

## Primary Stroke Service Consumer Information

Welcome. On this website you will find data from the [Primary Stroke Service \(PSS\)](#) hospitals in Massachusetts (MA). This information will help you assess the quality of [acute stroke](#) care provided in MA. In the data section of this website, you will find graphs that show how well hospitals in MA are performing with regards to admitting patients, assessing patients, and providing patients with the appropriate treatment for acute stroke. Talk to your doctor about this information to help you, your family, and your friends make your best hospital care decisions around stroke.

### **What is Primary Stroke Service (PSS)?**

The Massachusetts Department of Public Health (MDPH) began designating hospitals meeting the requirements for Primary Stroke Service (PSS) in 2004 with a goal to improve stroke care in Massachusetts. PSS designation requires that hospitals follow very specific stroke protocols for patient assessment and care and commit to continuous education of the public about warning signs and symptoms of stroke. As part of its PSS designation, a hospital must provide emergency diagnostic and therapeutic services 24 hours-a-day, seven days-a-week to patients presenting with symptoms of acute stroke. These services are needed to ensure that every patient who arrives within hours of the start of their stroke symptoms and is eligible can be treated with [IV-tPA](#). In follow-up to the PSS program, a plan was created requiring ambulances to transport patients presenting with symptoms of acute stroke to the nearest designated PSS hospital (bypassing non-PSS hospitals even if they are closer). Currently there are 69 MA hospitals that have been designated as PSS hospitals.

[Click here to view the list of PSS hospitals <<link to PSS hospital list/map>>](#)

### **Where does the Primary Stroke Service (PSS) data come from?**

As part of their designation, the 69 PSS hospitals are required to collect data on all patients who present to their Emergency Departments with acute stroke symptoms within three hours from when they were [last known to be well](#). These data are entered without patient identifiers into a central registry. The statewide information in the graphs on the data page of this website represents data from the PSS registry for the time period of January 2006 to December 2007. The national comparative statistics are provided from the American Heart Association's *Get With The Guidelines<sup>SM</sup>-Stroke* program which includes acute stroke and TIA cases from over 1,400 hospitals located in all 50 states, including districts and territories (DC & PR). <http://www.americanheart.org/getwiththeguidelines>

### **Available data:**

Currently only aggregate data (which *does not* identify any specific hospital) are being displayed on the data page of this website. Individual hospital data will be available on this site in the future.

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## Important Information about Stroke and Stroke Treatment

- [What is a Stroke?](#) (hyperlink to answer)
- [What is an Acute Stroke?](#) (hyperlink to answer)
- [What is IV-tPA?](#) (hyperlink to answer)
- [How does IV-tPA help people having a stroke?](#) (hyperlink to answer)
- [What is “Last Known to be Well” ?](#) (hyperlink to answer)

### What is a Stroke?

A stroke is a sudden interruption in the blood supply of the brain. Most strokes (about 80%) are caused by a sudden blockage of arteries leading to the brain ([ischemic stroke](#)) <<link to AHA website—link below>>. Other strokes are caused by bleeding into brain tissue when a blood vessel bursts ([hemorrhagic stroke](#)) <<link to AHA website—link below>>. Because stroke occurs rapidly and requires immediate treatment, stroke is also called a *brain attack*. Stroke has many consequences. To learn more about the signs and symptoms of stroke and its effects [click here](#). <<link to AHA website>>.

<<Link to FAST

### What is an Acute Stroke?

Acute stroke refers to a current blockage in a vessel to or in the brain that has just occurred (within hours of its onset). Prompt treatment improves the chances of survival and decreases disability that may be expected. A person who may have suffered a stroke should be seen in a hospital Emergency Department without delay. If given within three hours of when the person was [last known to be well](#), a clot-busting drug called [intravenous-tissue plasminogen activator \(IV-tPA\)](#) can reduce long-term disability for [ischemic stroke](#)—the most common type of stroke. IV-tPA is the only medication approved for the treatment of acute stroke (Source: <http://www.answers.com/topic/stroke> accessed 12/11/2008). <http://www.americanheart.org/presenter.jhtml?identifier=3053#Stroke> Accessed 12/12/08

### What is IV-tPA?

Intravenous Tissue Plasminogen Activator (IV-tPA) is a thrombolytic agent (clot-busting drug). It is approved for use in certain patients having a heart attack or stroke. The drug can dissolve blood clots, which cause most heart attacks and strokes. IV-tPA is the only drug approved by the U.S. Food and Drug Administration (FDA) for the acute, urgent treatment of [ischemic stroke](#).

