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BRAIN DEFENSE

A Stroke Prevention and Treatment Strategy for Pennsylvania

Report of the Task Force and Advisory Committee on Stroke Prevention and Treatment

General Assembly of the Commonwealth of Pennsylvania
JOINT STATE GOVERNMENT COMMISSION
November 2002

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Advisory Committee on
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General Assembly of the Commonwealth of Pennsylvania
JOINT STATE GOVERNMENT COMMISSION
108 Finance Building
Harrisburg, Pennsylvania 17120
November 2002

The release of this report should not be interpreted as an endorsement by the members of the Executive Committee of the Joint State Government Commission of all the findings, recommendations and conclusions contained in this report.

JOINT STATE GOVERNMENT COMMISSION
ROOM 108 FINANCE BUILDING
HARRISBURG PA 17120-0018

717-787-4397
FAX 717-787-7020

E-mail: jntst02@legis.state.pa.us
Website: http://jsg.legis.state.pa.us

The Joint State Government Commission was created by act of July 1, 1937 (P.L.2460, No.459) as amended, as a continuing agency for the development of facts and recommendations on all phases of government for the use of the General Assembly.

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KēPRO

Flossie Wolf
Director
Health Policy Research
Pennsylvania Health Care
Cost Containment Council

Richard D. Zorowitz, M.D.
Medical Director, Piersol Rehabilitation Unit
Director, Stroke Rehabilitation
University of Pennsylvania Medical Center

GENERAL ASSEMBLY OF THE COMMONWEALTH OF PENNSYLVANIA
JOINT STATE GOVERNMENT COMMISSION
ROOM 108 - FINANCE BUILDING
HARRISBURG 17120

717-787-4397
FAX 717-787-7020

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TO THE MEMBERS OF THE GENERAL ASSEMBLY:

The Joint State Government Commission is pleased to present the report of the Task Force and Advisory Committee on Stroke Prevention and Treatment. The report includes factual background on stroke and its impact on the Commonwealth and the recommendations of a panel of experts on how the Commonwealth can best respond to this serious and growing pubic health concern.

The recommendations in this report represent the product of the advisory committee after more than a year of work under the able chairmanship of Dr. Lawrence R. Wechsler. On behalf of the General Assembly, I thank the members of the advisory committee for their valuable time and expertise and commend them for their accomplishment.

Respectfully submitted,

Roger A. Madigan
Chair

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EXECUTIVE SUMMARY

Stroke is among the most serious public health challenges facing this Commonwealth. Sometimes referred to as a brain attack, stroke is the third leading cause of death and a leading cause of adult disability in both Pennsylvania and the United States. This devastating illness is a particularly severe problem in Pennsylvania, which has a population significantly older than most of the other states. As the population of the Commonwealth continues to age, the incidence of stroke and the number of deaths from stroke are likely to increase.

A variety of programs are already responding to the challenge of stroke with considerable success. These untiring efforts in both the private and public sectors—with much of the work performed by volunteers—deserve our admiration and support. However, more can and should be done because of the growing need for stroke prevention, treatment, and rehabilitative care.

In addition to its high incidence, two other factors have caused greater attention to be paid to stroke. Recent advances in treatment, including the emergence of thrombolytic therapy, have made it possible to limit the damage caused by some strokes. However, these therapies must be administered rapidly after the onset of symptoms to be effective. Consequently, the stroke care community must develop a new approach to the structure of stroke treatment and must educate the public about the need to treat stroke as a medical emergency.

A second factor is proposed federal legislation called the Stroke Treatment and Ongoing Prevention (STOP) Act that would provide block grant funding for stroke prevention and treatment. The legislation contemplates a phased in appropriation rising from $50 to $125 million, contingent in later years on matching state appropriations. If this legislation is enacted, Pennsylvania will need to have a stroke prevention, treatment and rehabilitation structure in place to qualify for federal funding.

Pursuant to 2000 Senate Resolution No. 130, the Commission assembled an advisory committee of 27 experts in various related fields to draw upon their knowledge and experience and recommend measures to the task force to improve the state's response to stroke. These recommendations are set forth in this report and are briefly summarized here.

The report includes a summary of data relating to stroke incidence and death rates, data on risk factors affecting stroke, and a description of current acute care and rehabilitative treatments. Among the items included in the data are the following:

- The annual number of deaths from stroke in Pennsylvania has risen from its low point of 7,587 in 1991 to 8,919 in 2000.

- While the age-adjusted death rate for stroke is lower for Pennsylvania than for the nation, the unadjusted death rate is higher.

- Preventable causes include a higher incidence of smoking in Pennsylvania African Americans and persons aged 25-34, compared to national rates.

- Hispanics are the only Pennsylvania race or ethnic group with an age-adjusted stroke death rate that is higher than the national average.

- A crude estimate of the cost of stroke to the economy of Pennsylvania puts it at well in excess of two billion dollars per year.

Statistical tables from *Pennsylvania Vital Statistics 2000* are included as appendices to the report. Also included are extensive tables of Pennsylvania data on each stage of stroke treatment, compiled with the assistance of the Emergency Medical Services Office and the Pennsylvania Health Care Cost Containment Council. The informational part of this report concludes with descriptions of public and private programs that deal with the study and treatment of stroke.

RECOMMENDATIONS

Because of the particular urgency of stroke as a public health problem in Pennsylvania, the advisory committee recommends that the Commonwealth establish a special stroke office within the Department of Health (PADOH) but with an independent advisory committee. Draft legislation to implement this recommendation is included as appendix 5. The purpose of this office would be to coordinate and assist stroke prevention, treatment, and rehabilitation programs, disseminate best practices and other information, and conduct research. An office with a similar mission has been established in Ohio, and offices dealing with cardiovascular disease and stroke have been established in Maryland and Mississippi. PADOH does not agree with this recommendation, as it believes such an office would duplicate its stroke programs and its effort to formulate a

statewide cardiovascular disease implementation plan. (See pp. 52-53 and PADOH's statement at appendix 6 for a discussion of this issue.)

The advisory committee recommended to PADOH that it reorganize so as to create an administrative unit under the Bureau of Chronic Disease and Injury Prevention that would be responsible for vascular diseases; this unit would include a cardiovascular disease office and a stroke office, which could perform the functions recommended in this report.

The first maxim among professionals who face the challenge of stroke is this: The best way to treat a stroke is to prevent it. The stroke office can greatly assist in the implementation of preventive efforts that address the specific requirements of underserved urban and rural populations and are tailored to the cultural backgrounds and other characteristics of the public intended to be served. The next essential component of a comprehensive stroke treatment and prevention system is an acute care structure that takes the maximum realistic advantage of the new therapies and responds to the need to administer treatment within three hours of onset. Finally, the stroke program must address the needs of stroke survivors. Many survivors need extensive rehabilitation services, and the earlier the services are provided, the more likely the patient can preserve function and maintain independence.

Leading recommendations of the advisory committee are as follows:

Stroke Office

- Establish a stroke office under PADOH, guided by a representative multidisciplinary advisory committee. The office should be afforded adequate resources to enable it to lead the Commonwealth's response to stroke, following the more detailed suggestions made throughout this report, as well as its own strategies.

Prevention

- Establish educational programs to raise health care provider and public awareness about risk factors and warning signs of stroke, emphasizing early recognition of risk factors to increase the effectiveness of early preventive intervention.

- Encourage educational programs that inform potential victims and their caregivers to treat stroke as an emergency and to obtain immediate EMS assistance.

- Make available to health professionals the best practices for preventive care and establish a clearinghouse for stroke research and information.

- Create a stroke registry to facilitate medical research into stroke prevention.

- Study strategies for expanding the availability of insurance coverage for diagnostic services and preventive care for stroke.

Acute Care

- Formulate a statewide stroke care plan, starting with a comprehensive survey of the present capability of the Commonwealth's acute care providers.

- Establish a long-term goal of improving acute care capacity such that no Pennsylvania resident lives more than one hour away from a hospital with capability of treating all acute strokes. Where this is not presently the case, public funds should be used (either alone or in conjunction with private funds) to close this gap.

- Establish as a professional practice that every hospital that is not capable of treating all acute strokes must have a transfer agreement under which the receiving hospital can quickly evaluate the patient and, if necessary, transfer the patient to a hospital with that capability.

- Public health policy at this time should emphasize improving the stroke treatment capability of all hospitals. At the same time, it should leave open the possibility of using designated stroke centers within a well-planned stroke treatment system.

Rehabilitation

- Perform a comprehensive study of insurance coverage of rehabilitation to inform carriers of the types of coverage that can reduce overutilizaton of nursing homes.

- Promote awareness of evidence-based rehabilitation guidelines and protocols established by professional organizations.

- Expand the right to appeal denial of rehabilitation coverage for patients outside managed care, insure that all stages of utilization review are conducted by qualified medical specialists, and inform patients and caregivers of their right to challenge coverage decisions under present law.

- Ensure that all stroke rehabilitation is performed in facilities that are licensed by PADOH or accredited by appropriate professional organizations.

Implementing these recommendations will obviously require a substantial commitment of financial resources. The STOP legislation, if enacted, may supply a portion of these. Money from the tobacco settlement can help, especially in funding medical research, but such funds would need to be reallocated. A possible avenue is reallocation of part of the recent increase in cigarette taxes. The stroke office could pursue funding from private sources, such as foundations and medical charities.

The advisory committee believes that directing funds and effort toward enhancing stroke prevention and care will pay off by helping more Pennsylvanians achieve a longer, healthier life, free of the tragic effects of stroke that too often darken the lives of the Commonwealth's citizens.

INTRODUCTION

This report is a product of the Joint State Government Commission, the bipartisan central legislative research agency of the Pennsylvania General Assembly. 2000 Senate Resolution No. 130, Printer's No. 2217 (appendix 1), directed the Commission to create a Task Force on Stroke Prevention and Treatment and an advisory committee "to promote professional and public education and awareness and to improve the quality of care for stroke victims." The task force, chaired by Senator Timothy F. Murphy, consists of a bipartisan group of eight legislators, four from each chamber. The task force met to provide guidance on the scope and direction of the report and approve members of the advisory committee.

The advisory committee was chaired by Lawrence R. Wechsler, M.D. It consisted of a diverse group of experts on the subject of stroke, including medical professionals and representatives from acute care and teaching hospitals, rehabilitation hospitals and centers, insurance providers, research and advocacy organizations, the Department of Aging (PDA), the Department of Health (PADOH), and the Pennsylvania Health Care Cost Containment Council (PHC4).

The advisory committee met five times to deliberate the issues and direct the drafting of the report. Subcommittees were formed to discuss the three main policy areas dealt with in the report: prevention (chaired by Edgar J. Kenton III, M.D.); acute care (chaired by John R. Combes, M.D.); and rehabilitation (chaired by Richard D. Zorowitz, M.D.). Between the full meetings of the advisory committee, each of these subcommittees met to provide guidance in their respective areas.

The task force authorized publication of the report on November 26, 2002.

While published sources are cited for many points in this report, the conclusions and recommendations depend heavily on the expertise, wisdom, and experience of the advisory committee.

MEDICAL AND ECONOMIC CONSEQUENCES

A stroke can hit without warning. Within moments, the victim can be wrapped in a shroud of darkness and excruciating pain, unable to communicate with the people around him. Or the victim may feel weak or numb on one side and lose her orientation. As devastating as a stroke and its outcome may be, it is nonetheless a reality that will be experienced more often as the Commonwealth's population ages and as the unhealthy behaviors characteristic of modern life continue to take their toll.

