

# **Stroke Performance Improvement Guide**

**MINNESOTA STROKE PROGRAM 5.0**

**JANUARY 2026**

**For help navigating performance improvement, please contact:**

Minnesota Department of Health- Stroke Program  
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# Welcome

An effective stroke program at an Acute Stroke Ready Hospital (ASRH) requires dedicated staff, establishment of key structural processes, and a commitment to continuous quality improvement.

The Minnesota Department of Health has provided the framework for a successful stroke program at an ASRH through our *Reference Guide for Acute Stroke Ready Hospital Designation*. This Performance Improvement Guide is a companion to that guide which provides further information, best practices, and tools related to the **performance improvement component** of a successful stroke program. Performance Improvement requires key team members; defined clinical and administrative processes including establishment of a stroke committee; and a clear process for the tracking, abstracting, and utilizing stroke patient data. For further support on developing a performance improvement program please contact the Minnesota Department of Health Stroke Program at [health.stroke@state.mn.us](mailto:health.stroke@state.mn.us).

## Structural Components

Here is an outline of the key activities that are essential to creating and maintaining a successful performance improvement process. [View Appendix A: Stroke Performance Improvement Model for a visual map of these written activities.](#)

### 1. Maintain a Stroke Code Activation Log

The purpose of the stroke code activation log is to track stroke codes activated in the emergency department in real time. Implementing stroke code activation log/process is required of Acute Stroke Ready Hospital Designation. At a minimum the log should include patient details such as date and time of stroke activation, response time to bedside, final diagnosis, treatments, and discharge disposition.

*Reference MDH Stroke Program Resources webpage for access to resources including the Designation Reference Guide (Criteria 1): [health.state.mn.us/diseases/cardiovascular/stroke/resources.html](http://health.state.mn.us/diseases/cardiovascular/stroke/resources.html)*

### 2. Identify stroke cases for both Performance Improvement and the Minnesota Stroke Registry

The stroke coordinator should identify stroke cases on a regular basis. Determining a flow/cadence for this process depends on the volume and frequency of stroke codes and patients. Stroke patients may be identified from the following sources (casting a wide net to ensure stroke codes and stroke patients are not missed) with all cases added to a broader comprehensive performance improvement log.

- The emergency department stroke code activation log
- ICU patient log
- Inpatient log

- Medical record ICD-10 discharge diagnosis report

The purpose of the performance improvement log is to track and trend comprehensive stroke code data for performance improvement and is required of Acute Stroke Ready Hospital Designation.

*Reference MDH Stroke Program Resources webpage for access to resources including ASRH Designation Reference Guide (Criteria 7) [health.state.mn.us/diseases/cardiovascular/stroke/resources.html](http://health.state.mn.us/diseases/cardiovascular/stroke/resources.html)*

### 3. **Abstract and submit stroke patient data into the Minnesota Stroke Registry**

Minnesota hospitals are required to abstract and submit all confirmed (final diagnosis) stroke and TIA patient data into the Minnesota Stroke Registry (Minnesota Stroke Portal). A subset of data submitted to the Minnesota Stroke Registry is subsequently submitted to the Centers for Disease Control (CDC) for the Paul Coverdell National Acute Stroke Registry. Hospital identities are not included with any case records in this data transmission.

Data for the Minnesota Stroke Registry are required to be submitted quarterly, at a minimum, yet it is encouraged to identify, abstract, and submit patient case data monthly. An identified staff such as stroke coordinator or a data abstractor/registrar review various parts of the patient medical record to abstract the data needed for the stroke registry case record. It typically takes 20 minutes to abstract and enter data into the stroke registry for a patient treated and transferred.

*Reference the Minnesota Stroke Portal for access to the Minnesota Stroke Registry [stroke.web.health.state.mn.us/](http://stroke.web.health.state.mn.us/)*

*Reference the MDH Stroke Program Resources webpage for access to resources including the Minnesota Stroke Registry Abstraction Manual [health.state.mn.us/diseases/cardiovascular/stroke/resources.html](http://health.state.mn.us/diseases/cardiovascular/stroke/resources.html)*

### 4. **Provide feedback on individual patients to stroke team members**

Individual patient case results may be summarized into a single **case review form** as a way to share feedback with the individuals directly involved in the patient's care, as well as within the teams or committees that review care. This type of form may be referenced by several different names including but not limited to: case review report/form, PI filter form, stroke code feedback form, stroke audit report/form, patient time tracker. A separate feedback form specifically for EMS may be useful in sharing pre-hospital (and transfer) stroke feedback.

