Access to State-of-the-Art Healthcare: a Missing Dynamic in Consumer Selection of a Retirement Community

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The top ten retirement destinations in the United States are compared to the State of Michigan with regard to the quality of medical care that can be readily obtained in the event of a medical emergency. Access to care during the following three medical emergencies was analyzed: cardiac arrest, thromboembolic (ischemic) stroke, and severe traumatic injury. In all instances, successful treatment is dependent on timely access to care. The authors report that, when combined with the health status of baby boomers and their migratory trends on retirement, access to tertiary medical care for the treatment of cardiac arrest, certified primary stroke centers, and level 1 trauma centers is the missing dynamic in the choice of retirement community among today’s prospective retirees. They recommend that physicians encourage this patient population to consider such factors when choosing a retirement community.


According to 2004 Census Community Profile data, the population aged 65 years and older comprised 12% of the total US population.1 The demographics of the United States are changing rapidly. In 2000, the number of Americans in this demographic group was 35 million. By 2030, it is projected that this group will number 71 million—nearly 20% of the total population.2 Ensuring high quality of life for our senior population, derived largely from access to state-of-the-art healthcare, is one of the greatest challenges that will face policymakers and urban planners in the next 2 decades.

Of course, not all senior adults have the same healthcare needs. There is a large difference between the healthcare needs of “active seniors,” who are more likely to be on their own and in good health, and the “chronic elderly,” who are more likely to be in assisted living facilities.3 The focus of this paper is on active seniors as they are most likely to continue living on their own rather than moving into group retirement homes or assisted living residences. Due to the number and differing lifestyle patterns of active seniors, the trends of an aging population will be explored through the cohort of American “baby boomers.” Baby boomers are the 77 million American citizens born after World War II between 1946 and 1964.4

We outline the demographic trends of this population and explore their migratory trends in retirement as related to three common health challenges faced by seniors for which treatment is dependent on ready access to care: cardiac arrest, thromboembolic (ischemic) stroke, and severe traumatic injury. Based on our findings, we suggest that access to state-of-the-art healthcare is the missing dynamic when individuals in this demographic group select retirement living communities. For the purposes of this study, accessibility is measured by the number of state-of-the-art healthcare facilities available within a “treatable distance” (ie, 25 miles or 30 minutes by ground).5 We encourage physicians to advise their patients to consider access to care when selecting a retirement location. We further recommend public policy intervention to ensure that aging adults have full access to life-saving opportunities.

Baby Boomers as Prospective Retirees

With the return of World War II veterans, a small postwar baby boom was expected in the years 1946-1948. When the birthrate started to decrease in 1948, demographers believed that the trend established in the years prior to the war would reach an all-time low. However, an unexpected boom in fertility rates occurred for an extended period, 1949-1964. During this time, married women had more children (ie, on average one additional child), leading to a historically large number of live births.6 The US birthrate peaked in 1957, declining to prewar levels in 1965—and continuing to fall to this day.7 As of July 1, 2005, there were an estimated 78.2 million baby boomers in the United States.8 Beginning January 1, 2006, an estimated 8000 baby boomers have a 60th birthday each day.8 National Center for Health Statistics data show the average life expectancy for a person aged 65 years in 2000 was 83 years.9

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Women who are currently at traditional retirement age, 65 years, can expect to live to 85 years.9

Women will continue to outnumber men with a gender gap that increases with age.9 In 2003, the female-to-male ratio for the demographic group aged 65 to 69 years was 11.5; for individuals aged 85 years and older, this ratio was 22.6.10

There were 35 million Americans older than 65 years in 2000, and it is estimated that there will be 54 million in this segment of the population by 2020.4 By 2030, there will be a doubling of older Americans as baby boomers pass through their 60s, 70s, and 80s.11 Almost 1 out of every 5 Americans—a total of 72 million people—will be aged 65 years or older by 2030.12

According to a 2005 survey conducted by the Del Webb Corporation (Bloomfield Hills, Mich), more than half of baby boomers expect to move to another state at retirement. Among those willing to move to another state, the most preferred states by age group are North Carolina (14% for individuals aged 41 to 49 years) and Florida (18% for individuals aged 50 to 59 years; 17% for those aged 60 to 69 years).13