### How does IV-tPA help people having a stroke?

IV-tPA has been shown to be effective in treating ischemic stroke, the kind of stroke that is caused by blood clots that block blood flow to the brain. In 1996 the U.S. Food and Drug Administration (FDA) approved the use of IV-tPA to treat ischemic stroke in the first three hours after the start of symptoms in eligible patients. (Note: Not all patients qualify for IV-tPA. The best way to determine if you qualify is to be assessed as soon as possible). It is very important for people who think that they are having a stroke to seek help immediately and call 9-1-1. If given promptly, IV-tPA can significantly reduce the effects of stroke and reduce permanent disability. IV-tPA is FDA approved only to be given to a person within the first three hours after the start of their stroke symptoms which is why it is so important for stroke patients to get to the hospital quickly. (Source: <http://www.americanheart.org/presenter.jhtml?identifier=4751> accessed 12/11/2008).

**What is “last known to be well”?**

Sometimes it is easy to determine when stroke symptoms began especially if they are witnessed by another person. However, other times it may be difficult to establish when the symptoms of a stroke started. In these circumstances it is important to know when the patient was last known to be functioning normally (before their stroke symptoms started) to determine treatment and to reduce the risk of a complication with IV-tPA. This is known as the time “last known to be well,” and it is the earliest possible time at which the stroke might have begun.

**Definitions**

**What is a median?**

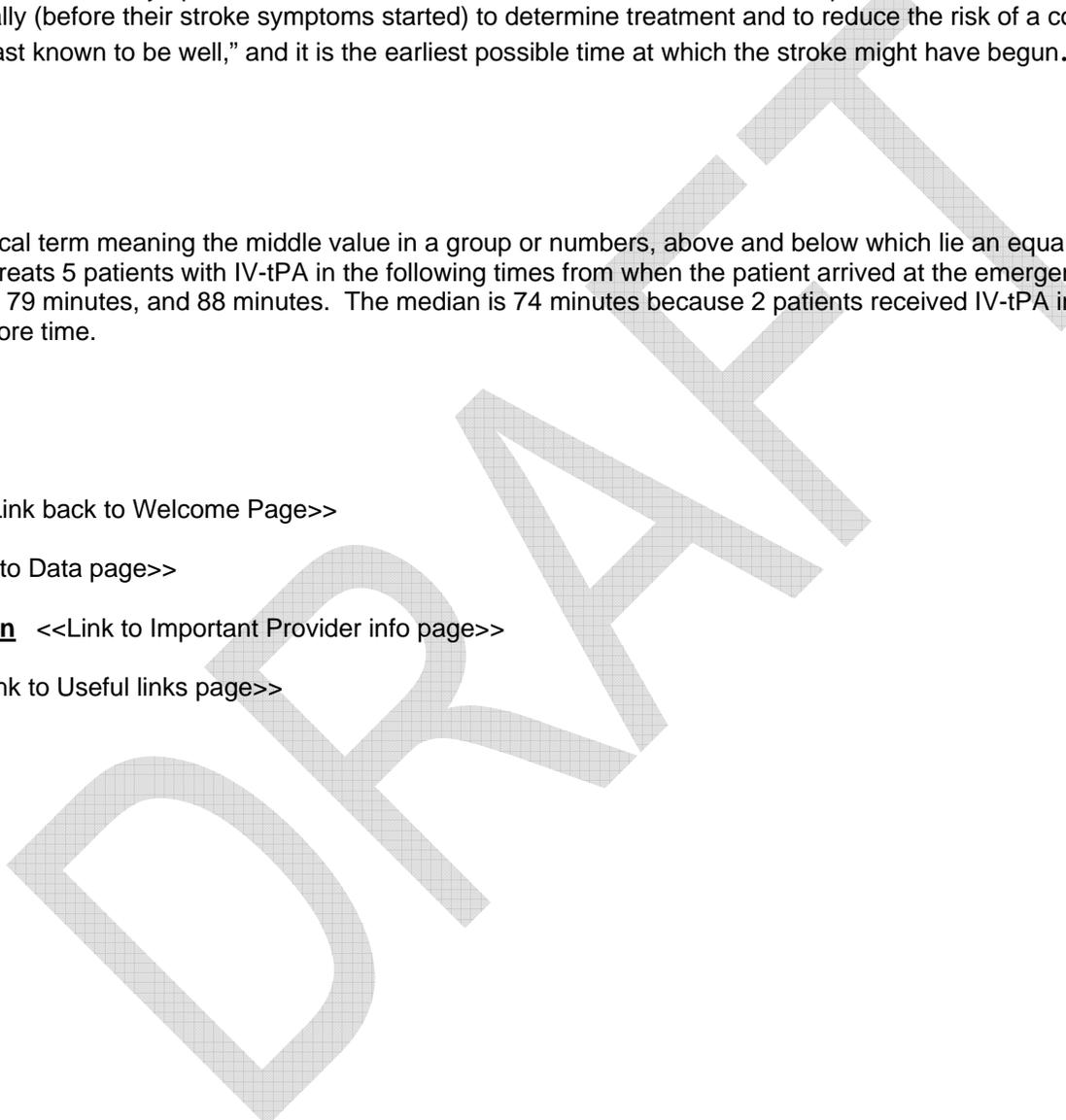
A median is a statistical term meaning the middle value in a group or numbers, above and below which lie an equal number of values. For example, a hospital treats 5 patients with IV-tPA in the following times from when the patient arrived at the emergency department; 64 minutes, 72 minutes, 74 minutes, 79 minutes, and 88 minutes. The median is 74 minutes because 2 patients received IV-tPA in less time and two patients received IV-tPA in more time.

