The 30-Minute Challenge: A Quality Improvement Bundle for Stroke Patients

Executive Summary

Karen Reavis

College of Nursing, East Carolina University

Doctor of Nursing Practice, Nursing Leadership

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Acute ischemic stroke (AIS) patient outcomes improve significantly when timely endovascular therapy (EVT) is performed, a procedure that requires rapid coordination among multidisciplinary teams. Guided by the American Heart Association's (AHA) 12 strategies to improve EVT timeliness (see Appendix A; Table 1), this project implemented a multi-component improvement bundle to strengthen communication, procedural readiness, and role clarity, efforts that contributed to a 34.8% improvement in EVT timeliness (AHA, 2025a). The most important findings from the project included:

- improved staff foundational knowledge scores following targeted testing
- enhanced communication behaviors observed during EVT simulation
- improved teamwork perceptions after evidenced teamwork tool training
- strong alignment with the AHA's twelve AIS timeliness strategies
- demonstrated the feasibility of improvement bundle implementation

Background & Purpose

This seven-month project implemented an improvement bundle consisting of focused Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS™) training, baseline and repeat EVT knowledge testing, and a high-fidelity EVT simulation conducted in partnership with the hospital's Simulation Lab Department (Agency for Healthcare Research and Quality [AHRQ], 2023). Prior to implementation, the team completed the evidence-based TeamSTEPPS™ Teamwork Perceptions Questionnaire (T-TPQ) to identify targeted teamwork domains for one-hour training sessions with the EVT procedural team and evaluate perceptions of confidence (AHRQ, n. d.). The purpose of the project was to improve the

team's confidence, perception of teamwork, and competence in performing EVT, which averaged 33 minutes in 2025 and exceeded the AHA's recommended benchmark of 30 minutes. The intended audience for the project included the full EVT team consisting of (a) nurses; (b) radiological technologists; (c) registered diagnostic cardiovascular specialists; (d) paramedics; (e) anesthesia support members; and (f) neuroendovascular surgeons. The results of this project were shared with the hospital education department, which oversees AHA training programs, to secure support for adopting Advanced Stroke Life Support (ASLS) as an additional standardized competency for stroke care departments.

Methodology

The project followed the Define, Measure, Analyze, Improve, & Control (DMAIC) quality improvement framework to guide the design, implementation, and evaluation of the improvement bundle. In the *Define* phase, the problem was established: the EVT team's mean performance time was inconsistent and exceeded the AHA-recommended benchmarks. The *Measure* phase included baseline EVT-proctored knowledge testing and the administration of the T-TPQ questionnaire to identify teamwork gaps. During the *Analyze* phase, teamwork domain scores, communication patterns, and workflow inconsistencies were reviewed to determine targeted areas for improvement. These findings targeted the *Improve* phase, which consisted of structured TeamSTEPPS™ education delivered during monthly staff meetings, baseline and repeat EVT knowledge testing, and a high-fidelity EVT simulation.

Implementation followed a staged DMAIC approach to support adoption while minimizing workflow disruption. Early phases included small-group sessions focused on reviewing EVT supplies, workflow sequencing, and role clarity to standardize expectations across disciplines. The primary improvement activity was a high-fidelity EVT simulation

conducted with the hospital's Simulation Lab, which enabled the multidisciplinary EVT team to rehearse the time-critical workflow in a controlled environment with structured debriefing. Knowledge retention was evaluated using pre- and post-intervention testing, while outcome evaluation in the *Control* phase relied on audited electronic medical records. Objective timestamps from patient electronic medical records for *in-room* and *device-insert* times were used to calculate door-to-device (DTD) intervals and to determine whether the improvement bundle enhanced EVT timeliness for AIS patients.

Results

This project showed notable improvements in perceptions of teamwork, basic knowledge, and DTD performance. All five evidence-based TeamSTEPPS™ teamwork domains—leadership, communication, function/structure, mutual support, and situation monitoring—had higher average scores from before to after the intervention (see Appendix B; Table 2). Although these increases were not statistically significant, the overall upward trend suggests better collaboration, clearer role understanding, and enhanced team coordination. Confidence, assessed with a simple three-item tool, also rose from 3.56 to 3.80.

The most substantial improvement was in EVT foundational knowledge. Scores on the 19-item knowledge test increased significantly from a mean of 64.75 to 87.29, $t(11) = -5.85$, $p < .001$, indicating strong retention of procedural anatomy and physiology, stroke patient assessment, and EVT workflow steps. EVT performance also improved clinically: 4-months after the intervention, the DTD time improved from 33 minutes to 21.5 minutes, a reduction of nearly 12 minutes across five patients. Together, these results show that the improvement bundle enhanced team readiness, communication behaviors, and EVT timeliness, even in the absence of statistically significant changes in teamwork perception scores.