A 2006 survey, conducted by Harris Interactive for the National Association of Realtors (Chicago, Ill), found that of almost 2000 American adults born between 1946 and 1964, approximately 42% would like to retire in the South, 32% in the West, 15% in the Midwest, and 12% in the Northeast.14 Half of the boomers who live in an urban area would like to retire in a small town or rural area. As such, the subsequent patterns of residential location by the elderly is intensifying with 56% residing in the suburbs, 23% residing in rural areas, and 21% residing in urban ones.3 A lower cost of living, being near family, quality of healthcare, better climate, and being near a body of water are all considerations consumers cite as important factors in their selection of a retirement location. More than a third wants to retire in an urban or suburban setting, motivated by quality healthcare and cultural activities.15 With the exception of a temperate climate, the State of Michigan could satisfy all these criteria. For this reason, a comparison was tabulated between Michigan and the top ten states to gain retirement-age population.

By 2030, the US Census Bureau16 estimates that the 10 states receiving the highest growth in population will have an average of one quarter of their populations aged 65 years and older. The South now accounts for 36% of the nation’s population. Using data from July 1, 2005, to July 1, 2006—and with Michigan as a comparator—the top ten states to gain retirement-age population were ranked in Table 1 according to the number of certified primary stroke centers to population served aged 65 years and older. Likewise, in Table 2, rankings are provided for these states according to the number of adult level I trauma centers for the demographic group. These top ten states represent a net migration of 2,193,386 of our populace. Texas gained 579,275 people (2.5%); Florida, 321,697 (1.8%); and California was third with 303,402. California did not make the top ten in percent increase, however, since it remains the most populated state at 36.5 million as of July 1, 2006. Florida is the nation’s “oldest” state having the highest percentage of people aged 65 years and older (17.6%).12 Nevada ranked second as its population climbed by 3.5%.

**Current Health Status**

According to the National Bureau of Economic Research,17 baby boomers appear to be heading for retirement in worse health than their predecessors—despite wide-held beliefs to the contrary.18,19 Their 2004 study17 revealed that individuals in this population (N=5000), then aged 51 to 56 years, had more pain, higher alcohol consumption levels, more psychiatric problems, and more difficulty with activities of daily living (eg, walking, climbing stairs) than those born between 1936 and 1941.

The raw data showed evidence that boomers on the verge of retirement are in a poorer state of health than their predecessors 12 years earlier.17 Continued gender disparities in functional status have also been found. More women (30%) than men (18%) reported difficulty in performing at least one task important for independent functioning, such as stooping or kneeling, reaching overhead, writing, walking two to three blocks, or lifting 10 pounds.20 This data is further supported by the Centers for Disease Control and Prevention,21 which reported that the baby boom generation accounted for over one half of all doctor visits in 2001. While the population aged 45 years and older rose by 11% in the past decade, physician visits for that age group increased by 26%. The leading diagnoses prompting these visits included hypertension and diabetes, both of which are modifiable risk factors for stroke and coronary heart disease.22

**Expected Health Challenges**

Popular retirement Web sites23,24 and publications such as *Baby Boomers Guide to Selecting a Retirement Community* failed to list access to healthcare as a factor that requires active consideration from prospective retirees—especially for unexpected but fairly common medical incidents: cardiac arrest, thromboembolic (ischemic) stroke, and severe traumatic injury.23,25 For all three conditions, the success of patient treatment is dependent on ready access to care. Without prompt life-saving treatment—specifically (1) tertiary medical care, (2) access to certified primary stroke centers, and (3) level I trauma centers, respectively—patients are more likely to experience these health incidents as devastating rather than “merely” challenging.

**Cardiac Arrest**

Heart disease is the leading cause of death in the United States. It accounted for 30% of all deaths in 1999 and 39% of all deaths in individuals older than 85 years.26 Sonnenschein and Brody studied the effect of population aging on proportionate mortality from heart disease. They estimate that, between 2000 and 2050, the mortality rate due to heart disease will increase nearly threefold, from 739,658 to 2,104,834.27 The American
Heart Association describes prompt activation of emergency medical service (EMS), rapid provision of cardiopulmonary resuscitation, and ready access to definitive care as the "chain of survival."

In 2004 it was calculated that 155,000 persons in the United States would be treated by EMS for cardiac arrest for an expected survival rate of 8.4% or a total of 13,020 individuals. A prospective multicenter study of 174 prehospital cardiac arrests managed by urban, suburban, and rural EMS showed no patient survival if advanced cardiac life support was instituted 30 minutes postevent or if total resuscitation and transport time was more than 1.5 hours (90 minutes).