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# Data Page

## Information about Hospital Performance

Performance rates tell you the proportion of cases where a hospital provided the recommended process of care. Only patients meeting certain criteria are included in the calculation of the rate for a measure. A rate of 75% means that the hospital provided the recommended process of care 75% of the time. For example, the rates for eligible stroke patients who received IV- tPA in MA PSS hospital Emergency Departments tells you the percentage of patients who received IV-tPA within three hours of the time they were last known to be well. The seven figures below represent how well hospitals are adhering to preset indicators of stroke care.

**Time period:** the data reported in the following bar graphs are from January 2006 to December 2007.

<<hyperlink to each data page by clicking on title>>

## Timeliness of Arrival to the Emergency Department

PSS regulations require that hospitals incorporate a stroke education component into their Community Education outreach efforts. While not indicators of hospital care, Figures 1 and 2 represent the timeliness of patient arrival to Emergency Departments. These data reveal the need for continued efforts to increase knowledge among the public of stroke signs and symptoms and the importance of calling 9-1-1.

1. Percentage of all ischemic stroke patients who arrived at MA PSS Emergency Departments within two hours of the time that they were last known to be well
2. Distribution of patient arrival times

## Treatment with IV-tPA

IV-tPA is a proven intervention for eligible acute ischemic stroke patients who arrive at the Emergency Department within three hours from the time they were last known to be well. However, for a variety of reasons, only a small percentage of patients with acute ischemic stroke receive IV-tPA. The benefits of IV-tPA in acute ischemic stroke are based on time. The recommendation is to start treatment in eligible patients within 60 minutes of arrival at the Emergency Department. Figures 3-6 represent the rates of IV-tPA administration and timeliness of treatment.

3. Percentage of all ischemic stroke patients who received IV-tPA within three hours of the time they were last known to be well
4. Percentage of eligible ischemic stroke patients who received IV-tPA
5. Percentage of eligible ischemic stroke patients who received IV-tPA within 60 minutes from arrival
6. Median times (in minutes) from Emergency Department arrival to IV-tPA administration in IV-tPA recipients

## Brain Imaging

Rapid brain imaging is a critical step in facilitating the use of IV-tPA. For patients in whom IV-tPA should be considered, brain imaging should be performed as rapidly as possible, ideally within 25 minutes of arrival to the Emergency Department. Figure 7 depicts those eligible ischemic stroke patients at MA PSS hospitals who met this time recommendation.

