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**TO:** Tom Bradley, Congressional Budget Office  
**FROM:** Sue Nelson, Vice President of Federal Advocacy, and Stephanie Mohl, Senior Government Relations Advisor, American Heart Association/American Stroke Association

**SUBJECT:** Proposal to Expand Medicare Reimbursement for “Telestroke”

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The purpose of this memo is to provide the CBO with information that relates to the estimated cost of a legislative proposal that would provide for Medicare reimbursement of acute stroke telehealth services and increased use of tPA drug treatment for ischemic stroke patients when they originate at a hospital in a non-rural area. This provision is included in Section 105 of the Telehealth Enhancement Act (H.R. 3306/S. 2662).

Telestroke Proposal

Medicare currently reimburses for a telestroke consult when the patient originates at a hospital in a rural area. This proposal would amend section 1834(m)(4) of the Social Security Act to permit a hospital or critical access hospital providing services related to the evaluation or treatment of an acute stroke to be an originating site for purposes of Medicare reimbursement for telehealth services, regardless of whether it is located outside of a rural Health Professional Shortage Area or in a Metropolitan Statistical Area. This would allow the distant site practitioner to be reimbursed by Medicare for the professional consultation service provided via telehealth for the evaluation and treatment of a patient with acute stroke. The proposal specifies that these new originating sites would *not* be paid the originating site facility fee. The proposal would expand diagnoses of ischemic stroke in the Medicare population and thus enable broader use of tPA drug therapy.

The Need to Expand Telestroke Consultations

A number of barriers currently prevent patients from receiving accurate diagnosis and treatment for stroke, including long distances or travel times to stroke center hospitals, a shortage of vascular neurologists, and patients not arriving at the hospital within the treatment time window. Even in urban settings, patients may experience delays to diagnosis and treatment, largely due to neurologists having competing demands on their time that prevent them from being in the Emergency Department 24/7 in person.

Ischemic stroke patients who receive the clot-busting thrombolytic therapy tPA, which was approved by the FDA in 1996, are at least 30 percent more likely to have minimal or no disability at three months, compared to patients who do not receive this therapy.<sup>1</sup> (This study did not find a difference in mortality between patients who receive tPA and those who don't.) To be most effective, this therapy must be administered as quickly as possible but within no longer than 3 to 4.5 hours of stroke symptom onset. Hemorrhagic stroke patients are not candidates for tPA therapy. Telestroke has been proven to improve the quality of stroke care that patients receive, increase the utilization of evidence-based stroke treatments, and reduce stroke-related disability.

## Estimate of New Medicare Beneficiaries Treated Under the Proposal

Allowing for Medicare reimbursement for telestroke consultations in urban and suburban areas would increase the number of Medicare beneficiaries who receive telehealth consultations and drug therapy treatment. However, it would apply to a limited number of beneficiaries, as outlined below by two alternative estimation methods.

Method 1: Approximately 795,000 people in the United States experience a stroke each year<sup>2</sup>, and about 66 percent of the total hospitalizations for stroke occur among adults ages 65 and older.<sup>3</sup> Additionally, about 94 percent of all strokes occur in an urban or suburban area that are not currently Medicare telehealth originating sites<sup>4</sup>. As a result, we estimate that the number of Medicare beneficiaries 65 and older who have a stroke and would be newly eligible for a telestroke consultation to be approximately 522,811 in 2014. Of these beneficiaries, 87 percent<sup>2</sup>, or approximately 454,846 will have had an ischemic stroke. If we assume 3 percent growth in Medicare eligibles per year, the number of Medicare beneficiaries newly eligible for stroke consultation and ischemic treatment under the proposal would be:

$$795,000 \times 0.66 \times 0.94 \times 1.06 \text{ (pop. growth)} = 522,811 \text{ in 2014}$$
$$522,811 \times 0.87\% = 454,846$$

Method 2: A 2014 study of ischemic stroke hospitalization rates by age estimates that the overall stroke hospitalization rate was 1134 per 100,000 for those 65 years and older.<sup>5</sup> According to the most recent NHE projections, approximately 52.7 million persons are enrolled in the Medicare program in 2014. Using this figure and the rate of stroke hospitalization from the study, we calculate that approximately 597,618<sup>6</sup> hospitalizations for ischemic stroke occur each year in Medicare beneficiaries.

$$52,700,000/100,000 \times 1134 = 597,618$$

## Increased Medicare Costs Under the Proposal

There are two sources of increased costs to Medicare if Congress were to expand telestroke reimbursement to non-rural hospitals: 1) the reimbursement to the distant site hospital for the telestroke evaluation (emergency department or initial inpatient); and 2) the net increase in reimbursement to the originating site hospital due to the increased utilization of the thrombolytic (clot-busting) therapy tPA.