As noted, the second priority of an EMS system is to provide hasty patient transport to a facility that is appropriately equipped, staffed, and ready to administer emergency medical care appropriate to the needs of the patient." For management of cardiac arrest, this standard of care would be a tertiary care hospital that is capable of "highly specialized medical care over an extended period of time that involves advanced and complex procedures and treatments performed by medical specialists in state-of-the-art facilities."

The Texas Department of Health includes in their definition of tertiary medical services those that are required for care of the heart attack victim such as cardiothoracic and vascular surgery, cardiac catheterization, computerized tomographic angiography, magnetic resonance imaging (MRI), and organ transplant.

To date, there are no state or federal laws that establish parameters for EMS response times. In most cases, however, there are contractual agreements between EMS providers and political subdivisions that stipulate response times—some of which are ratified into local ordinances and are generally directed toward private EMS providers.

Although some self-regulatory consensus standards have been developed within that profession to establish minimal operating performance levels and safety standards, in most cases, compliance is voluntary. Undoubtedly, the impact of potential litigation limits the reach of voluntary and mandated standards.

The few studies on EMS response times that have been done are usually confined to urban areas—often by city, county, or municipality—and there are scarce data comparing urban, suburban, and rural response times. Comparative studies, when available, consist of combined data from cities in disparate states—most of which are not included in the list of the top ten retirement states noted elsewhere in the present article.

In addition to numerous other methodologic problems involved in reporting EMS response times, the most notable barrier to research on this topic is that there is no national consensus on how to measure response times (ie, when to start and stop the clock).
Thromboembolic Stroke
Thromboembolic stroke is currently the third leading cause of death in the United States. Mortality rates from this common medical incident are predicted to rise three times as fast as the general population during the next 30 years, doubling the number of stroke deaths annually by 2032.

Between 2002 and 2032, the US population will grow 27%, from 280 million to 356 million people. During this period, the proportion of stroke deaths is projected to increase by 98%, from 139,000 to 270,000. The proportion of total stroke deaths occurring in men is projected to increase from 38% in 2002 to 41.4% by 2032.

There is a rapid increase in the risk of stroke with advancing age. Individuals aged 55 to 64 years experience an incidence rate of 11.5 per 1000 for thromboembolic (ischemic) stroke, which rises to 24.1 per 1000 for ages 65 to 74 years and 34.2 for ages 75 to 93 years.

Hypertension is second only to advanced age as a risk factor for ischemic stroke. The prevalence of hypertension increases with age from 20% during a patient’s 50s to 60% in his or her 90s. In addition, diabetes has a prevalence of 20% in the general population. The adverse effects of diabetes seem to be equally important across all ages. Men with diabetes have a twofold excess risk of coronary heart disease across all age groups.

Using 2000 Medicare data, the Centers for Disease Control and Prevention estimated that there were a total of 445,452 hospitalizations in that year for stroke. Only 8.7% of these patients died during the hospitalization. Therefore, 91.3% died subsequently or were left with some degree of incapacity—and a higher risk of recurrent fatal or nonfatal stroke than the rest of the population. Indeed, focusing on mortality rather than morbidity underestimates the problem presented by this condition and the number of individuals affected.

Successful management of acute stroke depends on early recognition of symptoms, prompt emergency transport, and rapid in-hospital treatment. Ischemic stroke results largely from thrombotic arterial occlusion. To date, the only treatment for acute ischemic stroke approved by the US Food and Drug Administration is intra-venous (IV) recombinant tissue plasminogen activator (rt-PA, alteplase). For 38% of patients, treatment with rt-PA led to complete or near-complete recovery in 3 months when compared with 21% who received placebo.

The availability of thrombolytic therapy has brought with it the need to shorten the length of time that it takes a person to reach the hospital after exhibiting one or more warning signs of ischemic stroke. These warning signs include sudden confusion, trouble speaking or understanding speech, and sudden numbness or weakness on one side of the body. The window of opportunity for IV administration of rt-PA is 3 hours from the onset of the first warning signs until drug infusion.

In 1999, approximately half of those who died from thromboembolic stroke did so before hospital admission. Activation of EMS has been documented as the quickest mode of transportation for these patients. Researchers reported a median hospital arrival delay time of 2.85 hours using EMS compared to a delay of 4.03 hours without. The likelihood of pretransport stroke death increases with age, occurring most frequently in the oldest demographic groups.