### 7. Percentage of eligible ischemic stroke patients who had brain imaging completed within 25 minutes of arrival

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## Timeliness of Arrival to the Emergency Department

1. **Percentage of all ischemic stroke patients who arrived at MA PSS Emergency Departments within two hours of the time that they were last known to be well. *Results are displayed regionally and statewide with a national comparison.***

Recognizing stroke symptoms and calling 9-1-1 are the first steps to receiving timely treatment for stroke. The following figure depicts, by [region](#), [<< hyperlink to description of regions>>](#) the percentage of ischemic stroke patients who arrived at a MA PSS hospital Emergency Department within two hours of the time they were last known to be well. Statewide, less than \_\_\_% of ischemic stroke patients in MA PSS hospitals arrived at the hospital Emergency Department within the first two hours. Since early treatment is associated with better recovery, this graph highlights the importance of educating the community about the recognition of stroke symptoms and the need to call 9-1-1.

Select link below to see regional map and list of hospitals in region.

[Metro Boston](#)

[Northeast](#)

[Southeast](#)

[Central](#)

[West](#)

[<< link to a page showing regions and hospitals within regions>>](#)

## Timeliness of Arrival to the Emergency Department

### 2. Distribution of patient arrival times to MA PSS Emergency Departments.

*Arrival time is broken down into less than 1, 1 to 2, 2 to 3, or 3 or more hours from the time last known to be well.*

The following figure shows the timeframe in which patients arrived at a PSS hospital Emergency Department from the time they were last known to be well. An 'unknown' time would indicate that the date and/or time the patient was last known to be well could not be determined. This figure illustrates that over \_\_\_% of ischemic stroke patients arriving at PSS hospital Emergency Departments do not arrive within three hours of the time they were last known to be well and are therefore outside the FDA approved time window for treatment with IV-tPA.

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### Treatment with IV-tPA

**3. Percentage of all ischemic stroke patients who received IV-tPA within three hours of the time they were last known to be well at MA PSS Emergency Departments.**

The following figure depicts the statewide percentage of all ischemic stroke patients who arrived at MA PSS hospital Emergency Departments within three hours of the time they were last known to be well and who received IV-tPA. While greater than the comparable national average (\_\_%), the statewide average is \_\_%. One reason why the percentages are low in both cases may be that the majority of patients arrive too late for treatment (as shown in Figures 1 & 2), but many factors contribute to determining if patients are appropriate candidates for IV-tPA.

## Treatment with IV-tPA

### 4. Percentage of eligible ischemic stroke patients who received IV-tPA at MA PSS hospital Emergency Department.

The following graph shows the percentage of eligible stroke patients who received IV-tPA at a MA PSS hospital Emergency Department. The evaluation of patients with stroke is complex and challenging to complete in less than one hour, therefore, the data in this figure include only those patients who arrive within two hours from the start of their symptoms leaving at least one hour for patient evaluation and treatment with IV-tPA . Eligible patients consist of ischemic stroke patients who arrived at the Emergency Department of a MA PSS hospital within two hours of the time they were last known to be well and who had no contraindications for IV-tPA use. These data are broken down to show the range of performance among the top 10%, top 50%, and bottom 10% of hospitals.

#### What does this graph show?

This graph shows that the top hospital treated \_\_\_ of their eligible stroke patients with IV-tPA in 2006 and 2007. Likewise, The top 10% (\_\_\_ hospitals) also treated \_\_\_ of their eligible patients. The top 50% (\_\_\_ hospitals) treated a range of \_\_\_% to \_\_\_% of their eligible patients. The bottom 10% (\_\_\_ hospitals) treated only \_\_\_% to \_\_\_% of their eligible patients and the bottom hospital treated \_\_. \_\_\_ hospitals had no eligible patients visit their Emergency Department. Overall \_\_\_% of \_\_\_ eligible patients were treated in Massachusetts, more than the national rate which was \_\_\_%.

### Treatment with IV-tPA

#### 5. Percentage of eligible ischemic stroke patients who received IV-tPA within 60 minutes from arrival at MA PSS hospital Emergency Department.

All hospitals strive to treat eligible patients with IV-tPA as rapidly as possible. The ultimate goal is to treat most patients within one hour of hospital arrival. Nationally, less than \_\_\_% of patients receive IV-tPA within 60 minutes. The following graph shows the percentage of ischemic stroke patients in MA PSS hospital Emergency Departments who received IV-tPA within 60 minutes from arrival at the Emergency Department. The data are broken down to show the range of performance among the top 10%, top 50%, and bottom \_\_\_% of hospitals because \_\_\_\_ of hospitals did not treat any patients within 60 minutes.