INCIDENCE AND DEATH RATES

The statistics that describe the impact of stroke are frightening. Stroke is the third leading killer in both the United States and Pennsylvania and is one of the leading causes of adult disability.[1] Every year about 600,000 people suffer new or recurrent strokes nationwide leaving to date about 4.6 million survivors, many with severe disabilities.[2] More than 166,000 Americans died from stroke in 2000, and 8,919 of them were Pennsylvania residents.[3] That same year, the Commonwealth saw 40,839 hospitalizations for stroke. (See appendix 4, table 8.) Victims of hemorrhagic stroke die within 30 days at a rate of 37.5%.[4] Many victims never make it to a hospital, and 47% of deaths occur outside of hospital care.[5]

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[1] Richard C. Senelick, M.D., Peter W. Rossi, M.D., and Karla Dougherty, *Living with Stroke* (Chicago: Contemporary Books, 1999), 1; David Wiebers, M.D., *Stroke Free for Life* (New York: HarperCollins Press, 2001), 12. E-mail from Lila Darling, manager, PADOH Heart Disease and Stroke Program, to Commission staff (November 21, 2002, 2:21 p.m. EDT).

[2] American Heart Association (AHA), "2002 Heart and Stroke Statistical Update," (Dallas: AHA, 2001), 14, 15.

[3] U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (CDC), "Deaths: Final Data for 2000," *National Vital Statistics Reports* 50, no. 15 (2002) http://www.cdc.gov/nchs/data/nvsr/nvsr50/nvsr50_15.pdf (October 2, 2002).

[4] AHA, "2002 Statistical Update," 14.

[5] Ibid.

Despite the disturbing statistics, the health systems in the United States and in Pennsylvania have done a remarkably fine job in limiting the incidence of stroke. Despite a population with a rising median age, the nation's death rate from stroke has dropped by over 40% since 1950 (and over 30% in Pennsylvania), with most of that fall occurring between 1970 and 1990. (See appendix 3, table C-20.) In an international comparison of 35 nations, the age-adjusted death rate for stroke for the United States was fifth best for men, and seventh best for women. This was considerably better than the nation's showing in that survey for cardiovascular death rate or for overall death rate.[6]

The age-adjusted stroke death rate for 1999 for Pennsylvania was 58.0 per 100,000 people, which ranked the Commonwealth 12th best of the states.[7] Although the age-adjusted stroke death rate for 2000 increased slightly to 58.7 per 100,000 residents, it nonetheless remained below the national age adjusted rate of 60.2.[8] The crude (unadjusted) death rate for stroke for the United States was 58.6 in 1997, at which time the same rate for Pennsylvania was 68.5.[9] The crude death rate for different ethnic groups in Pennsylvania is shown in table 1. The national Hispanic age-adjusted stroke death rate of 40.0, while for Pennsylvania's Hispanic population the corresponding rate was substantially higher at 43.3.[10]

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[6] Ibid., 10.

[7] CDC, National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP). "The Burden of Chronic Diseases and Their Risk Factors, Section II" http://www.cdc.gov/nccdphp/burdenbook2002/02_stroke.htm (June 11, 2002).

[8] Age-adjusted death rates for stroke are calculated as follows: For a given year, the total number of stroke deaths in any particular age group is divided by the number of people in that age group. The result is that year's "age specific death rate" for that age group. The age specific death rate for each age group is multiplied by the number of people who were in that age group in the "standard year," which yields the "expected deaths." All of the age groups' expected death rates are summed. This sum is divided by the total number of people in the standard year's population. The dividend is multiplied by 100,000 to yield the age-adjusted death rate per 100,000 for the given year. Thus (Total Expected Deaths/Total Standard Population) x 100,000 = Age Adjusted Rate per 100,000. http://www.health.state.pa.us/HPA/stats/techassist/ageadjusted.htm (August 8, 2002).

[9] U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States 2001*, 121st ed. (Lanham, Md.: Berman, 2002), 83.

[10] NCCDPHP, Burden of Chronic Diseases (August 8, 2002). See note 7 for URL.

Table 1

PENNSYLVANIA DEATHS
AND CRUDE DEATH RATE
DUE TO STROKE, 2000

Ethnic group	Number	Crude death rate[a]
White	8,055	76.8
Black	791	64.6
Hispanic	78	19.8
All persons	8,885	72.3

[a] Crude death rate per 100,000 people.

SOURCE: PADOH, *Pennsylvania Vital Statistics*, 2000, 110-121.

As can be seen from appendix 3, table C-20 and figure C-20 of this report, the number of stroke deaths in Pennsylvania remained fairly steady from the 1950s through the mid-1970s. At that time, stroke deaths began to decline rather quickly reaching a low point of 7,587 in 1991. Since that year the number of deaths and the death rate from stroke has risen gradually. Pennsylvania stroke deaths closely mirrored national trends, although Pennsylvania's crude death rate was higher for most years. Since the mid 1980s, the gap between the Pennsylvania and national rates has widened from about 5 per 100,000 to about 10 per 100,000.

Healthy People 2010, the national health plan developed by the federal Department of Health and Human Services (HHS) set as the national health goals to "increase quality and years of healthy life and eliminate health disparities."[11] Goal 12-7 of the plan aims to reduce stroke deaths to 48 per 100,000 from the 1998 baseline of 60 per 100,000 people by 2010—in other words, to achieve a 20% reduction in the stroke death rate.[12]

[11] HHS, *Healthy People 2010* (Washington, D.C.: GPO, 2000), 2 (bullet points omitted).
[12] Ibid., 12-19.

According to public health surveys, our aging population may be plagued by cardiovascular diseases and strokes in the coming decades. Pennsylvania has the second highest percentage of any state of people aged 65 and older, with 15.6% of the people belonging to that cohort;[13] it has the fourth highest median age of any state.[14] Stroke risk more than doubles every decade after age 55.[15] But stroke does not only affect the elderly: over 20% of all stroke victims in Pennsylvania from 1994-2000 were under the age of 65. (See appendix 4, table 9). Nor does a relatively old population necessarily entail an unusually high stroke death rate. All the states with higher median ages than Pennsylvania have lower crude stroke death rates.[16]

Rural and underserved urban populations are subject to particular risk. Pennsylvania has one of the largest rural populations in the nation with roughly 15% of its residents living in nonmetropolitan areas.[17] Many rural residents are beyond the major urban centers and out of the immediate reach of cutting edge stroke treatments. In urban areas, cultural differences can become obstacles that keep some people from accessing proper stroke education, preventive treatment, and acute care. Considering age-adjusted stroke rates by county, there is a higher stroke rate in the rural northwestern part of the Commonwealth and in scattered counties elsewhere. Philadelphia also experiences a higher rate of stroke death than the Commonwealth as a whole.[18]

ADDITIONAL DATA

The appendices to this report include data that may be of interest in analyzing issues relating to stroke.

Appendix 3 is a set of tables selected from the PADOH publication *Pennsylvania Vital Statistics 2000*. These tables show death rates from stroke in the context of other causes of death and enable comparisons of crude and age-adjusted stroke mortality by sex, race and location, among other factors.

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[13] Bureau of the Census, *Statistical Abstract 2001*, 23.

[14] Bureau of the Census, "Age: 2000" (Census 2000 Brief), (2001), 6 http://www.census.gov/prod/2001pubs/c2kbr01-12.pdf (August 28, 2002).

[15] AHA, "2002 Statistical Update," 14.

[16] Crude 1997 stroke death rates per 100,000 for the four states with the highest median age: Florida – 67.6; Maine – 63.3; Pennsylvania – 68.5; West Virginia – 67.1. Meyer, "Age: 2000," 6; Bureau of the Census, *Statistical Abstract 2001*, 83.

[17] Ibid., 30.

[18] PADOH, Bureau of Health Statistics and Research, *Pennsylvania Vital Statistics 2000*, (Harrisburg: PADOH, 2002). See appendix 3, table C-29 and figure C-34.

Appendix 4 is a set of statistical tables developed from the data supplied by the PADOH's Emergency Medical Services Office (EMSO) and the Pennsylvania Health Care Cost Containment Council. The tables are arranged so as to follow the care process chronologically from patient delivery, admission, diagnosis, treatment, discharge and payment.

The following points from Pennsylvania data for 2000 seem to be particularly noteworthy:

- Stroke (referred to in vital statistics tables as cerebrovascular disease) is the third leading cause of death in Pennsylvania, as it has been since at least 1950 (appendix 3, table C-8). Pennsylvanians die from stroke at the rate of about one every hour (appendix 3, figure C-4).

- The median age at death from stroke is seven years lower for black men (73.1 years) than for black women or white men. The highest median age at death from stroke is for white women (85.2 years) (appendix 3, table C-10).

- For over 80% of EMS responses to stroke, the time from initial EMS response to arrival at the treatment destination is 50 minutes or less (appendix 4, table 5).

- Hospitalizations for stroke totaled 40,839, which is about a 4.5% decrease from 1994 (appendix 4, table 8).

- 77.0% of patients hospitalized for stroke were age 65 and older, and 89.3% were 55 or older (appendix 4, table 9).

- Reports show less than one percent of stroke patients were treated with tPA (appendix 4, table 19). The experience of clinicians on the advisory committee suggests that this procedure is likely underreported.

- After an average hospital stay of 8.1 days, 31.4% of stroke patients were discharged to home or self-care, 22.9% to a skilled nursing facility, 17.8% to another institution for inpatient care or outpatient services, 16.4% were discharged to other settings, and 11.4% died (appendix 4, tables 20 and 22).

- Medicare was the primary payer for 73.6% of stroke hospitalizations (appendix 4, table 24).

ECONOMIC COSTS

Table 2 presents an analysis of the estimated direct and indirect costs of stroke nationally. According to AHA, the cost to the nation of strokes is about $49.4 billion, including direct costs of $30.8 billion and indirect costs of $18.6 billion.[19] Direct costs were estimated using both the results of a 1995 study[20] and total costs estimated in 2002 by the Centers for Medicare and Medicaid Services (CMS).[21] The National Heart, Lung and Blood Institute (NHLBI) used the proportion of direct costs for stroke to direct medical costs for all conditions and applied that proportion to all direct medical costs estimated by CMS for 2002. Indirect costs were estimated by multiplying the estimated present value of lifetime earnings in gender specific, five-year age groups by the number of people in each group who died or were disabled. These subtotals were then added to obtain the estimated national indirect costs of stroke in 2002.

Since CMS does not break down total national cost by state, the cost of stroke for Pennsylvania could not be determined using NHLBI's method of estimation. Instead, a rough estimate of how much Pennsylvania will spend on strokes in 2002 is made by two methods: Pennsylvania's proportion of the nation's population and its proportion of the nation's stroke deaths.

The first cost estimation method applies Pennsylvania's percentage of the total population of the United States to the total national cost of stroke.[22] Using this approach, the total cost of strokes in Pennsylvania in 2002 will be approximately $2.156 billion. This estimation method may not accurately reflect Pennsylvania's costs because it ignores the relative age of our population as compared to the nation's. As we have noted, Pennsylvania's age profile is older than the nation's as a whole. Since the great majority of strokes occur in older individuals, Pennsylvania is likely to represent a larger relative proportion of the total national stroke costs than most states with younger populations.

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[19] AHA, "2002 Statistical Update," 33.

[20] T. A. Hodgson and A. J. Cohen, "Medical Care Expenditures for Selected Circulatory Diseases: Opportunities for Reducing National Health Expenditures," *Medical Care* 37 (1999): 994–1012.

[21] In 2001 the Health Care Financing Administration (HCFA) was reorganized and renamed CMS.

[22] United States census population figures from 2000 were used for this calculation. The population of Pennsylvania was 12,281,000; the population of the United States was 281,422,000. Therefore, about 4.36% of the nation's population lived in Pennsylvania in 2000. Bureau of the Census, *Statistical Abstract 2001*, 21.