In addition, women are more likely than men to die from thromboembolic stroke before hospital admission. This sex-based disparity has been attributed, in part, to differences in emergency response time. One study indicated that during a stroke, women have a longer delay time in reaching the hospital than men. Thus, timely arrival of emergency medical care and a short traveling distance to a hospital with appropriate facilities for treatment of stroke patients can reduce the proportion of pretransport stroke deaths and the sequelae that lead to severe disabilities.

In a study of 50 stroke survivors and/or their companions, Maze and Bakas reported that the mean hospital arrival time from onset of symptoms was 5.5 hours. Only 28.9% of patients arrived within 3 hours and were therefore eligible for conventional rt-PA therapy.

A study from Ohio State University College of Medicine in Columbus reported that the almost 25% of patients with acute ischemic stroke experienced significant improvement within 24 hours of receiving intra-arterial (IA) thrombolytic therapy with rt-PA. The average time to treatment was 3.46 hours (208 minutes) in patients showing rapid recovery vs 5.1 hours (306 minutes) in those who did not.

In 2000, representatives of the Brain Attack Coalition, a group of professional organizations involved with delivering stroke care, recommended the establishment and operation of primary stroke centers as an approach to improve the medical care of patients with stroke. These stroke centers are issued certificates of distinction recognizing centers that make exceptional efforts to foster better outcomes for stroke care patients by the Joint Commission in collaboration with the American
Stroke Association. The certificate program is based on con-
formity to the Coalition’s Recommendations for the Establish-
ment of Primary Stroke Centers.52

The Florida Stroke Act,53 which went into effect on July 1,
2005, requires EMS personnel in that state to transport all
patients with ischemic stroke to the nearest certified primary
stroke center rather than to the nearest medical center. This leg-
islation has resulted in a nearly 75% increase in the use of rt-
PA for stroke patients for the 6 months prior the legislation’s
effective date.54

Table 1 indicates that the state of Florida, which experi-
enced the second highest increase in population between 2005
and 2006, has the highest ratio of certified primary stroke cen-
ters to citizens aged 65 years and older. Arizona has the lowest ratio of cer-
tified primary stroke centers to citizens aged 65 years and older—placing it at the bottom of our top ten vs Michigan
ranking. Texas, which saw the highest absolute increase in
seniors, ranks fourth.

Arizona was edged out of the top ten list even though it
is the nation’s fastest growing state, with a net increase of
213,311 citizens (3.6%) in this age demographic estimated from
2005 to 2015. Eleventh-ranked Arizona had two certified pri-
mary stroke centers, serving a total of 354,000 retirement-age
patients as of 2005. Our projections indicate that Arizona will
need to add a total of 17 CPCSs by 2015 to provide “gold stan-
dard” healthcare for its citizens who experience stroke.

By 2015, if other high-growth states wish to meet the high
standard of access to care for senior adults set by Florida, there
will need to be a large increase in the number of certified pri-
mary stroke centers. California, for example, will need to add
55 certified primary stroke centers; Michigan, nine; and Nevada,
four. Indeed, though Florida has set the bar for access to health-
care today in this factor, by 2015, that state will need to add
another 16 certified primary stroke centers to keep pace with
anticipated population growth.

Severe Traumatic Injury

The availability of EMS has dramatically improved prehospital
care of adult patients with severe traumatic injuries.55 However,
the threshold “treatable distance” that will ensure optimal
care for patients with life-threatening injuries is no more than
25 miles or 30 minutes by ground.5 Air evacuation by heli-
copter is usually not dispatched until ground EMS or safety (eg,
police or fire department) personnel can provide patient eval-
uation and triage.5

In such situations, the priority of an EMS system is to
deliver quality patient care in the briefest possible time postin-
jury by providing stabilization and transport to a hospital
capable of addressing the patient’s condition(s).59 A trauma
center is a hospital equipped to receive casualties from EMS by
providing care for those with severe traumatic injuries 24 hours
da day, 365 days per year. These centers were established once
it was understood that traumatic injuries often require imme-
diate and complex surgery to ensure patient survival.56 Trauma
centers provide a team of trauma surgeons, plastic surgeons,
and other specialists who can deal with the most severe injuries
within the “golden hour”—the earliest period postinjury,
where skilled intervention may mean the difference between
life and long-term disability or death. Trauma teams deal with
injuries that are life-threatening, such as blunt force wounds,
multiple internal injuries, burns, broken bones, and shock.57 The
San Francisco Department of Public Health58 defines a trauma
center as having:

...a focused scope of practice including general surgery, neu-
rosurgery, and orthopedic services. It has multiple specialties
characterized by hospital-based and outpatient practice, rapid
or immediate response to major injury patients, admitting ser-
dices with long-term follow-up, admitting performance of
major operative procedures, and [postadmission] critical
care. Trauma care follows a progression that usually includes:
[prehospital] care, resuscitation, operative care, critical
care, acute recovery, discharge planning [and] rehabilita-
tion, long-term follow-up, and functional recovery.