*Reference [Appendix B: American Heart Association Target: Stroke Phase III Patient Time Tracker](#)*

*Reference [American Heart Association Target: Stroke Phase III Resources](http://heart.org/en/professional/quality-improvement/target-stroke/clinical-tools-and-resources)*

5. **Evaluate overall performance by aggregating data, comparing to established program goals, and maintaining Performance Improvement Log**

Cases for all patients that activated a stroke code and or were confirmed as having a stroke are included in a comprehensive **performance improvement log**. Using a performance improvement case review tracking log as an effective way to support a successful performance improvement program.

The data that should be tracked include times of various diagnostic and care processes including the calculated time intervals throughout the patient’s emergency department experience. These performance goals/metrics, often referred to as “door to” indicators. Examples include door to stroke code activation, door to provider, door to CT imaging initiated, door to CT imaging interpreted, door to lab completed, door to needle/thrombolytic administration, door to transfer.

- Care may be analyzed case-by-case for patients for which time goals were missed. Data is also aggregated to assess overall performance and determine trends. Findings may be discussed with individual care providers, in group meetings with the acute stroke team, Stroke Committee, etc.
- The *Minnesota Stroke Portal* includes a dashboard of data reports on key stroke metrics, benchmarking options, as well as a report that outputs a performance improvement case review tracking log. The reports are an available option that may be used as a platform to track and analyze stroke patient data or you may generate your own.
- Realistic goals that coincide and/or challenge national standards should be part of performance improvement projects. MDH supports the American Heart Association’s Target: Stroke time phase III interval goals and campaign resources.

*Reference MDH Stroke Program Resources webpage for access to resources including ASRH Designation Reference Guide (Criteria 7) and ASRH Designation Case Tracer Form*

[health.state.mn.us/diseases/cardiovascular/stroke/resources.html](http://health.state.mn.us/diseases/cardiovascular/stroke/resources.html)

[\*Reference Appendix C: American Heart Association Target: Stroke Phase III Suggested Time Intervals\*](#)

*Reference American Heart Association Target: Stroke Phase III Resources*

[heart.org/en/professional/quality-improvement/target-stroke/clinical-tools-and-resources](http://heart.org/en/professional/quality-improvement/target-stroke/clinical-tools-and-resources)

6. **Develop/conduct/modify performance improvement (PI) projects**

Performance Improvement projects and actions should be systematically and formally planned and implemented. These can range from simple changes in practice to complex, systems-wide projects. Ensure staff and key team members are informed of results along the way – typically within an established Stroke Committee. Data collection,

assessment of program goals/metrics and data reports, and evaluation of process changes are essential variables in maintaining an effective performance improvement process.

### **Stroke Committee**

Maintaining a Stroke Committee is a requirement of ASRH Designation as is establishing a **Stroke Committee Charter** which describes the mission, scope, goals, and membership of the Stroke Committee. Consider the stroke committee as the overarching venue to review and monitor performance metrics, improvement projects, and overall stroke care in accordance with best practice guidelines. Utilizing a multidisciplinary committee approach provides representation from all departments that will assist in driving new processes and change forward. Consider ensuring all members of the Stroke Committee are involved in implementation of projects and assume accountability for action steps affecting their department/staff.

*Reference MDH Stroke Program Resources for resources including the ASRH Designation Reference Guide (Criteria 7 Stroke Committee Charter Sample):*

[health.state.mn.us/diseases/cardiovascular/stroke/resources.html](http://health.state.mn.us/diseases/cardiovascular/stroke/resources.html)

### **PI Project Planning**

Utilize quality improvement/performance improvement tools that work best for your program and identified performance improvement initiative. Engage quality improvement staff within your facility or broader system for existing tools and support. Implementation of a performance improvement project is required of ASRH Designation.

An optional, readily available, and easy to use tool that stroke programs may consider using to implement a PI project is the Plan Do Study Act (PDSA) QI tool. The PDSA tool can be utilized to plan and document your progress with tests of change conducted as part of chartered performance improvement projects (PIPs). The PDSA tool is not required of ASRH Designation; however, an example of a PI project is required.