Table 2

ESTIMATED COSTS OF STROKE IN 2002
(Dollars in millions)

Types of costs	United States estimate	Pennsylvania estimate based on population	Pennsylvania estimate based on stroke deaths
Direct costs			
Hospital and nursing home	$24,500	$1,069	$1,303
Physicians and other professionals	2,400	105	128
Drugs and medical durables	800	35	43
Home health care	3,100	135	165
Indirect costs			
Lost productivity due to morbidity	5,600	244	298
Lost productivity due to mortality[1]	13,000	567	692
Total	49,400	2,156	2,628

[1] Lost future earnings of persons who will die in 2002, discounted by 4 percent.

SOURCE: United States cost estimates—AHA, "2002 Statistical Update," (Dallas: AHA, 2002), 33 (using data supplied by NHLBI). United States stroke death estimates—CDC, *National Vital Statistics Report*. 50, no. 15 (September 16, 2002) http://www.cdc.gov/nchs/data/nvsr/nvsr50/nvsr50_15.pdf (October 2, 2002). Pennsylvania stroke deaths—PADOH, "Health Statistics" (2000) http://webserver.health.state.pa.us/health/lib/health/d99054p.pdf. Pennsylvania and U.S. populations—Bureau of the Census, *Statistical Abstract 2001* http://www.census.gov/prod/cen2000/dp1/2koo.pdf (November 1, 2002).

The second cost estimate method takes the ratio of Pennsylvania stroke deaths to the corresponding national number and applies that ratio to the total cost amount.[23] Using this approach, the total cost of strokes in Pennsylvania in 2002 is estimated at $2.628 billion. Although this figure is hardly exact, it may be a better estimate of stroke cost than the estimate using population figures.

The estimates presented in this section only roughly show the magnitude of stroke costs in Pennsylvania and, for a number of reasons, should be used with great caution. Neither estimate takes into account any demographic, economic, or other differences that might raise or lower the cost of stroke in Pennsylvania as compared to other states. Furthermore, the figures do not include many of the costs associated with stroke prevention.

To compare the stroke costs to certain expenditures from the General Fund, $2.628 billion is about 13.5% of the state's $20.8 billion General Fund for fiscal year 2002-03. The General Assembly appropriated $4.086 billion for basic education, $1.887 billion for medical assistance, and $1.045 billion for the operation of correctional institutions, the three largest expenditures of Commonwealth government. This estimated cost of stroke is more than 15 times greater than the $179 million the Commonwealth appropriates to the Children's Health Insurance Program (CHIP), which serves 133,000 people.[24]

NATURE AND TYPES OF STROKES

A stroke is a medical episode during which blood flow to the brain is reduced or blocked by an arterial obstruction or rupture. An ischemic stroke is caused by a blockage or narrowing in an artery that prevents blood from flowing to brain tissue. This can occur in the brain itself or at some point along the blood's path to the brain. A cerebral embolism occurs when a wandering clot (embolus) or other particle forms in a blood vessel away from the brain, usually in the heart. The clot is carried in the bloodstream until it lodges in an artery leading to or in the brain, blocking the flow of blood. Cerebral thrombosis occurs when a stationary blood clot (thrombus) forms and blocks blood flow in an artery

[23] The number of Pennsylvania stroke deaths in 2000 was 8,919; the number of stroke deaths for the United States in 2000 was 167,661. Pennsylvania's percentage of the Nation's total stroke deaths is 5.32%. CDC, "Deaths: Final Data for 2000."

[24] Commonwealth of Pennsylvania, Office of the Budget, "2002-03 General Fund Enacted Budget Overview," 19, 23 http://www.budget.state.pa.us/budget/lib/budget/2002-2003/budget_overview/enactedbudgetoverview2002_03.pdf (September 16, 2002).

carrying blood to the brain.[25] Ischemic strokes account for 83% of all strokes, and 7.6% of patients die within 30 days after suffering one.[26]

A hemorrhagic stroke occurs when a rupture in an artery diverts blood flow from the brain tissue it normally supplies. The pressure of blood leaking into brain tissue can damage or kill neurons. In a cerebral hemorrhage, bleeding occurs when a defective artery in the brain bursts, flooding the surrounding tissue with blood and preventing blood from reaching its destination. In a subarachnoid hemorrhage, bleeding occurs when a blood vessel on the brain's surface ruptures and bleeds into the space between the brain and the skull, but not into the brain itself. This prevents the blood from reaching areas of the brain and also puts pressure on brain tissue. Hemorrhagic strokes account for 17% of all strokes and are even more devastating than the ischemic type—37.5% of patients die within 30 days.[27]

Transient ischemic attacks (TIAs) are viewed as mini-strokes, although there is emerging evidence that they may occur through mechanisms different from those resulting in strokes. A TIA is a brief condition where blood is temporarily cut off from reaching the brain, often by an artherosclerotic condition. A TIA mimics many of a stroke's symptoms such as numbness, muscle weakness, and speech or language difficulties, but the symptoms usually last about an hour, although they may persist up to 24 hours. Nonetheless, TIAs are closely correlated with the occurrence of strokes; about one third of those with a history of TIAs will suffer an acute stroke. [28]

CONSEQUENCES OF STROKE

The severity of a stroke depends on the amount of brain tissue affected as well as the location in which it occurs. A relatively small stroke can be fatal or catastrophic if it hits an area of the brain that controls life sustaining functions, such as those contained in the brain stem. ASA lists the following five symptoms of stroke:

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[25] American Stroke Association (ASA), "What Are the Types of Strokes?" http://www.strokeassociation.org/presenter.jhtml?identifier=1014 (September 16, 2002).

[26] AHA, "2002 Statistical Update," 14.

[27] Ibid.

[28] HHS, National Institutes of Health, National Institute of Neurological Diseases and Stroke (NINDS), "Transient Ischemic Attack Information Page" http://www.ninds.nih.gov/health_and_medical/disorders/tia_doc.htm (September 16, 2002).

- Sudden numbness or weakness of the face, arm or leg, especially on one side of the body
- Sudden confusion, trouble speaking or understanding
- Sudden trouble seeing in one or both eyes
- Sudden trouble walking, dizziness, loss of balance or coordination
- Sudden, severe headache with no known cause. [29]

Any one of these signs can signal danger, and it is vital that someone experiencing one or more of them get medical attention immediately.

Right Hemisphere Strokes[30]

Right hemisphere strokes can lead to difficulty in performing the routine activities of life, such as bathing, eating, and dressing. A victim may be unable to button his shirt, tie his shoes, find her way to the restroom or perform other routine but complex, coordinated movements. In some cases, the victim is affected by a loss of left-field vision. In one example cited, a patient was unable to see a shirt lying on the left side of his room without turning his head, and therefore assumed it was missing.[31]

A condition known as neglect is also characteristic of right hemisphere strokes. Neglect, or more accurately neglect of the left side, is exhibited in different ways. A victim may neglect to shave the left side of his face, or, when asked to draw a clock face, draw only the right side. Even in reading and speaking, a word's left syllable may be ignored. For example, a person may see or say the word "word" when "crossword" is appropriate. A patient may neglect, or deny, that he had a stroke in the first place, which can hinder recovery. A patient may even attribute a paralyzed limb to another person.

Visual memory problems may also affect a stroke victim. A person who suffers these problems may have little or no ability to recall visual information, even immediately after seeing it.

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[29] ASA, "Know the Warning Signs of Stroke" http://www.strokeassociation.org/presenter.jhtml?identifier=1020 (July 18, 2002).

[30] Senelick, *Living with Stroke*, 65-73.

[31] Ibid., 69.

Right brain stroke patients often have difficulty with the nuances of language use. They may have difficulty interpreting emotions or humor, abstract information and non-verbal body language. They may speak excessively or have trouble taking turns in conversation. Their speech may be flat with limited inflection.

Poor judgment can also show up as a symptom of right hemisphere stroke. The difficulties with visual perceptions, visual memory, and neglect can combine with time disorientation and impaired abstract thinking. Poor judgment caused by a stroke can be particularly troubling with regard to safety issues, such as are associated with operating a motor vehicle. Extreme emotional swings, from happiness to sadness in a matter of seconds, are also characteristic of right brain strokes.

Left Hemisphere Strokes[32]

A left brain stroke is characterized by weakness, numbness or paralysis on the right side of the body. Right field vision can also be affected or lost, as is left side vision with right brain strokes.

Aphasia often results from left brain stroke. Aphasia is the loss or impairment of the ability to use or comprehend language. Aphasic individuals may have difficulty forming words or sentences. They may repeat the same phrase over and over or may only be able to produce nonsense words. Such victims may have trouble thinking of words or substitute a related word for the one they are trying to say. They may have difficulty understanding what others say to them or comprehending reading. Some individuals may also experience apraxia, which is a motor planning problem in which they have difficulty producing speech sounds or producing sounds in the correct order. Depression and anxiety affect 70% of left brain stroke victims, and may inhibit effective rehabilitation or cause patients to regress in their recovery.

Nonspecific Effects

Victims of right and left brain strokes may also suffer from difficulties with verbal memory. They are unable to retain what had been communicated to them verbally and might completely forget what had been said to them

[32] Ibid., 75-83.

immediately beforehand. Simple math skills can also be lost. "Among stroke survivors, about 40% have moderate functional impairment six months later, while about 10% to 15% remain severely disabled."[33]

[33] Andrew M. Kramer et al., "Outcomes and Costs after Hip Fracture and Stroke: A Comparison of Rehabilitation Settings," *JAMA* 277 (1997): 396.

RISK FACTORS

Certain personal behaviors and health conditions can lead to stroke if not addressed by affected individuals or their health care practitioners. These behaviors and conditions are commonly referred to as risk factors. It was only in the past 20 to 25 years that health came to be viewed as the comprehensive consequence of personal behaviors, permitting systematic study of health risks and behaviors as a basis for public health policy decisions. Smoking, overweight, or uncontrolled hypertension can lead to harmful outcomes, especially when existing simultaneously. Medical intervention is necessary to ameliorate some risk factors, as in cases of hypertension or diabetes. For many, improved diet, regular physical activity and smoking cessation can help prevent strokes. The Framingham Heart Study showed that the presence of certain risks, namely high blood pressure, diabetes, smoking and atrial fibrillation, together increase the likelihood of stroke in men and women over age 55 by 15% and 20%, respectively, over a ten-year period.[34] Many risk factors linked to stroke are not controllable, however, such as race, age, sex, and genetic characteristics.

Culturally distinct populations may experience risk factors disproportionately. According to the Centers for Disease Control and Prevention (CDC) Behavioral Risk Factor Surveillance System (BRFSS) as well as PADOH's "Special Report on the Health Status of Minorities in Pennsylvania," minorities in Pennsylvania exhibit higher than average risk factors that have been correlated to the occurrence of strokes.[35]

To gauge the public health risks associated with personal behaviors, the National Center for Chronic Disease Prevention and Health Promotion of the CDC established BRFSS in 1984.[36] The data topics presented in the following charts were retrieved from the BRFSS website, with the exception of age as a risk

[34] AHA, "2002 Statistical Update," 15.

[35] PADOH, "State Health Improvement Plan: Special Report on the Health Status of Minorities in Pennsylvania, 2002," 3-1 to 3-30, passim.