Another useful definition was provided by MacKenzie and col-
leagues,59 who wrote that a level I trauma center:

Provides comprehensive trauma care, serves as a regional
resource, and provides leadership in education, research,
and system planning.

A level I center is required to have immediate avail-
ability of trauma surgeons, anesthesiologists, physician spe-
cialists, nurses, and resuscitation equipment. American Col-
lege of Surgeons’ volume performance criteria further stipulate that level I centers treat 1200 admissions a year or
240 major trauma patients per year or an average of 35 major
trauma patients per surgeon.

A nationwide study by the Johns Hopkins Bloomberg
School of Public Health (Baltimore, Md) and the University of
Washington School of Medicine (Seattle) has demonstrated
that, at hospitals with level I trauma centers, the relative risk
of death by 1 year postinjury for patients treated was lower-
ed by 25% (10.4% vs 13.8%) when compared to patients
who received treatment at hospitals that did not have these spe-
cialized facilities. The differences in mortality rates were pri-
marily confined to those with “more severe” injuries.60

What many may not know is that the designation of
trauma facilities is a political process that is enacted by autho-
rized state governmental bodies. Establishing trauma systems,
selecting participating institutions, and designating the role of
those institutions in the system are the responsibility of local,
regional, and state healthcare system agencies. Legal requirements may vary, but are usually close to those outlined in Resources for Optimal Care of the Injured Patient from American College of Surgeons (ACS).

Trauma center verification is a voluntary (though expensive) process set in motion by the regional “designating authority” or by the hospital seeking a change in status when no such regional authority is present in that geographic area. During the verification process, representatives from the ACS confirm that the hospital meets their criteria and is performing as a trauma center. The hospital is inspected by members of the ACS’s Committee on Trauma who conduct a site visit for the Verification/Consultation Program and review patient medical records.

Table 2 provides a tally of the number of level I trauma centers for the ten states with the highest rate of population growth for adults of retirement age and Michigan. In addition, it compares the total number of level I trauma centers for each state to the number of centers that are verified by the ACS—and the number of centers that will be required for each state by 2015 to keep pace with planned population growth. As noted, Tennessee has the highest ratio of adult level I trauma centers to its population aged 65 years and older though none of their six centers are ACS verified. All designated level I trauma centers in Colorado, Michigan, and California are also verified by the ACS—as is Nevada’s only level I trauma center.

Based on the projected increase in this population, the states currently in “the top ten” for level I trauma centers will have to increase the number of such centers by the year 2015 to meet Tennessee’s current “gold standard.” Indeed, to keep pace, Tennessee will need to add two level I trauma centers by 2015, and third-ranked Michigan will need another three.

Discussion

Baby boomers have been characterized as trendsetters who may differ from previous generations of prospective retirees in that they seem to be opting to resettle in small towns in the South and West for their “golden years.” However, these communities may be unprepared to provide the medical and social services that these new residents will require. What does this population shift portend for the first cohort of baby boomers who will be eligible for Medicare?

Ready access to healthcare is an important factor for patients who survive cardiac arrest. Despite clinical care setting, there is no patient survival if advanced cardiac life support is initiated more than 30 minutes from symptom onset or if total resuscitation and transport time is more than 1.5 hours (90 minutes). It appears intuitive that a successful outcome is critically dependent on healthcare response time and access to a state-of-the-art tertiary level medical facility.

What if one retires to a location that is remote from a certified primary stroke center—or, for that matter, EMS transportation? The 3-hour window of opportunity for the use of intravenous tissue plasminogen activator could easily vanish.