*Reference the QAPI PDSA PDF TEMPLATE available on the CMS resources webpage:*  
[cms.gov/medicare/provider-enrollment-and-certification/qapi/downloads/pdsacyclededebits.pdf](https://www.cms.gov/medicare/provider-enrollment-and-certification/qapi/downloads/pdsacyclededebits.pdf)

[Reference Appendix D: Plan Do Study Act \(PDSA\) Considerations Checklist for further support.](#)

*Reference MDH Stroke Program Resources for resources including the ASRH Designation Reference Guide (Criteria 7):* [health.state.mn.us/diseases/cardiovascular/stroke/resources.html](http://health.state.mn.us/diseases/cardiovascular/stroke/resources.html)

### **PI Project Ideas**

American Heart Association Target: Stroke™ advocates for the consideration of these key best practice strategies (performance improvement project ideas) for reducing door-to-needle times for intravenous thrombolytics in acute ischemic stroke.

- EMS Pre-Notification
- Stroke Tools
- Rapid Triage Protocol, Stroke Team Notification, Stroke Code Activation process
- Timer or clock attached to the chart, clip board or patient bed
- Transfer Directly to CT Scanner
- Rapid Acquisition and Interpretation of Brain Imaging
- Rapid Laboratory Testing (Including point of Care Testing if Indicated)
- Rapid Verification of Eligibility
- Accurate Dosing and Efficient Administration of Intravenous Thrombolytic
- Safe Patient Monitoring Post-Thrombolytic Administration
- Team-Based Approach
- Prompt Data Feedback

*Adapted from 12 Key Best Practice Strategies, American Heart Association Target: Stroke Phase III*  
Resources: [heart.org/en/professional/quality-improvement/target-stroke/clinical-tools-and-resources](https://heart.org/en/professional/quality-improvement/target-stroke/clinical-tools-and-resources)

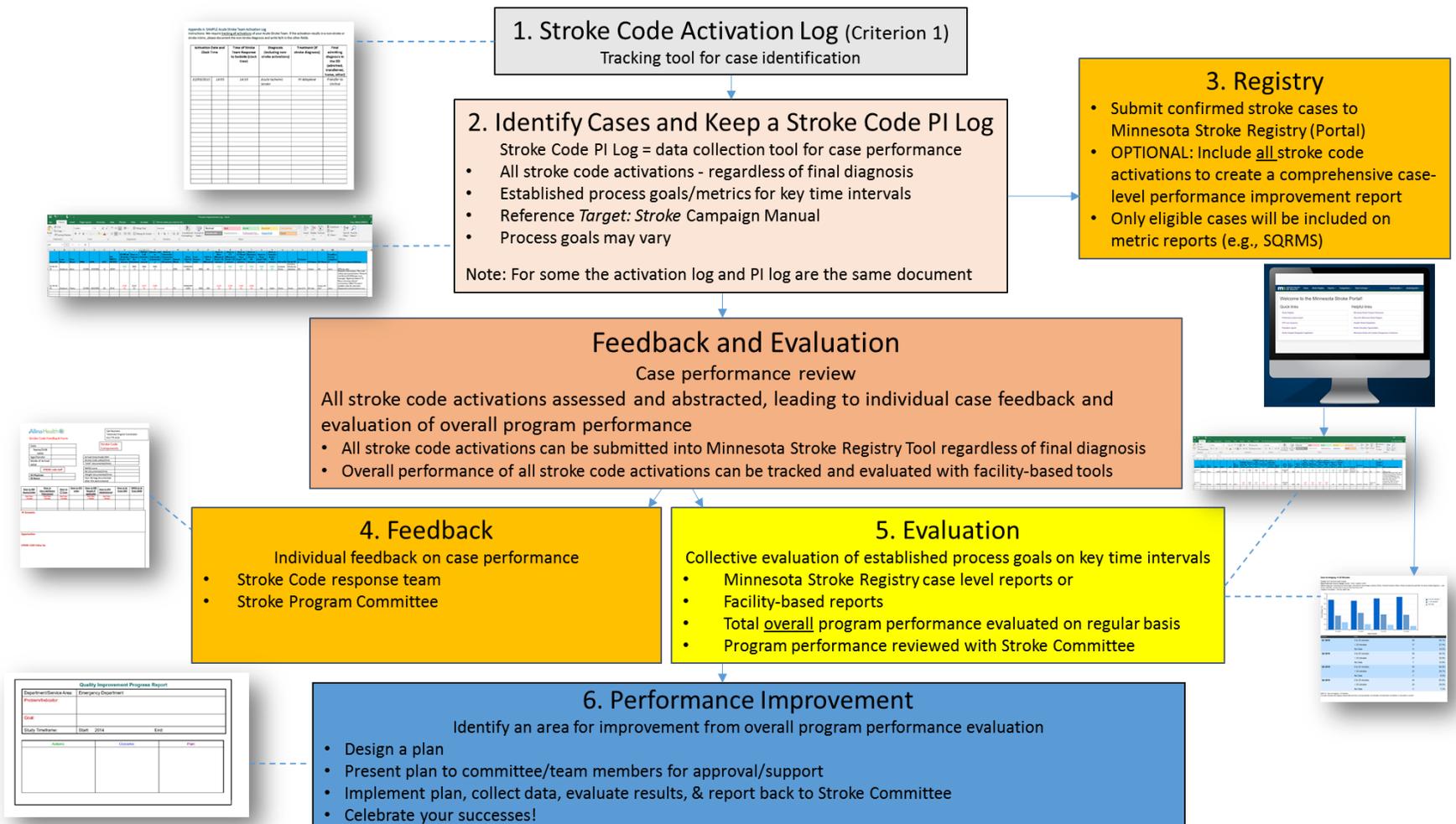
### **PI Project Successes – Showcase your improvements and celebrate your successes!**