[36] NCCDPHP, "About the BRFSS" http://www.cdc.gov/brfss/about.htm (June 26, 2002).

factor. These particular topics are included because they are the elements most closely associated with risks identified in stroke literature.[37] These elements include:

- Hypertension
- High cholesterol
- Diabetes
- Smoking
- Physical inactivity
- Obesity and overweight

AGE

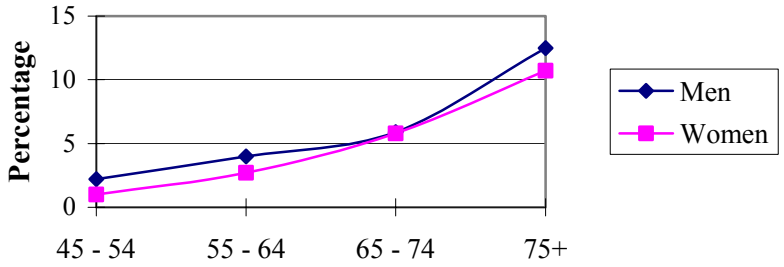
Because so many risk factors are chronic and cumulative, their consequences tend to increase over time; consequently, individuals face a sharply increasing risk from stroke as they age. Although about 75% of ischemic strokes occur from age 65 and older, aging begins to affect stroke risk at about age 45.[38] Thereafter, the chance of having a stroke sometime in a decade of one's life increases with each passing decade as shown in figure 1.[39] These probabilities, coupled with Pennsylvania's aging population indicate that the Commonwealth is likely to see an increase in the number of strokes in years to come.

[37] Wiebers, *Stroke Free for Life*, 48-84, passim. David Wiebers, M.D. is professor of neurology, chair of the Division of Cerebrovascular Diseases at the Mayo Clinic, and director of the Mayo Stroke Center. Larry B. Goldstein et al., "Primary Prevention of Ischemic Stroke: A Statement for Healthcare Professionals From the Stroke Council of the American Heart Association," *Stroke* 32, 1, (2001), 280-299; Internet Stroke Center, "Stroke in Perspective: Risk Factors" (2002) http://www.strokecenter.org/education/ais_risk_factors/treatable.htm (November 6, 2002).

[38] Wiebers, *Stroke Free for Life*, 51.

[39] AHA, "2002 Statistical Update," 15.

Figure 1
Prevalence of Stroke by Age and Sex
(United States)



HYPERTENSION

Hypertension is a risk factor associated with hemorrhagic, and to a lesser extent, ischemic strokes. High blood pressure weakens the small vessels in the brain, which can cause them to deteriorate and rupture. Also at risk is the heart's ability to function properly. Hypertension often occurs along with atherosclerosis, the build-up of plaque in the arteries. Stroke risk increases with blood pressure values. Moderate and severe hypertension is one of the risk factors that is most strongly predictive of stroke.[40]

A higher proportion of Pennsylvanians have been alerted that they suffer from hypertension than have people in the nationwide population. In terms of race, Pennsylvania Whites and Hispanics are more likely to have been told about their condition than have Whites and Hispanics nationwide. However, Blacks and Other Pennsylvanians show a slightly lower incidence of being told they have hypertension. (See figure 2.) The data show that Pennsylvania's age groups up to near age 50 have a higher incidence of diagnosed hypertension than the corresponding national population. The spread between the nation and Pennsylvania narrows from that age point until about age 60, when nationwide proportionately more persons are aware of a hypertensive condition than are Pennsylvanians.[41] (See figure 3.)

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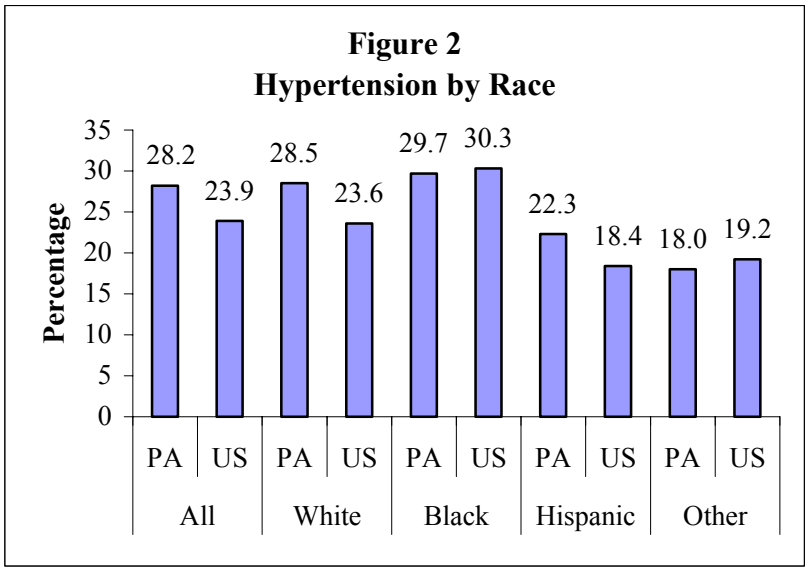
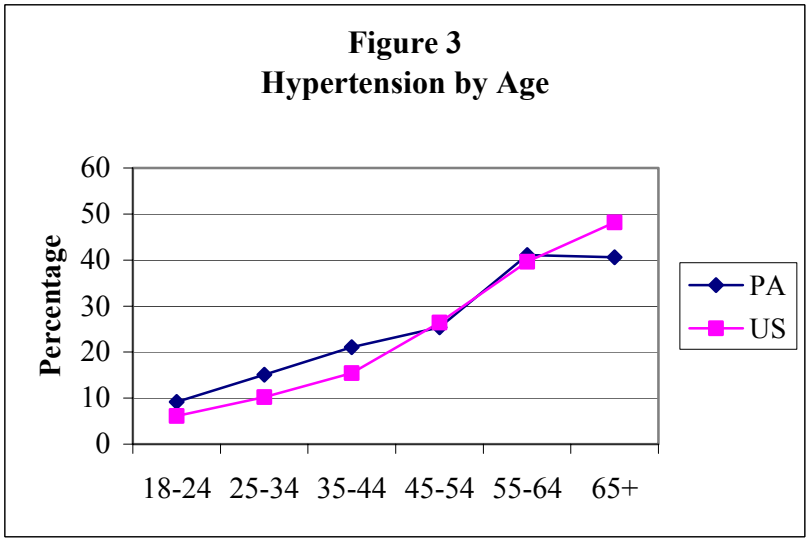
[40] Wiebers, *Stroke Free for Life*, 41, 67.

[41] All data shown in figures 2 through 12 is from BRFSS. NCCDPHP, *Behavioral Risk Factor Surveillance System Online Prevalence Data*, 1995-2000 http://apps.nccd.cdc.gov/brfss/ (June 26, 2002).





HIGH CHOLESTEROL

High cholesterol can accelerate the development of atherosclerosis. The plaque characteristic of atherosclerosis can result in formation of a thrombus or embolus, which in turn can lead to stroke.

Pennsylvanians in general tend to have a lower incidence of high cholesterol than the nation as a whole. (See figure 4.) However, Blacks in Pennsylvania show a higher incidence of elevated cholesterol than either the nationwide sample of Blacks or the Pennsylvania sample as a whole. The largest spread between the Pennsylvania and the national populations appears between ages 40 and 60, with the greatest difference at ages 45-54, when 25.4% of Pennsylvanians report a high cholesterol diagnosis and 32.8% of people nationwide report the same. (See figure 5.) Pennsylvanians may indeed have lower cholesterol, or proportionately fewer Pennsylvanians may have been tested.

Figure 4
High Cholesterol by Race

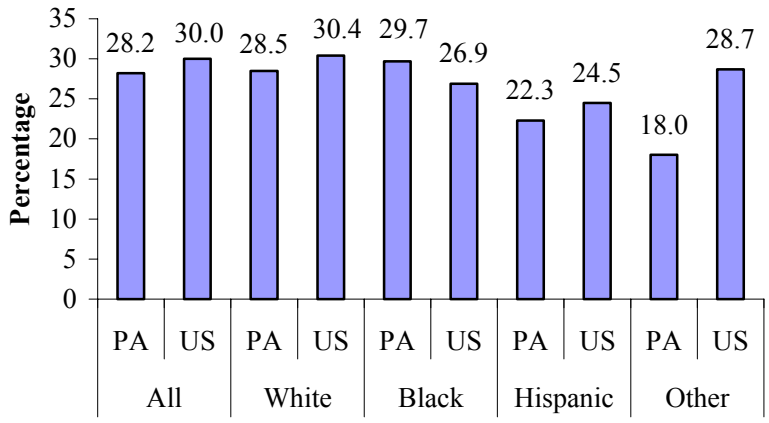
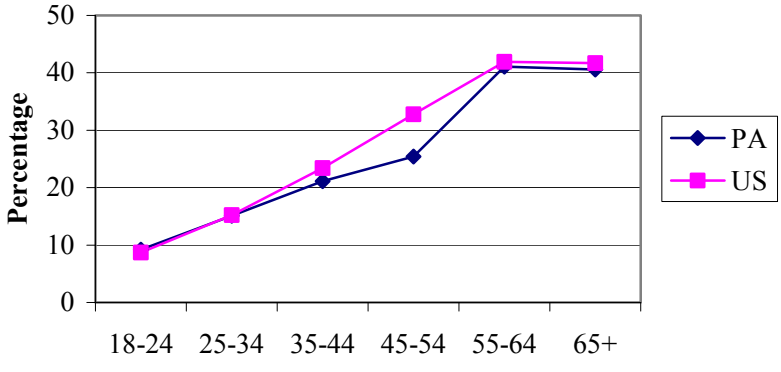


Figure 5
High Cholesterol by Age



DIABETES

How diabetes increases the risk of ischemic stroke is not entirely clear, but it is known that the disease affects blood vessels and appears to heighten both the incidence and severity of stroke.

Pennsylvania shows a significantly higher rate of diabetes than the nation as a whole. Minority populations in Pennsylvania suffer higher rates of diabetes than non-minority populations. For example, 12% of Blacks have been diagnosed with the disease, whereas approximately 7% of Whites have been diagnosed. Close to 8% of Hispanics are diabetic, and almost 9% of Others have been diagnosed with diabetes. (See figure 6.) In both Pennsylvania and the United States, the incidence of diabetes rises sharply after age 54. (See figure 7.)

Figure 6
Diabetes by Race

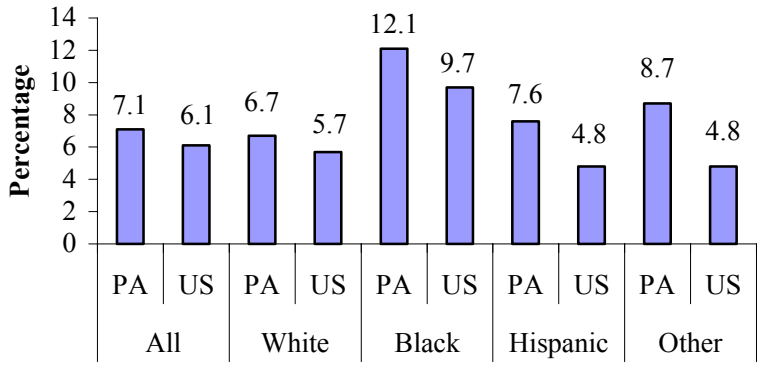
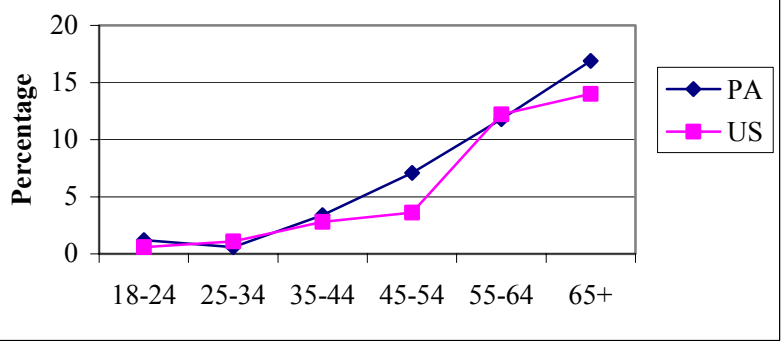
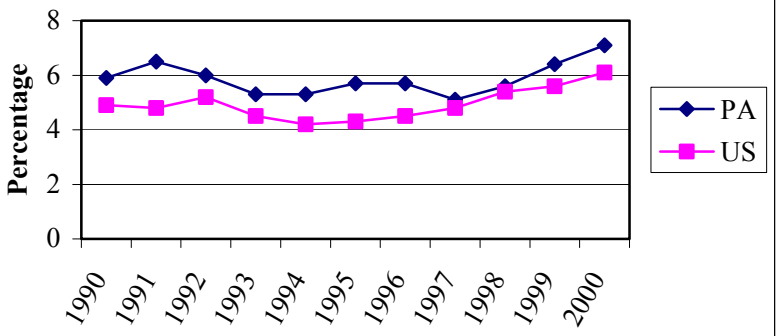


Figure 7
Diabetes by Age



Health officials are alarmed at the rise in diabetes cases over the past several years, especially in younger age groups. As can be seen in figure 8, the national diabetes rate has been steadily increasing. According to the CDC, diagnosed diabetes increased by 49% between 1990 and 2000.[42] In Pennsylvania the rate has been on the rise as well.