Strengths & Limitations

A key strength of the project was the combination of interventions—structured education, knowledge testing, and high-fidelity simulation—which addressed multiple learning styles and formed a comprehensive improvement strategy. This systematic approach helped identify workflow gaps and reinforced role clarity across the EVT team. The high-fidelity simulation provided a realistic environment for practicing time-sensitive EVT tasks, and multidisciplinary participation ensured that debriefing insights reflected the needs of the entire procedural team. One of the most meaningful strengths was the relationship-building that occurred during the project. The protected learning time and low-stress simulation environment allowed team members to connect, communicate openly, and build trust in ways that had not existed before. This cultural shift was evident in staff engagement: individuals who once avoided stroke cases began requesting to participate. Strong organizational support and the addition of a visible procedural clock—one of the AHA's recommended strategies—further contributed.

Limitations included dependence on electronic medical record timestamps, which can introduce variability in documentation. EVT is a low-volume procedure, and only five patients met the criteria during the evaluation period, restricting the generalizability of the findings. The department also experienced a 25% (n=4 of 16) staff turnover during the project, resulting in new hires not receiving comprehensive training, simulation, or testing. Despite this, the sustained improvement in DTD times indicates that workflow modifications became integrated into team practice. The increased willingness of staff to participate in stroke cases further supports the durability of these cultural and operational advancements.

Implications & Conclusion

The findings of this project have significant implications for patient outcomes, team

performance, and organizational practice. The physiology of AIS demonstrates that nearly 1.9 million neurons are lost each minute if untreated, reinforcing the need for rapid EVT activation (Burns et al., 2023). The 11.5-minute improvement in DTD time achieved through this project represents 21.85 million neurons preserved for each patient. These improvements directly advance the Quintuple Aim by enhancing the patient experience through timelier, coordinated care; improving population health by reducing long-term disability associated with delayed reperfusion; and lowering healthcare costs tied to chronic stroke-related disability. The project also fostered greater clinician well-being, as team members reported increased confidence and reduced stress when responding to high-acuity stroke cases. Importantly, more reliable and efficient EVT workflows contribute to health equity, ensuring that minority populations—who disproportionately experience stroke morbidity—receive high-quality, timely intervention (AHA, 2025b; Institute for Healthcare Improvement, n.d.).

In conclusion, adopting ASLS as a standardized job requirement would provide the organization with a ready-made, evidence-based training bundle that mirrors the structure of this project. ASLS includes the same foundational elements that contributed to this project's success—core knowledge, role clarity, and structured, simulated practice—which have been shown to increase confidence and improve performance in high-stress stroke environments. Because EVT is a relatively new treatment modality, with only about 20 years of widespread use, ASLS would also ensure that staff remain up to date as stroke science and reperfusion practices continue to evolve. Integrating ASLS annually alongside the improvement bundle would offer a sustainable, familiar, and future-focused approach to maintaining the high-reliability performance demonstrated in this project.

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Appendix A

Table 1

Twelve Key Best Practice Strategies

Strategy
1. Rapid Administration of Alteplase
2. Rapid Acquisition and Interpretation of CT/MR Angiography
3. Rapid Acquisition and Interpretation of Additional Imaging
4. Pre-Notification and Rapid Activation of the Neurointerventional Team
5. Rapid Availability of the Neurointerventional Team
6. Timer or Clock Attached to Chart, Clip Board, or Bed
7. Transfer Directly to Neuroangiography Suite
8. Transfer Directly from Brain Imaging Suite to Neuroangiography Suite
9. Endovascular Therapy Ready Neuroangiography Suite
10. Team-Based Approach
11. Anesthesia Access and Protocols
12. Prompt Data Feedback

Note. The 12 key best-practice strategies above are from the American Heart Association's Clinical Tools and Resources. Adapted from American Heart Association (2025b). *Target: Stroke Phase III door-to-device time key best practice strategies* [PDF]. https://tinyurl.com/4742ax2r

Appendix B

Table 2

TeamSTEPPS ™ Teamwork Perceptions Questionnaire (T-TPQ) Results

Domain	Pre-Intervention Mean	Post-Intervention Mean	Difference
Leadership	4.65	4.74	0.09
Communication	4.36	4.42	0.06
Structure/Function	4.19	4.45	0.26
Mutual Support	4.09	4.22	0.13
Situation Monitoring	4.04	4.22	0.18

Note. N=16. The T-TPQ 35-questionnaire was administered anonymously before and after implementation. Agency for Healthcare Research and Quality. (n.d.). *TeamSTEPPS ™ teamwork perceptions questionnaire.* U. S. Department of Health and Human Services. https://www.ahrq.gov/sites/default/files/wysiwyg/teamstepps-program/tools/ts-tpq-questionnaire.pdf