- Share within Stroke Committee and with Leadership
- Share 1:1 feedback and successes with frontline stroke team members.
- Post results on the walls of the emergency department, break rooms, hallways, and meeting rooms. Create posters that show improvements over time.
- Write about projects and how they resulted in better patient care in staff-wide emails and newsletters.
- Recognize staff and their collective performance and success at meetings and events. Staff will feel pride and ownership in performance improvement when their efforts are visibly appreciated and celebrated!

Checkout and celebrate what your ASRH peers are up to for Quality Improvement and consider showcasing your own achievements in the next Quality Improvement Award Program!

*Reference MDH Stroke Program Quality Improvement Award Program*  
<https://www.health.state.mn.us/diseases/cardiovascular/stroke/qualityimprovement.html>

## Appendix A: Stroke Performance Improvement Model<sup>®</sup>



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# PHASE III TARGET: STROKE<sup>SM</sup>

## PATIENT TIME TRACKER

**ACUTE ISCHEMIC STROKE TREATMENT GOAL:**

- DTN Time Within 60 Minutes
- DTN Time Within 45 Minutes
- DTN Time Within 30 Minutes
- DTD Time Within 90 Minutes (Direct Arriving)
- DTD Time Within 60 Minutes (Transfers)

Place patient sticker here

Last Known Well Date: \_\_\_\_\_ Time: \_\_\_\_\_

Weight: \_\_\_\_\_ (kg) Total IV thrombolytic Dose: \_\_\_\_\_ (mg) IV thrombolytic Bolus: \_\_\_\_\_ (mg)

Clock starts for Door-to-Needle (DTN) and/or Door-to-Device (DTD)	Date*	Clock Time
Patient Arrival:	_____	_____
Stroke Team Activation:	_____	_____
Stroke Team Arrival:	_____	_____
ED Physician Assessment:	_____	_____
Brain Imaging Ordered:	_____	_____
Brain Imaging Initiated:	_____	_____
Brain Imaging Interpreted:	_____	_____
Lab Tests Ordered:	_____	_____
Lab Test Completed:	_____	_____
IV thrombolytic Ordered*:	_____	_____
IV thrombolytic initiated: (Goal < 60, 45 or 30 minutes)	_____	_____

Interventional team activated: \_\_\_\_\_ Interventional team arrival: \_\_\_\_\_

Patient arrival in interventional suite: \_\_\_\_\_ Puncture: \_\_\_\_\_

\*\*First pass of mechanical reperfusion device (Goal < 60, 90 minutes) \_\_\_\_\_

\*\*Reperfusion (TICI Grade 2B/3 achieved) \_\_\_\_\_

\*Date only needs to be entered once, unless the time span crosses midnight and date changes

\*If IV thrombolytic not given or delayed, select reason(s) for non-treatment within the Patient Management Tool™ (PMT). See Get With The Guidelines® coding instructions for definitions.

DTN Time data feedback provided.

**DOOR TO DEVICE (DTD)**  
 \*\*If mechanical reperfusion not achieved or delayed, select reason(s) for non-treatment within the Patient Management Tool™ (PMT). See Get With The Guidelines® coding instructions for definitions.

DTD Time data feedback provided

How patient arrived at your hospital  Direct Presentation  Transfer

**Patient's Care Team Members**

Patient time tracker sheets are valuable quality improvement tools. Using time tracker sheets raises stroke team members' awareness of DTN time. Reviewing sheets can help to identify problem areas or aid in spotting patterns to target for process change.