Figure 8
Incidence of Diabetes Over Time

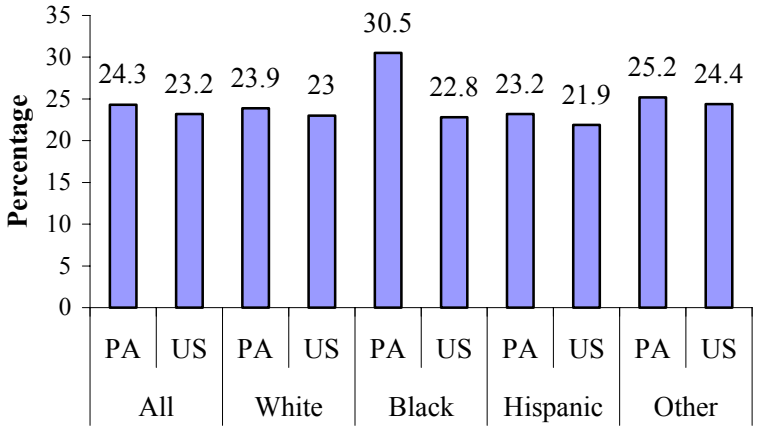


SMOKING

A slightly higher percentage of Pennsylvanians smoke cigarettes than does the nationwide population, with the largest spread between the two groups in the Black demographic. Pennsylvania Blacks smoke at a rate of 30.5% as compared to 22.8% nationwide. (See figure 9.)

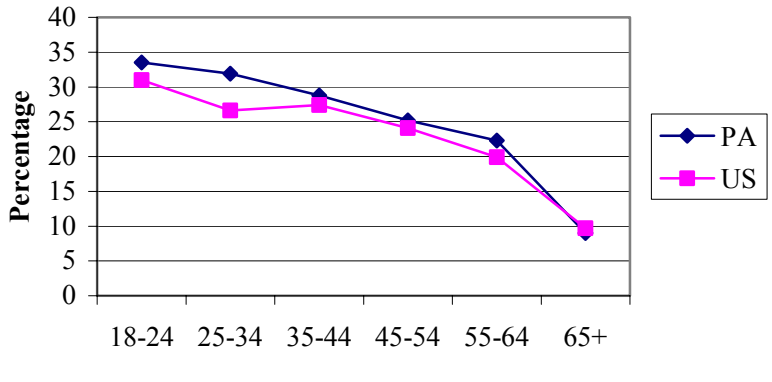
[42] NCCDPHP, "Diabetes Public Health Resource" http://www.cdc.gov/diabetes/pubs/glance.htm#growing (August 2, 2002).

Figure 9
Smokers by Race



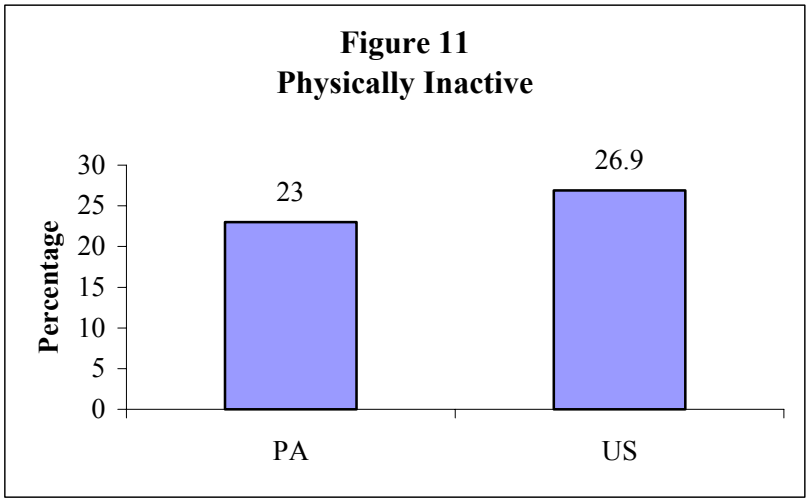
For both Pennsylvanian and national populations, the percentage of smokers declines as people get older. Over 33% of Pennsylvanians and 31% of Americans in the 18-24 age group responded that they are current cigarette smokers; in both populations, the number of smokers at age 65 is about 10%. In the 25-34 age range, the proportion of Pennsylvania smokers is significantly higher than the corresponding percentage for the nation (See figure 10.)

Figure 10
Smokers by Age



PHYSICAL INACTIVITY

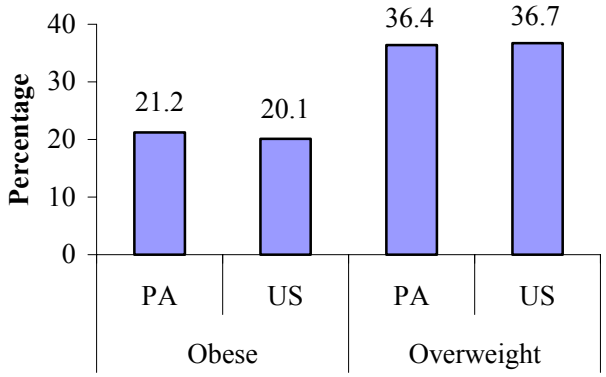
A slightly lower percentage of Pennsylvanians reported not engaging in physical activity over the most recent month than did the national population. (See figure 11.)



OBESITY AND OVERWEIGHT

"Obesity" is defined as a Body Mass Index (BMI) of 30.0 or higher; "overweight" as a BMI between 25.0 and 29.9. A lower proportion of Pennsylvanians reported their BMI in the overweight category than Americans as a whole, but a higher proportion of Pennsylvanians reported themselves as being obese. (See figure 12.)

Figure 12
Obese and Overweight Population



The factors listed above, hypertension, diabetes, high cholesterol, smoking, a lack of physical activity, and obesity are in and of themselves health risks that threaten a large portion of Pennsylvania's residents. When exhibited together in a single individual, however, they compound to pose grave health risks, including an increase in the chances of stroke.[43]

CONCLUSION

The following data from BRFSS seem to be particularly significant:

- Pennsylvania exceeds the national average in the following risk factors: smoking, obesity, hypertension and diabetes; Pennsylvania is lower than the national average in overweight, high cholesterol, and physical inactivity.

- Rates of smoking and diabetes are appreciably higher among African Americans in Pennsylvania than among African Americans nationwide. Rates of hypertension in White and Latino Pennsylvanians are higher than for the corresponding demographic groups nationwide.

- A larger proportion of African Americans and of persons aged 25-34 smoke in Pennsylvania than in the nation as a whole.

[43] AHA, "2002 Statistical Update," 15.

TREATMENT AND REHABILITATION

ACUTE THERAPIES[44]

Treatment for Ischemic Stroke

Recent discussions about acute care therapies have been dominated by the advent of tissue plasminogen activator (tPA), the only clot dissolving agent currently approved for treatment of stroke by the FDA. This medication is administered intravenously to ischemic stroke patients to break up blood clots that are interrupting blood flow to the brain. However, its use may cause hemorrhaging, which is likely to be fatal if the medication is administered to a hemorrhagic stroke patient misdiagnosed as ischemic.

TPA and other thrombolytic treatments have a brief window of usefulness. Currently, they must be administered within three hours of the onset of symptoms, and particular patients must have favorable medical characteristics in order for them to be used safely and effectively. One study suggested that doctors failed to follow tPA guidelines 50% of the time; in cases of such failure, 15.7% of patients given tPA died as compared to a death rate of 5.1% of those not given tPA. When the guidelines are properly followed, up to 50% of patients have been found to make complete recoveries, compared with up to 38% who recover completely after receiving a placebo.[45]

Only two to three percent of ischemic stroke patients receive tPA or other thrombolytics annually, because many hospitals do not have the resources or expertise to safely use thrombolytics and because about 15% of ischemic stroke patients arrive at the hospital within the three hour time frame during which thrombolytics can be effective.[46] It has been estimated that half of all ischemic stroke victims would be candidates for tPA if the optimal conditions of timeliness and hospital resources could be met.

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[44] Wiebers, *Stroke Free for Life*, 220-39, unless otherwise indicated.

[45] Ibid., 233.

[46] Ibid., 236. Proportionately fewer ischemic stroke patients arrive at the hospital within three hours than hemorrhagic patients, possibly because the symptoms of ischemic strokes are often less dramatic than those of hemorrhagic strokes.

Treatments other than thrombolytics may be administered as acute care therapy to stroke patients. Anticoagulants and antiplatelet agents, which are used to prevent ischemic strokes, can also be used once a stroke occurs. They can aid in preventing further clotting, curtailing the growth of existing clots, and helping blood flow more freely through existing blockages. Aspirin can also be used as an antiplatelet therapy in the treatment of ischemic strokes.

Other treatments include emergency carotid endarterectomy and carotid angioplasty. Both interventions can remove or clear blockages. Carotid endarterectomy is a procedure whereby plaque lining the interior of the carotid artery is surgically removed to allow for increased blood flow. Carotid angioplasty may also be used to increase blood flow by the insertion of a balloon tipped catheter into the carotid artery. The balloon is inflated to widen the artery and then removed.

Neuroprotective agents may be administered as treatment for ischemic stroke. These include calcium channel blockers and free radical scavengers. Calcium channel blockers prevent the potentially damaging flood of calcium into the brain that occurs in an ischemic stroke. Free radical scavengers bond with free radicals, which are unstable and damaging oxygen compounds, to prevent them from causing brain damage. Ongoing studies are investigating the efficacy of neuroprotective agents for treating both ischemic and hemorrhagic strokes.

As we shall see in the chapter on acute care recommendations, stroke treatment professionals are concerned that many hospitals lack adequate resources to properly use tPA and other thrombolytics. First and foremost, a computed tomography (CT) or a magnetic resonance imaging (MRI) device and trained medical staff must be available at all times. A CT scan can be effectively used to identify a hemorrhage and may be able to find the location of the aneurysm or vascular malformation, the scan thus indicating when thrombolytic therapy may be appropriate or if bleeding would make these treatments potentially fatal.[47]

Treatment for Hemorrhagic Stroke

Because of their different causes, hemorrhagic strokes are treated differently from ischemic strokes. Doctors employ several methods to treat subarachnoid and intracerebral hemorrhages. An aneurysm is clipped or coiled to prevent rebleeding or rupturing. Medications are administered to prevent or treat spasms that may constrict the blood vessels. Also, stool softeners and cough suppressants can be used to reduce the risk of straining. If there is excessive cerebrospinal fluid in the brain's ventricles it may be drained via surgical

[47] Wiebers, *Stroke Free for Life*, 224.

procedure. In the case of intracerebral hemorrhage, emergency surgery may involve draining a hematoma, or pool of blood, that is exerting pressure on the brain. Treatments for ischemic stroke and seizures may be needed if those conditions are present as well.

