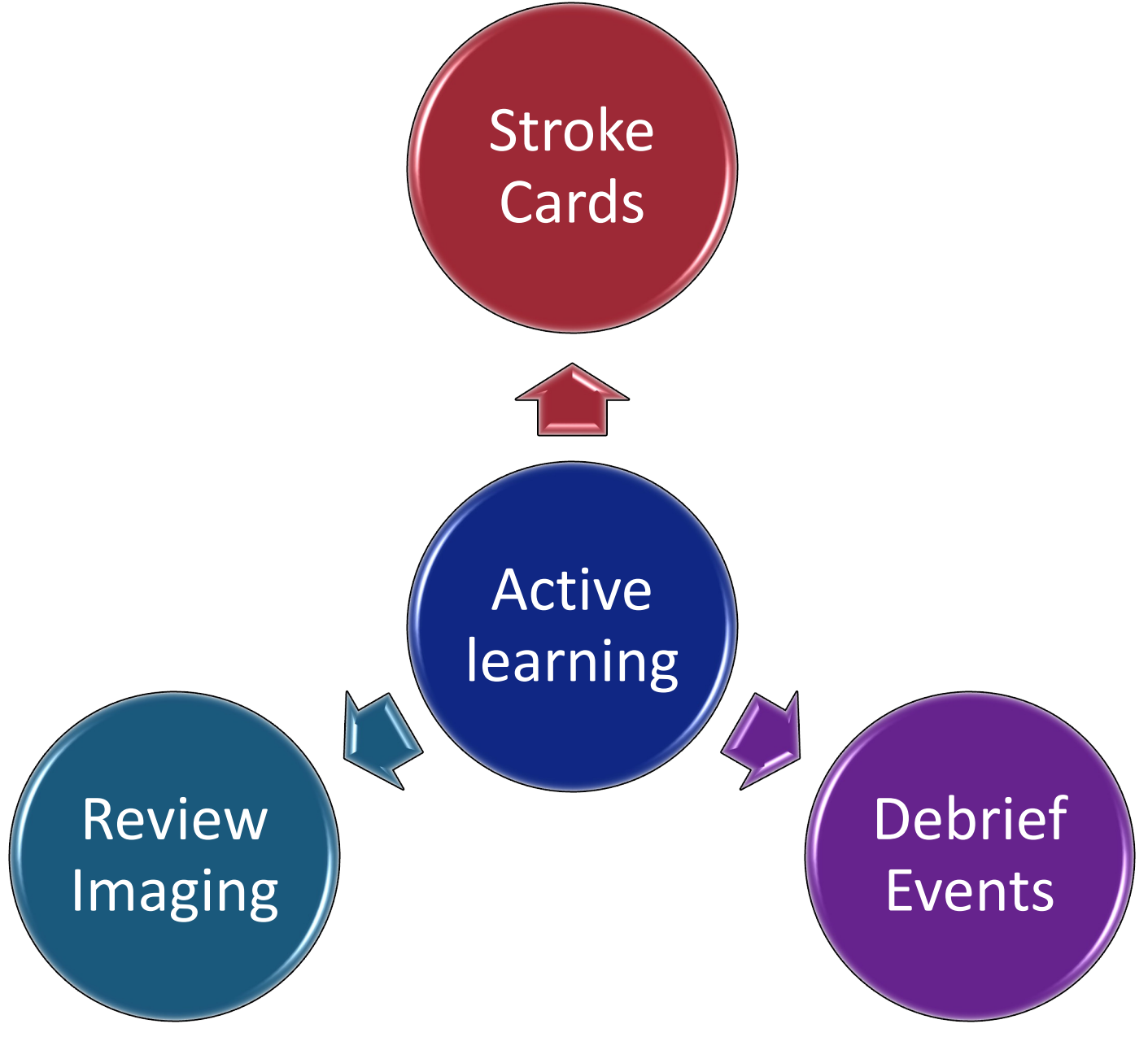
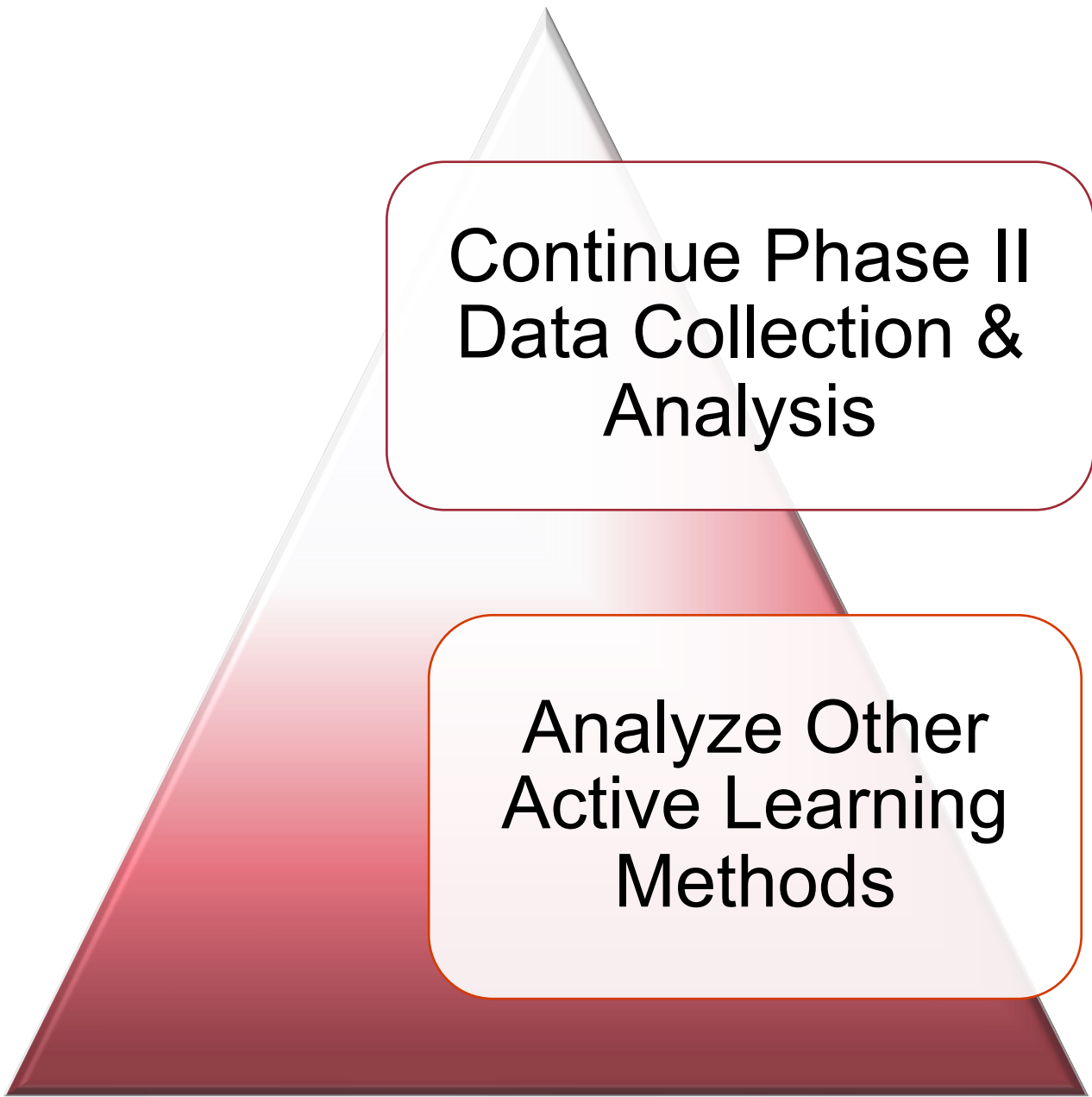


Figure 5. Active learning methods for stroke education can include the use of stroke cards, debriefing with students after a stroke code, and a Socratic review of patient imaging.

Conclusion

This study evaluated the usage of stroke cards to implement active student learning during an acute stroke code. Preliminary, stroke cards showed a non-statistically significant increase in stroke knowledge. Data collection will be continued to further assess this.

Future Endeavors



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