#### What does this graph show?

This graph shows that the top hospital gave IV-tPA within 60 minutes from the time the patient arrived at the ED to \_\_\_% of the patients who received IV-tPA. The top 10% (\_\_\_ hospitals) gave IV-tPA within 60 minutes to \_\_\_% to \_\_\_% of their patients who received IV-tPA. The top 50% (\_\_\_ hospitals) gave \_\_\_% to \_\_\_, while \_\_\_% (\_\_\_ hospitals) did not give any patients IV-tPA within 60 minutes of ED arrival. \_\_\_ hospitals did not treat any ischemic stroke patients with IV-tPA. Overall \_\_\_% of \_\_\_ patients who received IV-tPA were treated within 60 minutes of ED arrival.

## Treatment with IV-tPA

### 6. Median times (in minutes) from Emergency Department arrival to IV-tPA administration in IV-tPA recipients.

Prompt treatment of eligible ischemic stroke patients with IV-tPA improves the chances of survival and increases the degree of recovery that may be expected. The following graph shows the **median** [<<hyperlink to definition of median>>](#) times from ED arrival to IV-tPA administration for acute stroke patients who received IV-tPA in MA PSS hospital Emergency Departments. Reporting the median time is another way to measure how swiftly hospitals are delivering treatment. (A median time of \_\_ minutes, for example, tells you that half of the patients who were treated with IV-tPA were treated in less than \_\_ minutes, and half were treated in more than \_\_ minutes.)

#### What does this graph show?

This graph shows that half of the patients given IV-tPA in the top hospital received it within \_\_ minutes from the time the patient arrived at the Emergency Department. The top 10% (\_\_ hospitals) gave IV-tPA to half their patients within \_\_ to \_\_ minutes from ED arrival. Fifty percent (\_\_ hospitals) gave IV-tPA to half their patients within \_\_ to \_\_ minutes from ED arrival and the bottom 10% (\_\_ hospitals) gave IV-tPA to half within \_\_ to \_\_ minutes. Half of the patients given IV-tPA in the bottom hospitals received it within \_\_ minutes from ED arrival. \_\_ hospitals did not treat any ischemic stroke patients with IV-tPA. Overall, half of the \_\_ patients receiving IV-tPA in Massachusetts were given IV-tPA within \_\_ minutes of ED arrival, while nationwide, half received IV-tPA within \_\_ minutes.

## Brain Imaging

### 7. Percentage of eligible ischemic stroke patients who had brain imaging completed within 25 minutes from arrival at MA PSS hospital Emergency Department.

In order for patients to be treated with IV-tPA, brain imaging needs to be completed to confirm the type of stroke that the patient is experiencing. Timely brain imaging is key to good stroke care and completion within 25 minutes of hospital arrival is considered an ideal benchmark <<ref/link to NINDS time targets>>. The following graph shows the percentage of eligible patients who had brain imaging completed within 25 minutes from arrival at a MA PSS hospital Emergency Department.

#### What does this graph show?

This graph shows that the top hospital completed brain imaging within 25 minutes from the time the patient arrived at the ED for \_\_\_ of their eligible patients. The top 10% (\_\_\_ hospitals) completed brain imaging within 25 minutes of ED arrival for \_\_\_% to \_\_\_%. The top 50% (\_\_\_ hospitals) completed brain imaging within 25 minutes of ED arrival for \_\_\_% to \_\_\_% of their eligible patients. The bottom 10% (\_\_\_ hospitals) completed imaging for only \_\_\_% to \_\_\_% of their eligible patients and the bottom hospital \_\_\_\_\_ eligible patients within 25 minutes of ED arrival. Five hospitals had no eligible patients visit their Emergency Department. Overall \_\_\_% of \_\_\_ eligible patients had a brain image completed within 25 minutes of ED arrival in Massachusetts.

## Provider Information

Information on this page is directed towards healthcare providers and contains relevant background information as well as detailed information on measure definitions and patient exclusions which will likely be of interest to healthcare providers.