REHABILITATION

Rehabilitation after a stroke is a comprehensive process that involves physical, cognitive, and speech therapies and counseling. Therapists, counselors, and other health providers are coordinated to enable the victim to regain as much of her normal life as is possible. A typical rehabilitation team is led by a physiatrist or other appropriate physician, and may include a neuropsychologist, psychologist, speech, physical, occupational, respiratory and recreational therapist, clinical dietician, nurse, vocational counselor, and the patient's caregiver. Each plays an important and integral role in the management of each patient's rehabilitation.[48] A clinical flow diagram for stroke rehabilitation appears as Figure 13.

One of the most important members of the rehabilitation team is the survivor's caregiver. This person may be the spouse, relative, friend, or employee who takes on the role of providing round the clock home care. Most family members have no formal training in stroke rehabilitation, yet they are often thrust to the center of the rehabilitation plan. It is important that these caregivers receive the support of rehabilitation professionals and other family and friends in order for the survivor to achieve the fullest possible recovery.

A wide range of resources are available to the family caregiver for help and support. These resources not only help with the survivor's rehabilitation but are also important in helping the caregiver with his or her new role in life on a personal level. In fact, the survivor's success in rehabilitation is often closely related to how well the family caregiver can cope with that role.[49]

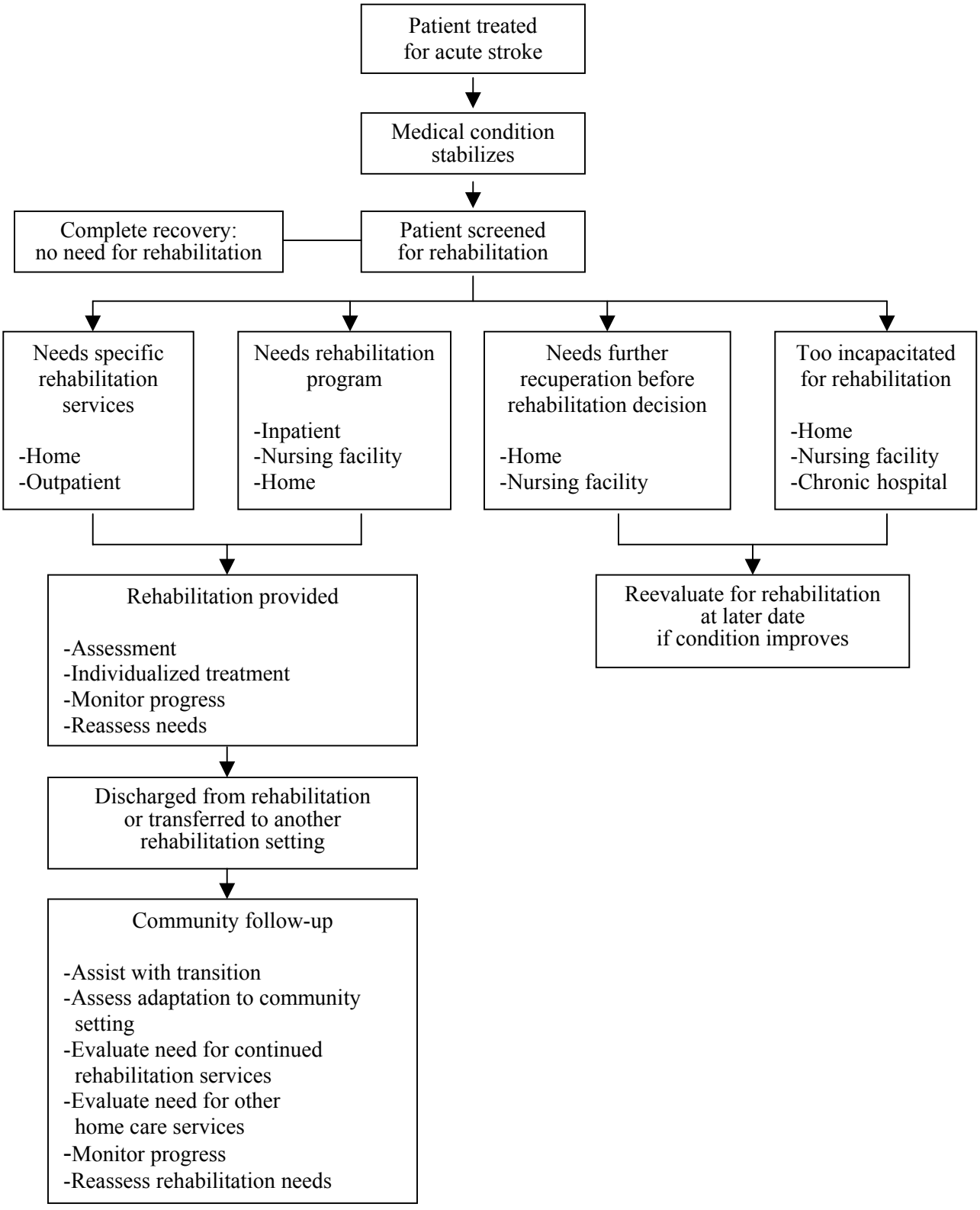
To efficiently use the type of care that targets a stroke victim's rehabilitative needs, the factors to consider include the patient's physical condition and the family's ability to assist care. Placement alternatives include rehabilitative hospitals, units with a dedicated brain injury program, skilled

[48] Marilynn Larkin, *When Someone You Love Has a Stroke* (New York: Dell Publishing, 1995), 7-14; Senelick, *Living with Stroke*, 120. A physiatrist is a medical doctor who specializes in rehabilitative medicine.

[49] Larkin, *When Someone You Love Has a Stroke*, 174-88.

Figure 13

Clinical Flow Diagram For Stroke Rehabilitation



SOURCE: HHS, Agency for Health Care Policy and Research, "Post-Stroke Rehabilitation: Assessment, Referral and Patient Management," (Quick Reference Guide for Clinicians No. 16), (1995), 3.

nursing homes, intermediate nursing homes, subacute nursing homes,[50] assisted living, and outpatient treatment with intermittent therapeutic visits to a patient's home.[51] Medicare reimbursement standard provide coverage for at least three hours of therapy daily, five days per week.[52] Under Medicare guidelines, this is the minimum amount of rehabilitation services that a patient needs to justify an acute inpatient rehabilitation admission.

While there are no rules and no one piece of scientific data that can predict success, the following seven factors can help the rehabilitation team assess the chances for recovery:

1. A quick, spontaneous return of some voluntary muscle movement
2. No severe visual or sensory loss
3. An ability to resume swallowing and eating soon after one's stroke
4. Intact cognitive ability to follow instructions
5. Bladder and bowel continence
6. Treatable depression
7. Supportive family and friends.[53]

There are six goals that should be attained by rehabilitation therapy teams. The first goal is to continuously evaluate the patient and his progress. Conditions and needs are fluid and change frequently. The plan must reflect the current needs, what is attainable in terms of progress, and how it will be achieved. The second goal is to avoid or minimize complications at all costs. Conditions that are a danger to the patient and his recovery must be monitored and treated, if not prevented entirely. The third goal is to provide a structured, consistent, and secure environment. Fourth, the therapy team must teach compensatory skills. If the patient is unable to perform routine but necessary tasks, the therapy team must provide him with the knowledge, flexibility, and means by which disabilities can be overcome. The fifth goal is for the team to build the morale of the patient and encourage him to learn and use the coping methods he is taught. The final goal is to have the patient be able to live as normally and independently as possible in surmounting the new challenges of everyday life.[54]

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[50] Subacute nursing homes (also known as subacute skilled nursing facilities) provide more intensive rehabilitative therapy than other skilled nursing homes, thus affording a level of care between rehabilitative hospitals and skilled nursing facilities. Kramer, "Outcome and Costs," 396-97.

[51] Mary Pat Murphy et al., "Discharge Planning for Individuals with Neurocognitive Barriers" http://www.remed.com/html/print.html (August 14, 2001).

[52] CMS, "Hospital Manual" (August 29, 2002) http://cms.hhs.gov/manuals/10_hospital/ho00.asp (November 8, 2002).

[53] Senelick, *Living with Stroke*, 114, 117.

[54] Ibid., 118-20.

STROKE ORGANIZATIONS

This section identifies programs and initiatives aimed specifically at the prevention and treatment of stroke that are currently available to the public. Based on the key participating organizations, each program is summarized and classified as professional, public and volunteer, or government.

PROFESSIONAL

National Stroke Project

The main objective of this project is to decrease the morbidity and mortality rate related to stroke by improving the quality of care.[55] It was created as a quality improvement organization program, funded by CMS. The program is carried out by a national network of private organizations to promote the adoption of antithrombolitics and other stroke therapies, increase appropriate diagnostic testing, and educate patients and their families and caregivers.

Stroke Prevention, Awareness, & Recognition Campaign (SPARC)

Keystone Peer Review Organization (KePRO) has coordinated this volunteer driven effort of numerous public and private organizations in Pennsylvania to raise public awareness of stroke preventive measures.[56] Following a brief personal and family history, physicians screen for rapid or irregular pulse, high blood pressure, and the presence of a carotid bruit. If any problems are found, the patient is advised to obtain a follow-up evaluation with his or her personal physician.

The screenings are made possible through the services of qualified volunteers at hosting sites throughout the Commonwealth. KePRO provides free

[55] HCFA, "Stroke National Project Overview," "Medicare Priorities," HCFA Pub. no. 10156, version 5.2 (2000), 23.

[56] KePRO, "SPARC 1997 Comprehensive Final Report" (1998), 3, 4.

materials and supplies to SPARC screening sites. These items are used to plan, set up, and conduct the screenings. Materials are available in English and Spanish.

PUBLIC AND VOLUNTEER

American Stroke Association (ASA)

The American Stroke Association, a division of AHA, sponsors a variety of programs for stroke, the most prominent of which are Operation Stroke, Get With The Guidelines, Stroke Awareness Month, and Stroke Alert.

Operation Stroke is an ASA initiative with four objectives: [57]

1. To educate the general public about the warning signs of a stroke

2. To encourage the general public to call 9-1-1 when these warning signs are observed

3. To advocate the improvement of EMS systems and personnel for the transport of stroke patients.

4. To urge acute care facilities to implement stroke protocols, teams, units, and outcomes tracking systems.

One important aspect within the campaign is the Stroke Chain of Survival. This is a sequential list of steps designed to improve the medical outlook for people who suffer from a stroke by substantially reducing delays in stroke treatment. The chain includes rapid identification, rapid transportation, rapid diagnosis, and rapid treatment.[58] The ASA is planning to add early and rapid rehabilitation to the chain of survival.[59]

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[57] American Stroke Association, "Operation Stroke" http://www.strokeassociation.org/presenter.jhtml?identifier=1018 (May 29, 2002); Martin P.S. Raniowski, senior director of public advocacy, Pennsylvania-Delaware affiliate, AHA, telephone conversation with Commission staff, November 12, 2002.

[58] "Operation Stroke"; Lauren Zaccarelli, vice president for programs, communications, and advocacy, Pennsylvania-Delaware affiliate, AHA, interview with Commission staff, September 26, 2001.

[59] E-mail from Richard D. Zorowitz, M.D., to Commission staff (November 19, 2002, 6:12 p.m. EST).

Operation Stroke uses customized communication and year-round community-wide events to educate healthcare professionals, EMS personnel, and residents of the community.

An acute care hospital-based program of AHA, Get With The Guidelines (GWTG) helps manage risk factors in coronary artery disease patients. GWTG-Stroke is the second module to be introduced and is currently in the pilot stage. Philadelphia has been selected as one of eleven sites nationwide for the second or "beta" phase of testing of this project. GWTG focuses on care team protocols to ensure that stroke patients are treated and discharged appropriately.[60] The program begins with an assessment of the hospital's current treatment and discharge protocols to provide a baseline to compare future results for measuring progress. Subsequently, designated teams use the program's tools to improve treatment and discharge procedures.