# PHASE III TARGET: STROKE<sup>SM</sup>

## SUGGESTED TIME INTERVAL GOALS



### THE 30 MINUTES DTN GOAL TIME INTERVAL GOALS ARE:

ACTION	TIME
Door to physician	≤2.5 minutes
Door to stroke team	≤5 minutes
Door to CT/MRI initiation	≤15 minutes
Door to CT/MRI interpretation	≤25 minutes
Door to needle time	≤30 minutes



### THE 45 MINUTES DTN GOAL TIME INTERVAL GOALS ARE:

ACTION	TIME
Door to physician	≤5 minutes
Door to stroke team	≤10 minutes
Door to CT/MRI initiation	≤20 minutes
Door to CT/MRI interpretation	≤35 minutes
Door to needle time	≤45 minutes



### THE 60 MINUTES DTN GOAL TIME INTERVAL GOALS ARE:

ACTION	TIME
Door to physician	≤10 minutes
Door to stroke team	≤15 minutes
Door to CT/MRI initiation	≤25 minutes
Door to CT/MRI interpretation	≤45 minutes
Door to needle time	≤60 minutes



### THE 90 MINUTES DTD GOAL TIME INTERVAL GOALS ARE:

ACTION	TIME
Door to physician	≤5 minutes
Door to stroke team	≤10 minutes
Door to CT/MRI initiation	≤20 minutes
Door to CT/MRI interpretation	≤35 minutes
Door to neurointerventional team activation	≤40 minutes
Door to needle time	≤45 minutes
Door to patient arrival in NI suite	≤60 minutes
Door to puncture	≤75 minutes
Door to device	≤90 minutes

The suggested time intervals are intended to facilitate time interval benchmarking and quality improvement efforts towards achieving the Target: Stroke DTN and DTD goals. The interval benchmarks may be modified as needed. Individual institutions may wish to modify these to achieve ultimate intervention within recommended time frame.

## Appendix D: Plan Do Study Act (PDSA) Considerations Checklist

### PLAN

#### Step 1: Identify area for improvement.

- Identify the new process, change, problem, or opportunity for improvement.

#### Step 2: Assemble a team and develop SMARTIE aim.

- Designate a team member that knows the process/change/problem.
- Specify team member roles and responsibilities, set timelines, and agree on a meeting schedule.
- Develop a SMARTIE (specific, measurable, aligned, realistic, time-bound, inclusive, and equitable) aim statement guided by improvement questions:
  - What are we trying to accomplish?
  - How will we know that a change is an improvement?
  - What change can we make that will result in improvement?

#### Step 3: Describe current process.

- Examine the current approach or process flow.
- Gather existing baseline data or create a plan to obtain needed baseline data.
- Obtain input from stakeholders, process owners, and subject matter experts.

#### Step 4: Identify potential change/PI strategies and develop action plan.

- Determine root causes of the problem or impact of new process (if applicable). Tools to consider for exploring root causes:
  - Fishbone diagram/cause effect diagram
  - 5 whysTools to consider for process related changes:
  - Flowcharts
  - Swim lane maps
- Brainstorm and identify all potential approaches and predictions based on root causes with team.
- Select and develop performance improvement strategy (or strategies) most likely to achieve the SMARTIE aim and test the theory on a small scale.
- Create plan to carry out strategy (who, what, where, when)

### DO

#### Step 5: Test the process improvement.

- Carry out the test on a small scale.
- Collect, chart, and display data to determine the effectiveness of the change strategy.
- Monitor fidelity of implementation of the change, document problems, observations, lessons learned and unexpected effects.

### STUDY

#### Step 6: Study the results.

- Study and analyze the data. Did your plan results in an improvement? By how much or how little?
- Determine if the change results in outcomes you predicted. Were there any surprises and/or unintended consequences?
- Describe and report what you learned.

## ACT

### Step 7: Establish future plans.

- Adapt** (*modify, keep testing, and repeat PDSA cycle*), **adopt** (*standardize and scale up successful change*), **or abandon** (*change approach entirely and execute new PDSA cycle*) until improvement or ideal state for new process is achieved.
- Repeat the PDSA cycle, when needed.
- Keep monitoring, take steps to preserve gains and sustain successes.
- Make long-term plans for additional improvements.
- CELEBRATE and SHARE your success! Consider applying for MDH's Stroke Quality Improvement Award!**