For further information regarding data, eligibility and measure calculations, please contact: <<List MDPH Contacts or Link to a Contacts page>>

### Development & Oversight of the PSS Program

The Massachusetts Department of Public Health promulgated hospital licensure regulations for Primary Stroke Services (PSS) in 2004. Regulations were modeled on the [Brain Attack Coalition Consensus Statement](#), *JAMA*, 2000; 283: 3102–3109 <<LINK TO THE BAC STATEMENT HERE>>. While the Division of Healthcare Quality at the MA Department of Public Health is responsible for oversight of the PSS program, a Hospital Stroke Care Advisory Committee was formed to provide guidance on the development of the program including the release of data for public consumption. The Committee is comprised of a diverse group of clinical and quality improvement experts appointed by statewide professional organizations relevant to the delivery of acute stroke care in Massachusetts.

Organizations represented include:

- American Association of Neuroscience Nurses
- American Heart Association/American Stroke Association
- EMS Regional Councils
- Massachusetts Association for Healthcare Quality
- Massachusetts College of Emergency Physicians
- Massachusetts Emergency Nurses Association
- Massachusetts Hospital Association
- Massachusetts Neurologic Association
- Massachusetts Speech Language Hearing Association
- Society of Hospital Medicine

### Background on Data

- The statewide information in the graphs on the data page comes from data entered into the PSS registry (which is operated by [Outcome Sciences, Inc.](#), Cambridge, MA) between January 2006 and December 2007.
- Data were collected for all patients presenting to Emergency Departments at MA PSS hospitals with symptoms of acute stroke who arrived within three hours of the time they were last known to be well and were discharged with a diagnosis of ischemic stroke.
- The comparative national statistics come from Get With The Guidelines<sup>SM</sup>–Stroke (GWTG–S) data.
- GWTG-S is the American Heart Association's collaborative performance improvement program, demonstrated to improve adherence to evidence-based care of patients hospitalized with stroke. The GWTG-S registry (which is operated by Outcome Sciences, Inc., Cambridge, MA) includes acute stroke and TIA cases from over 1,400 hospitals located in all 50 states, including districts and territories

(DC & PR). Data from this registry provide us with the best estimates for national statistics at this time, comparable to Massachusetts data.

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## Useful Links

- Amendments to the Hospital Licensure Regulations (105 CMR 130.000) 105 CMR 130.1400 Primary Stroke Service Licensure Regulations: [http://www.mass.gov/Eeohhs2/docs/dph/regs/105cmr103\\_140\\_amend.doc](http://www.mass.gov/Eeohhs2/docs/dph/regs/105cmr103_140_amend.doc)
- PSS Circular Letters: [http://www.mass.gov/Eeohhs2/docs/dph/quality/hcq\\_circular\\_letters/hospital\\_stroke\\_065460.rtf](http://www.mass.gov/Eeohhs2/docs/dph/quality/hcq_circular_letters/hospital_stroke_065460.rtf)
- Point of Entry Plan: [http://www.mass.gov/Eeohhs2/docs/dph/emergency\\_services/ambulance\\_stroke\\_point\\_of\\_entry.pdf](http://www.mass.gov/Eeohhs2/docs/dph/emergency_services/ambulance_stroke_point_of_entry.pdf)
- Treatment Guidelines for Ischemic Stroke (article): <http://stroke.ahajournals.org/cgi/content/full/38/5/1655>
- NINDS Trial: [http://www.ninds.nih.gov/news\\_and\\_events/proceedings/stroke\\_proceedings/execsum.htm](http://www.ninds.nih.gov/news_and_events/proceedings/stroke_proceedings/execsum.htm)
- GWTG Website: <http://www.americanheart.org/getwiththeguidelines>
- SCORE: [http://www.mass.gov/?pageID=eohhs2terminal&L=6&L0=Home&L1=Provider&L2=Guidelines+and+Resources&L3=Guidelines+for+Services+%26+Planning&L4=Diseases+and+Conditions&L5=Heart+Disease+and+Stroke+Prevention&sid=Eeohhs2&b=terminalcontent&f=dph\\_com\\_health\\_heart\\_stroke\\_p\\_score&csid=Eeohhs2](http://www.mass.gov/?pageID=eohhs2terminal&L=6&L0=Home&L1=Provider&L2=Guidelines+and+Resources&L3=Guidelines+for+Services+%26+Planning&L4=Diseases+and+Conditions&L5=Heart+Disease+and+Stroke+Prevention&sid=Eeohhs2&b=terminalcontent&f=dph_com_health_heart_stroke_p_score&csid=Eeohhs2)
- Primary Stroke Hospitals in Massachusetts <<Link to hospital list on web>>

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