### Table 2

Michigan vs the Top Ten Retirement Locations: Designated and ACS-Verified Adult Level I Trauma Centers in States With High Growth of Population Aged 65 Years and Older

<table>
<thead>
<tr>
<th>State</th>
<th>Population, No.*</th>
<th>LITCs, No.</th>
<th>Population Served by Each LITC, No.</th>
<th>Current Ranking</th>
<th>Projected Need for LITCs†</th>
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<tr>
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<td>2005</td>
<td>2015</td>
<td>2025</td>
<td>% Change</td>
<td>Designated</td>
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<tr>
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<td>994</td>
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<td>1580</td>
<td>1.7</td>
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</tr>
</tbody>
</table>

* Population data (No.) is presented in thousands. All other data is presented in real numbers. Rankings are based on the ratio of adult level I trauma centers (LITCs) to population served aged 65 years and older.
† Projected need for adult LITG per gold standard set by first-ranked state, Tennessee.

Abbreviation: ACS, American College of Surgeons (Chicago, Ill).
The expansion to 6 hours for intra-arterial rt-PA may allow medical science to save some patients, but according to the Ohio State study, those who enjoyed rapid recovery were treated within an average of 3.46 hours vs 5.1 hours for those who did not. Time is still of the essence. Positive outcomes require a great deal of effort by a large team of health professionals working very rapidly in a sophisticated medical center using state-of-the-art techniques.

Of the states with the highest population growth among individuals aged 65 years or older, Florida and Georgia have the highest ratio of certified primary stroke centers (57.07 and 56.8 per 1000, respectively). The first-ranked state, Arizona, has the lowest ratio of certified primary stroke centers, despite having the highest percentage population increase in this demographic group. Nevada, the second highest growth state, ranked only 9 out of 10.

Despite its high ratio of certified primary stroke centers, Florida ranks ninth in access to level I trauma centers. None of Florida’s centers are ACS verified. Michigan, with all eight level I trauma centers verified, ranks third. As noted, seeking ACS verification is an expensive process. In addition, some states tie trauma center funding to this verification, so potentially there are multiple financial implications for an institution’s ACS-verification status. When ACS verification is not required by regional designating authorities, there may be a marketing or perceived prestige factor that prompts the institution to seek ACS verification. At present, however, there is so little competition that prestige may not be a significant factor in the decision to pursue this “stamp of approval.” Thus, in some states, all the trauma centers are verified but in others, some or none will be verified even though they are highly qualified by state standards.

Compared to the top ten retirement relocation destinations, Michigan would rank third in its ratio of stroke and trauma centers to population served.

In 2002, survey results from the American Association of Retired People reported that 83% of baby boomers either “strongly agree” or “somewhat agree” that they would like to remain in their current homes for as long as possible. All prospective retirees, including those who plan to “retire in place,” should be encouraged to evaluate their access-to-care options.

Conclusion
If current trends continue, the top ten states to which one third of baby boomers will migrate after retirement are in the South and West. These states have been profiled regarding access to state-of-the-art healthcare facilities for treatment of cardiac arrest, thromboembolic (ischemic), and severe traumatic injury. It appears that such access is not being promoted by these states, housing developers, the media—or by primary care physicians.

By 2030, the number of Americans at risk for cardiac arrest, stroke, and severe traumatic injury will have doubled from pre-sent levels. At that time, 72 million Americans will be 65 years or older—meaning that nearly 1 of every 5 individuals will experience these increasingly common medical incidents.

The availability and proximity of specialized treatment centers currently do not appear to play a role in prospective retirees’ selection of retirement residences. We recommend that physicians encourage this patient population to consider access to tertiary medical care, certified primary stroke centers, and level I trauma centers when choosing a retirement community.

References

(continued)
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The lead author of this study, Bridgette Lee Perrotta, died shortly after completion of the final draft of this paper, at the age of 30, on June 7, 2007. She received a Master of Urban Planning degree, with a 3.8 grade point average, from Wayne State University (Detroit, Mich) on May 1, 2007. Bridgette was a marathon runner and Pilates instructor. She was unwavering in her commitment to fitness and a healthy lifestyle.

While contributing to this collaborative effort, she endured—with great dignity and grace—chemotherapy and radiation for treatment of a rare malignant teratoma of the mediastinum, metastatic to the lung…and ultimately to the central nervous system (ie, meningeal carcinomatosis).

This article is dedicated to the team of osteopathic physicians that cared for Ms Perrotta: Joanna R. Pease, DO; Louis L. Rondini, DO; and Kenneth R. Lock, DO, at Henry Ford Macomb Hospital – Warren (Mich) Campus; as well as Laurence H. Baker, DO, and Lisa R. Rogers, DO, at the University of Michigan Health System’s University Hospital in Ann Arbor.

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