1) Consultation: According to the CMS Physician Fee Schedule Search Tool, the national payment amount for a telehealth consultation, emergency department or initial inpatient, is \$138.63 in 2014. (Note: For calculation purposes, we chose HCPCS code G0426, which is the middle amount among the HCPCS codes for emergency department or initial inpatient telehealth consultations, G0425-G0427.) We propose to restrict the use of the code only to those patients arriving within 4.5 hours of symptom onset. Given that the vast majority of stroke patients (73%) arrive after 3.5 hours, the number of eligible subjects is quite limited.<sup>7</sup> By restricting reimbursement for a telestroke evaluation only to stroke patients arriving within the treatment window, the cost to Medicare declines dramatically to \$19.57 million.

$$522,811 \times (1.00 - 0.73\%) \times \$138.63 = \$19.57\text{m}$$

2) Drug therapy: Only ischemic stroke patients who arrive at the hospital within 4.5 hours of symptom onset are eligible candidates to receive the thrombolytic therapy tPA. As a result of this and other barriers, the national average tPA treatment rate for Medicare-eligible hospital discharges is only 2.4%.<sup>8</sup> The use of telestroke has been shown to increase the utilization of tPA by two to six times.<sup>9</sup> For the purposes of calculating the net increase in Medicare payments for tPA resulting from increased use of telestroke, we assume that the tPA utilization rate would triple to 7.2%. This is comparable to the treatment rate achieved by The Joint Commission-certified primary stroke centers.<sup>10</sup> Based on this data, we calculate that an additional 21,833 Medicare beneficiaries with ischemic stroke could be treated with tPA each year. The net difference in Medicare reimbursement for ischemic stroke patients treated with tPA (MS-DRG 63), relative to Medicare reimbursement for stroke patients who did not

receive tPA (MS-DRG 66), was \$3,823 in FY2014.<sup>11</sup> We therefore calculate that the increased cost to Medicare as a result of increasing utilization of tPA would be approximately \$83.47 million annually.

$$454,846 \times (0.072 - 0.024) = 21,833$$
$$21,833 \times \$3,823 = \$83.47\text{m}$$

Total costs of expanding telestroke to all areas: \$19.57m + \$83.47m = \$103.04 million/year

### Savings to Medicare/Medicaid Under the Proposal

A number of studies have demonstrated that increasing the use of tPA by expanding the use of telestroke ultimately saves the health care system money by reducing disability and the need for inpatient rehabilitation or nursing home care services. Many of the health services that could be avoided by Medicare beneficiaries are covered under Medicare and Medicaid.

For example, a 1998 study published in the journal *Neurology* used data from the National Institute of Neurological Disorders and Stroke (NINDS) randomized, controlled tPA clinical trial to model the cost savings associated with increased use of tPA against the increased costs of its administration.<sup>12</sup> This study reported that patients receiving tPA were more likely to be discharged to home than to inpatient rehabilitation or nursing home care, compared to patients not receiving tPA (48% versus 36%). The study further projected a decrease in rehabilitation costs of \$2.29 million (in 2013 dollars) per 1,000 eligible treated patients and a decrease in nursing home costs of \$7.9 million (in 2013 dollars) per 1,000 eligible treated patients.<sup>13</sup>

Applying these projections to the estimates of the additional number of Medicare beneficiaries likely to be treated with tPA as a result of expanding the use of telestroke, we estimate savings of \$50.00 million in reduced rehabilitation costs and \$172.48 million in reduced nursing home costs at one year.

$$21,833/1000 \times \$2.29\text{m} = \$50.00 \text{ million}$$
$$21,833/1000 \times \$7.9\text{m} = \$172.48 \text{ million}^{14}$$

Another study that reinforces the anticipated savings, which was aimed at evaluating the cost utility of telestroke networks, determined that telestroke results in incremental cost savings of \$1,436 per patient over a patient's lifetime, after taking into account the costs of setting up and maintaining the network and increased initial hospitalization costs. The greatest cost savings were attributable to decreased nursing home care, with estimated lifetime nursing home savings of \$2,227 per patient.<sup>15</sup> Applying this savings estimate to the additional number of Medicare beneficiaries projected to be treated with tPA via telestroke, we project savings of \$48.62 million in nursing home costs alone. While this is a lifetime savings, not just annual, one would expect accrued savings to continue into each new year for patients who were spared long-term nursing home care. So the savings is acquired not just in the first year of the stroke, but in every year after that the patient remains independent.