Recognizing the need to assist health care professionals to rapidly triage, diagnose, and treat a stroke in progress, AHA has developed the Acute Stroke Treatment Program (ASTP) to address these issues as they relate to primary stroke centers.[61] The program is a comprehensive resource to enable stroke center directors, hospital providers, and staff to establish a basic stroke center. Included is a checklist to help assure efficient and high quality acute care to stroke patients, once the decision to establish a stroke center has been made. The core component of the program will be a set of Program Capacity Assessment Criteria, which will enable hospitals to evaluate their capacity to treat stroke. Other program components include physicians' standing orders, integrative pathways, hospital stroke scales, and other ASA products.

ASA has designated May as Stroke Awareness Month. During this month, organizations are especially encouraged to use media campaigns to enhance public awareness of stroke warning signs and risk reduction strategies and to perform risk assessment screenings through the Stroke Alert risk assessments program. Particularly during May, ASA publicizes its toll-free number, which the public may call to find the nearest risk assessment site.

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[60] ASA, "Get With The Guidelines" http://www.strokeassociation.org/presenter.jhtml?identifier=3002728 (May 28, 2002).

[61] Primary stroke centers are hospital-based centers that stabilize and provide emergency care to the acute stroke patient, then either transfer the patient to a comprehensive stroke center or admit the patient for further care, depending on the patient's needs and the center's capabilities.

National Stroke Association (NSA)

The mission of NSA is to reduce the incidence and impact of a stroke.[62] The organization devotes its entire resources to stroke, providing an extensive range of programs that concentrate on all stages of stroke. NSA's prevention programs and guidelines offer screening tools and prevention educational materials about stroke symptoms. Public Health Outreach allows NSA to partner with state and local public health departments to spread prevention messages. Furthermore, its Ethnic Disparities Initiative focuses attention and educational campaigns on minority populations. NSA's Acute Treatment Program assists hospitals through personal consultations and specific recommendations to provide the best stroke care possible.

Philadelphia Stroke Council (PSC)

The Philadelphia Stroke Council (PSC) was founded in 1995 as an organization of consumers and health care professionals dedicated to improve the awareness of stroke risks and symptoms, to advocate for stroke survivors and their caregivers, and to improve the delivery of life saving and life changing healthcare delivery in southeastern Pennsylvania and southern New Jersey. PSC is the Pennsylvania affiliate of NSA.

PSC, NSA and AstraZeneca developed the Stroke Treatment Enhancement Program (STEP) to address these issues. STEP is a multi-part initiative with two goals outlined in NSA's Acute Stroke Response Education Program:

- Assist sites in more effectively executing the emergency response to acute stroke patients

- Enable potential patient populations to identify signs of stroke and the need for emergency treatment.

Following guidelines established by the NSA, a STEP consulting team, composed of a nurse and a neurological stroke specialist, brings state-of-the-art stroke care to an institution and modifies current practices to implement optimal emergency response to acute stroke patients. The institution is also advised on publicizing the signs of stroke and the need for emergency care.

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[62] NSA, "Facts about National Stroke Association" http://www.stroke.org/pages/press_nsafaq.cfm (June 4, 2002).

National Stroke Council (NSC)

The National Stroke Council, a program of the National Emergency Medical Association (NEMA), supports research and education on the causes and effects of stroke.[63] A variety of free or modestly priced stroke publications and materials can be ordered from NSC. In particular, a "Stroke Survival Manual" containing stroke prevention and treatment articles is distributed by mail.

Consortium for Latino Health

The Consortium for Latino Health was formed in 1993 to improve the health of Latinos in the Philadelphia region through innovative responses to their distinctive health needs and through fostering effective relationships between area health care providers and Latino community-based organizations. The consortium is comprised of Latino community-based organizations, providers, insurers and others, who have combined their efforts to improve the health outcomes of Latinos in Philadelphia. Activities include a comprehensive health career pipeline for Latinos in Philadelphia; advocacy and training on changes in federal and state health and social service systems; essay contests on Latino health issues for high school students; targeted scholarships for Latino adults in the health professions; a summer science program; a proposed Latino nurse licensure project; and technical assistance and various data to its membership.

One of the consortium's significant projects is a Task Force on Stroke Prevention. After analysis of both quantitative and qualitative data, the task force found a serious need for stroke prevention efforts.[64] As we have noted, the age-adjusted stroke death rate among Hispanics is higher in Pennsylvania than the national average.

One guide that was created during this project was the "Stroke Prevention Resource Directory." This directory summarizes information for stroke prevention and services of 16 Philadelphia organizations, including the type, cost, and rating of each service.[65]

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[63] NEMA, "National Stroke Council" http://www.nemahealth.org/strokecouncil.html (July 22, 2002). NEMA is a non-profit organization dedicated to trauma prevention and the delivery of quality emergency medical services.

[64] Philadelphia Health Management Corporation, "Latinos at Risk for Stroke: A Report Submitted to Consortium for Latino Health, Latino Stroke Prevention Sub-Committee" (January 2002), 13.

[65] Ibid., 3. Latino Health Consortium, "Stroke Prevention Resource Directory" (Philadelphia, 2001).

Also, the consortium has proposed educational programs for the community that should be bilingual and easy for the community to understand. The program will be undertaken cooperatively by several local organizations, with the lead agency being the Health Promotion Council of Southeastern Pennsylvania.

Delaware Valley Stroke Coalition

A coalition of the ASA, the Philadelphia Stroke Council (PSC), and Delaware Valley Healthcare Council (DVHC) formed a joint venture, recently named the Delaware Valley Stroke Coalition, to prevent strokes and assure appropriate care in the Delaware Valley.[66] The first step was to consolidate their existing programs and efforts, including ASTP, PSC's Stroke Treatment Enhancement Program (STEP), and broad-based efforts by DVHC.

The organizations have created an action plan, divided into the following major areas of activity:[67]

1. Stroke awareness, prevention and screenings for the general public
2. Stroke awareness and education for providers
3. Delivery system: pre-hospital providers
4. Delivery system: acute care
5. Delivery system: rehabilitation
6. Data collection and outcomes measurement.

Each area is headed by one of the organizations along with a committee of representatives of each participating organization and other appropriate persons. The committees review initiatives, identify gaps, and identify and resolve conflicts in each of these areas.

[66] American Stroke Association, Philadelphia Stroke Council, and the Delaware Valley Healthcare Council to Walter H. Tsou, M.D., M.P.H., Commissioner, City of Philadelphia, Department of Public Health, June 1, 2001.

[67] Ibid.

GOVERNMENT—FEDERAL

Department of Health and Human Services (HHS)

Healthy People 2010 presents a comprehensive health promotion and disease prevention agenda.[68] Developed by HHS, its two overarching goals are to increase quality and years of healthy life and to eliminate health disparities among ethnic groups. The plan states 28 focus areas, stating a goal for each area. Within each focus area a list of objectives is prescribed; a total of 467 such objectives are propounded for the nation.

In this plan, stroke is included in the focus area of cardiovascular disease. The goals for this focus area are "improve cardiovascular health and quality of life through the prevention, detection, and treatment of risk factors; early identification and treatment of heart attacks and strokes; and prevention of recurrent cardiovascular events."[69] Two specific objectives are identified for stroke:

1. Reduce the stroke death rate by 20%

2. (Developmental) Increase the proportion of adults who are aware of the early warning symptoms and signs of a stroke.[70]

National Institute of Neurological Disorders and Stroke (NINDS)

NINDS is a division of the National Institutes of Health established to conduct and support research, training, health information dissemination and other programs with respect to neurological diseases and disorders and stroke.[71] NINDS developed the Know Stroke education campaign to inform the public of the symptoms of stroke and the importance of getting to the hospital quickly.[72] The program can be set up and shown in a variety of settings including hospitals, senior citizen centers, health clinics and fairs, and community and church meetings.

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[68] HHS, *Healthy People 2010,* 1.
[69] Ibid., 56.
[70] Ibid., 12-19, 12-20.
[71] 42 U.S.C.A. § 285j et seq. (West 1991).
[72] NINDS, "Know Stroke" http://www.ninds.nih.gov/health_and_medical/pubs/knowstroke.htm#know (August 2, 2001).

GOVERNMENT—PENNSYLVANIA

Pennsylvania Department of Aging (PDA)

Health promotion and disease prevention activities for older Pennsylvanians are the focus of PrimeTime Health, a federally sponsored program administered through PDA. The program allows communities, through local Area Agencies on Aging, to define and address their own health promotion priorities.[73] For example, the Philadelphia Corporation for Aging sponsors a Stroke and Heart Health Education and Assessment Program. Participants learn the risk factors and early warning signs of a stroke and receive individual stroke risk assessment and counseling. In addition, PrimeTime Health sponsored free stroke screenings.

Pennsylvania Department of Health (PADOH)

State Health Improvement Plan (SHIP). PADOH's statewide health plan emphasizes the prevention of disease and disability, the coordination of resources, interagency cooperation, and improved government responsiveness to community health planning priorities.[74] The plan identifies tobacco use, poor diet, sedentary lifestyle, and untreated high blood pressure as risk factors for stroke.[75] SHIP also includes reports that focus on Pennsylvania's racial, ethnic, and linguistic minorities and rural health.

Cardiovascular Health Section. PADOH addresses risk factors for heart disease and stroke through the Cardiovascular Health (CVH) section of the Bureau of Chronic Disease and Injury Prevention. The CVH section includes the Nutrition Program, the Governor's Council on Physical Fitness and Sports, and the Heart Disease and Stroke Program.

The CVH section receives funding through the Preventive Health Services Block Grant; cooperative agreements with the CDC for diabetes, nutrition, and physical activity; and state appropriations for physical activity and diabetes. Total funding for the section is $4.2 million. These funds support central office staff, county and municipal health department staff, and program initiatives aimed at promoting healthy, active lifestyles in order to reduce the burden of

[73] PDA, "PrimeTime Health Program" http://www.aging.state.pa.us/aging/cwp/view.asp?a=3&q=173883 (June 5, 2002).

[74] PADOH, *State Health Improvement Plan 2001-2005* (Harrisburg: PADOH, 2001) http://webserver.health.state.pa.us/health/cwp/view.asp?a=169&Q=201421 (June 5, 2002).

[75] PADOH, *State Health Improvement Plan: Partners…In Pursuit of Good Health* http://www.health.state.pa.us/pdf/SHIP/DOCUMEN8.PDF (June 5, 2002).

cardiovascular disease and stroke. Initiatives are coordinated by PADOH and implemented by private and public partners.[76]

More broadly, the CVH section is working on a comprehensive and detailed cardiovascular health plan for the Commonwealth that is intended to encompass heart disease and stroke.

[76] E-mail from Emilie Tierney, director of the Bureau of Chronic Diseases and Injury Prevention and Acting Deputy Secretary for Health Promotion and Disease Prevention to Commission staff (July 12, 2002, 11:49 a.m. EDT).

STROKE OFFICE

Because the impact of stroke on Pennsylvania is demographically more serious than in most other states, Pennsylvania should consider an aggressively proactive approach. Accordingly, the task force recommends that the Commonwealth enact legislation creating a stroke office under PADOH to lead our public health response. The office should be guided by an interdisciplinary stroke council, including essential public and private stakeholders, while ensuring participation by stakeholders not directly represented on the council. (For the department's position that a separate stroke office is not necessary, see pp. 52-53 and appendix 6.)

