# Neurosurgeons Associated With Few Stroke Deaths

Researchers at Dartmouth-Hitchcock Medical Center in Lebanon, New Hampshire, have found an association in the United States between a higher density of neurologists and neurosurgeons and a decreased risk of death from stroke. The findings of their study are described in the article *Association of a higher density of specialist neuroscience providers with fewer deaths from stroke in the United States population*. *Clinical article*, by Atman Desai, M.D., and colleagues, published today online in the Journal of Neurosurgery *[1].*

Desai and colleagues performed a retrospective analysis of data from the Area Resource File 2009-2010, a database containing county-level information on healthcare facilities and their utilization and expenditures; healthcare professionals and their training; and socioeconomic and environmental characteristics. In the 3,141 U.S. counties that were examined, the median number of deaths from stroke per million persons was 586. The median number of neuroscience providers per county was zero (0).

In an unadjusted analysis, the authors found that an increase of one neuroscience provider per million population was associated with 0.71 fewer deaths due to stroke per million population. In a multi-variate analysis, in which adjustments were made for county urbanicity, socioeconomic conditions and the density of general practitioners, an increase of one neurologist or neurosurgeon was associated with 0.38 fewer deaths from stroke per million population. Curiously, an increase in one general practitioner per million population was associated with 0.143 more stroke deaths in that population. The authors speculate that this may be due to a decreased density of neuroscience providers in counties with high numbers of general practitioners or to increased recruitment of general practitioners to high-risk locales.

The association between the density of neuroscience providers and fewer stroke deaths was present regardless of whether the county was rural or urban. Rural setting was associated with a significant increase in stroke-related deaths, whereas low level of education and persistent poverty were not significant factors.

In an editorial accompanying the article by Desai and colleagues, Fred G. Barker II, M.D., states that the most powerful finding of the report is "the much higher stroke-related mortality for rural residents." Barker points out the time-sensitive nature of stroke treatment and the lack of sophisticated stroke care in many areas. Of the 3,141 counties listed in the Area Resource File, 2,051 are classified as rural. Neurosurgeons are generally clustered in and around cities that house tertiary care hospitals, and thus there is large disparity in the density of neuroscience providers throughout U.S. counties. Desai and colleagues state that timely diagnosis and intervention depend on the immediate availability of both specialties, and this is

extremely important in cases of stroke.

Given the association found between the distribution of neuroscience providers and stroke-related deaths, Desai and colleagues conclude that the availability of local neurologists and neurosurgeons may be important for the overall likelihood of surviving a stroke, and thus specialist education and practice throughout the U.S. should be promoted.

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[1] http://thejns.org/doi/full/10.3171/2012.10.JNS12518