Studies have also suggested that additional cost savings may be achieved for the health care system through greater use of telestroke networks by reducing the need to transfer patients; however, these studies have not modeled the cost savings associated with fewer transfers.<sup>16</sup>

$$\text{Total Savings: } \$50.00 + \$172.48\text{m} = \$222.48 \text{ million}$$

### Conclusion

Our estimates suggest that expanded use of telestroke in non-rural areas would minimally increase Medicare spending. In addition, we believe evidence that treatment improves patient outcomes and reduces the need for rehabilitation and nursing home care is robust and compelling, and therefore should be considered in the cost estimate. The \$222.48 million in cost savings attributed to the need for less rehabilitative and nursing home services can offset the \$103.04 million in increased costs to Medicare.

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- <sup>1</sup> The National Institute of Neurological Disorders and Stroke rt-PA Stroke Study Group. Tissue plasminogen activator for acute ischemic stroke. *N Engl J Med*. 1995;333:1581-1587.
- <sup>2</sup> Go AS, Mozaffarian D, Roger VL, et al. Heart Disease and Stroke Statistics-2014 Update: A Report from the American Heart Association. *Circulation*. 2014; 129.
- <sup>3</sup> Hall MJ, Levant S, DeFrances CJ. National Center for Health Statistics Data Brief: Hospitalization for Stroke in U.S. Hospitals, 1989-2009. May 2012. Accessed online at: <http://www.cdc.gov/nchs/data/databriefs/db95.pdf>.
- <sup>4</sup> Based on 2013 CDC survey data which reported the prevalence of stroke was 2.4% for adults living within a MSA and 3.2% for adults living outside a MSA. Using US Census Bureau estimates of the population living in MSAs and non-MSAs, we estimated the total number of strokes occurring in MSAs and non-MSAs.
- <sup>5</sup> Lichtman JH, Leifheit-Limson EC, Wang Y, Goldstein LB. Ischemic Stroke Hospitalization Rates by State and Age. *Stroke*. 2013; 44:ATMP43.
- <sup>6</sup> This number likely overstates the number of beneficiaries hospitalized for ischemic stroke each year because the rate of stroke hospitalization is likely lower for beneficiaries under age 65.
- <sup>7</sup> Tong D, Reeves MJ, Hernandez AF, Zhao X, Olson DM, Fonarow GC, Schwamm LH, Smith EE. Times from symptom onset to hospital arrival in the Get With The Guidelines-Stroke Program 2002 to 2009: temporal trends and implications. *Stroke*. 2012;43:1912-1917.
- <sup>8</sup> Kleindorfer DO, Yingying X, et al. US Geographic Distribution of rt-PA Utilization by Hospital for Acute Ischemic Stroke. *Stroke*. 2009;40:3580-3584.
- <sup>9</sup> Schwamm LH, Holloway RG, Amarenco P, Audebert HJ, Bakas T, Chumbler NR, et al. A review of the evidence for the use of telemedicine within stroke systems of care: a scientific statement from the American Heart Association/American Stroke Association. *Stroke*. 2009;40:2616-2634.
- <sup>10</sup> Mullen MT, Kasner SC, Kallan MJ, Kleindorfer DO, Albright KC, Carr BG. Joint Commission primary stroke centers utilize more rt-PA in the nationwide inpatient sample. *J Am Heart Assoc*. 2013;2:e000071.
- <sup>11</sup> <http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/FY2014-IPPS-Final-Rule-Home-Page.html>
- <sup>12</sup> Fagan SC, Morgenstern LB, Petitta A, Ward RE, et al. Cost-effectiveness of tissue plasminogen activator for acute ischemic stroke. *Neurology*. 1998;50:883-890.
- <sup>13</sup> These numbers have been updated for inflation. The original numbers in 1996 dollars were updated into 2013 dollars using the CMS Market Basket Index, 3rd Quarter Moving Average for 2010-based Skilled Nursing Facility and 2008-based based Rehabilitation, Psychiatric, and Long Term Care Hospitals with Capital. This was a conservative methodology for updating these figures for inflation. By contrast, using the BLS CPI-U, US City Average, Not Seasonally Adjusted, Medical Care Services to update for inflation, rehabilitation savings in 2013 dollars would be \$2.69 million and nursing home savings would be \$9.4 million.
- <sup>14</sup> We recognize that not all of these savings would accrue to the federal government. Nevertheless, we expect a significant portion of the savings to reduce spending for Medicare and the federal government's share of Medicaid.
- <sup>15</sup> Demaerschalk BM, Switzer JA, Xie J, Fan L, Villa KF, and Wu EQ. Cost utility of hub-and-spoke telestroke networks from societal perspective. *Am J Manag Care*. 2013;19:976-85.
- <sup>16</sup> Bashur RL, Shannon GW, Smith BR. The Empirical Foundations of Telemedicine Interventions for Chronic Disease Management. *Telemedicine and e-Health*. 2014;20:769-798.