Maryland, Ohio, and Mississippi have similar ongoing task forces, which are administered through the respective health departments but are not directed by the departments.[77] As the Ohio Council on Stroke Prevention and Education deals exclusively with stroke, it could readily serve as a model for a Pennsylvania stroke office.[78] As the Maryland and Mississippi legislation indicates, a significant alternative is an office that combines stroke responsibilities with cardiovascular disease (CVD), which is the leading cause of death in the United States and in Pennsylvania. This option has the advantage that the risk factors for CVD and stroke are largely identical, so that a combined office could deal with both without duplication. On the other hand, the advisory committee has expressed concern that where an organization combines services for CVD and stroke, stroke tends to receive a much lower priority.

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[77] Maryland: State Advisory Council on Heart Disease and Stroke (Md. Code Ann., Health–Gen. I § 13-201 et seq. (Lexis 2000 and Supp. 2002), established July 1, 2001; Mississippi: Task Force on Heart Disease and Stroke Prevention (Miss. Code Ann. §§ 41-103-1 (West Supp. 2001)), established July 1, 2001; Ohio: Council on Stroke Prevention and Education (Ohio Rev. Code § 3701.90 et seq. (West Supp. 2002)), established February 13, 2001. The 2001 Maryland legislation renamed and changed the powers and duties of the Advisory Council on High Blood Pressure and Related Cardiovascular Risk Factors, which was established in 1957.

[78] Ohio's stroke death rate as of 1999 was 59.9 per 100,000, as compared to 68.5 for Pennsylvania and 58.6 nationally. NSA, "Reducing the Incidence & Impact of Stroke" http://www.stroke.org/pages/state_stats.cfm (January 8, 2002), citing CDC's National Vital Statistics System. As the Ohio council was established in 2001, the state's lower stroke death rate can be attributed to other factors. However, it may be instructive that a state comparable in population with Pennsylvania put a high enough priority on stroke to establish a council devoted solely to it, even though its stroke problem is arguably not as urgent as Pennsylvania's.

PROPOSED STROKE OFFICE LEGISLATION

Draft legislation establishing an office devoted exclusively to stroke, patterned after the Ohio statute, is set forth as appendix 5. The council would be under the administrative control of PADOH as the lead agency for stroke programs. The membership of the advisory council is set forth in section 4(b) of the proposed act and comprises a broadly inclusive list of public agencies and representatives of the associations most concerned with stroke care.

Under the proposed legislation, the council has the following responsibilities:

1. Developing and implementing a comprehensive public education program on stroke prevention, targeted to high-risk populations and to geographic areas where there is a high risk of stroke, including information developed or compiled by the council on healthy lifestyle practices, signs and symptoms of stroke and action to be taken when signs occur, determinants of high-quality health care for stroke, and other appropriate information.

2. Developing or compiling recommendations for primary care physicians that address risk factors for stroke, appropriate screening for risk factors, early signs of stroke, and treatment strategies. This may include evaluating the effectiveness of risk screenings and diagnostic testing for use by primary care physicians as a stroke prevention measure.

3. Developing or compiling for physicians, emergency health care providers and other health care providers, recommendations on initial and long-term treatment of stroke.

4. Developing or compiling for physicians, long-term care providers and rehabilitation providers recommendations on rehabilitation of stroke patients.

5. Assisting PADOH in the development of comprehensive plans regarding stroke and related health issues.

6. Assisting PADOH in administering the stroke registry.

7. Assisting PADOH in awarding grants related to the purposes of the act.

8. Taking other action to ensure that the public and health care providers are informed regarding the most effective strategies for stroke prevention and treatment.

9. Assisting the stroke office in preparing a report and prescribing recommendations for the governor, the department, and the legislature. After the report is issued, the council would meet annually and may meet at other times at the call of the chair to continue to advise the office.

The department is charged with publicizing the council's information and disseminating its recommendations as appropriate. Provisions relating to awarding of grants and the establishment of a stroke registry have been included.

Precedent for creating a special office for dealing with a single condition exists in the Pennsylvania Cancer Control, Prevention and Research Advisory Board.[79] The board consists of twelve members and develops the Pennsylvania Cancer Plan for cancer control, prevention, and research. The board may recommend grants and contracts for a cancer registry; screening, detection and prevention; epidemiological and statistical studies; community outreach programs; rehabilitation; communication and planning among cancer institutions; education and information; training; and clinical research. The proposed statute draws from the Emergency Medical Services Act[80] the concept of a council that, like the State Advisory Council for EMS, consists mostly of representatives of private volunteer professional and paraprofessional organizations. Representatives from seven public departments and agencies centrally concerned with the Commonwealth's response to stroke are also included on the council. This assures that the council will afford the office and the department advice from a broad array of stakeholders.

Much of the remainder of this report will elaborate the broad powers of the proposed statute by providing suggestions that the stroke office may implement in order for the stroke office to lead the Commonwealth's response to stroke, including the following:

[79] The board was established by the act of December 18, 1980 (P.L.1241, No.224) known as the Pennsylvania Cancer Control, Prevention and Research Act; 35 P.S. § 5631 et seq. (West 1993).

[80] Act of July 3, 1985 (P.L.164, No.45), § 7; 35 P.S. § 6927 (West 1993).

General Powers

- Establish a stroke information clearinghouse to collect and disseminate stroke research and information, including best practices relating to prevention, care and rehabilitation.

- Establish a stroke patient registry to assist medical research into prevention and treatment.

- Administer a program to award grants and contracts to private and public entities in support of programs in stroke prevention, care, education, training, and clinical research.

Prevention

- Support existing efforts to provide resources to local consortia where they exist and direct assistance to organizations where regional coordination is less advanced.

- Encourage and establish education programs to raise health care provider and public awareness of risk factors for stroke, particularly hypertension, diabetes, smoking, high cholesterol, and obesity.

- Encourage and establish public education programs to publicize the warning signs of stroke and the proper response to a stroke emergency.

- Ensure that public education programs are culturally appropriate to the groups at whom they are directed.

- Assist in developing and disseminating protocols to reduce the risk of suffering a stroke while under treatment for another condition and to guide acute care for such strokes.

- Conduct a study of the adequacy of insurance coverage for diagnostic services and preventive care, including the issue of whether or not mandatory coverage would be feasible.

- Conduct population-based research to improve the effectiveness of educational programs, especially targeting populations that are underserved because of geographic, socioeconomic, educational or cultural factors.

Acute Care

- Inventory all hospitals in the Commonwealth to assess whether all the resources necessary for hospitals to diagnose and initiate effective stroke treatment are available and accessible to all residents of the Commonwealth within one hour's time.

- Compile an official record of the stroke treatment capabilities of providers who self-designate or who undergo voluntary independent certification by an appropriate certifying organization and disseminate this information to EMS providers and other interested persons and organizations.

- Use the grant program to fund regional cooperative arrangements to promote improved stroke care at the regional level.

Rehabilitation

- Adopt or develop a statement of best practices for maintaining continuity of care between hospitalization and rehabilitation.

- Conduct a study of the appropriateness of the levels of care for stroke rehabilitation.

- Conduct a study of the cost-effectiveness of stroke rehabilitation, including the effect of early initiation of rehab.

- Assess rehabilitation coverage by health insurance plans and the comparative impact on care of differing standards of coverage as a basis for determining how effective the treatment under such plans is for survivors of stroke.

- Disseminate evidence-based guidelines and protocols relating to all phases of rehabilitative care.

ADMINISTRATIVE APPROACHES

There was unanimous agreement on the advisory committee on the need to strengthen the Commonwealth's public and private response to stroke. However, there was some difference of opinion regarding the best administrative structure and procedure to implement the common goal.

While the majority of the advisory committee supported the concept of the stroke office, PADOH is opposed to it. In its view, such an office would be duplicative and would fragment its present stroke program and its efforts at a stroke prevention plan. PADOH has initiated a procedure for developing a statewide cardiovascular plan over the next five years. The basis selected by PADOH for categorizing the state health plan is by risks; under that approach, stroke should logically be dealt with in the same segment as heart disease. The plan development procedure calls for the creation of a 15-member executive committee that would coordinate interaction with 75 to 100 stakeholder groups that will drive the plan. The end product is envisioned as a coordinated implementation plan, under which the stakeholders will commit to specific actions to improve cardiovascular and stroke care. Concerns regarding stroke care could be accommodated by including members of the advisory committee for this study on the executive committee and including stroke organizations among the stakeholder groups.

The majority of the advisory committee supported the creation of a separate stroke office within PADOH. While consideration of risk factors alone would justify treating stroke together with heart disease, acute treatment and rehab for stroke are quite different. In the committee majority's view, the history of initiatives that subsume stroke within an overall cardiovascular plan is that stroke tends to be treated as an afterthought. Furthermore, the recent advances in stroke care justify particular attention being given to it over the next five to ten years. As envisioned in the draft legislation, the stroke office is placed under PADOH's control, which should alleviate any fragmentation, and duplication could presumably be minimized by suitable reassignment of staff. PADOH is mandated to hold meetings of an independently selected advisory committee and to assign an unspecified staff complement to stroke, albeit under a directive to respond to a comprehensive list of duties relating to stroke. The legislation requires the advisory committee to assist PADOH in the development of comprehensive statewide plans. Until the statewide plan is formulated, it is impossible to judge whether it gives adequate emphasis to stroke care. In the meantime, a separate office may help assure that the maximum feasible level of effort is directed at stroke.

If STOP or similar legislation is enacted by Congress, establishment of a stroke office will give Pennsylvania a head start toward qualifying for funding thereunder and a vehicle for the well-coordinated and effective use of available resources.[81] In order to be effective, the office must be afforded adequate public and private resources to perform its duties. With the assistance of the council, PADOH through the stroke office can allocate the tasks in light of available resources over time in accordance with well-considered priorities.

With respect to the stroke registry specifically, PADOH recommended that before any legislative mandate is considered, a feasibility study, including a cost and benefit analysis, should be conducted to determine the need and use of the registry. PADOH estimated the cost of establishing such a registry, not including the feasibility study, would be about $1.6 million, and the cost of maintaining the registry would be about $ 0.6 million per year.

The advisory committee further recommended to PADOH that a reorganization of PADOH might facilitate a strengthened response to stroke. Presently, PADOH's Heart Disease and Stroke Program is a component of the cardiovascular health section within the Bureau of Chronic Disease and Injury Prevention. The committee suggests that the bureau include a major administrative unit to deal with vascular disease, with that entity to include two subunits dealing with cardiovascular disease and stroke, respectively. If the stroke office was created, it could then serve as the stroke subentity.

[81] Because of the anticipated enactment of STOP, it may be advisable that any appropriation to the office be made with the intent that the funds be used to maximize the receipt of federal funds to the fullest extent possible. This directive is often used in legislative appropriations where federal funding may be available.

PREVENTION RECOMMENDATIONS

In terms of both personal well-being and cost-effectiveness, the best way of dealing with strokes is to prevent them as much as possible. The recommendations in this section are intended to guide the implementation of a strategic plan to improve stroke prevention programs in this Commonwealth. The elements of the plan are: reducing stroke risk factors and stroke-related morbidity and mortality, providing the best preventive care, and developing a comprehensive stroke prevention research and information dissemination program.

Prevention initiatives must address the specific requirements of underserved urban and rural populations. All prevention initiatives, especially those directed at education and behavior change, must take due regard for the cultural backgrounds of the public intended to be served. It is also important that there be a careful review of existing public and private programs to avoid duplication of efforts. As with other phases of stroke response, the stroke office would support existing efforts to provide resources to local consortia where these exist and direct assistance to specific organizations where regional coordination is less advanced.

REDUCING RISK FACTORS, MORBIDITY AND MORTALITY

Because our governmental system is based on respect for individual liberty, a large part of the responsibility for maintaining public health falls on the individual citizen. Active public health education initiatives can increase public awareness of personal measures that reduce the risk of stroke. In recognition of this, the STOP legislation provides for "a national education and information campaign to promote stroke prevention and increase the number of patients who seek immediate treatment."[82] The stroke office should give high priority to the encouragement and establishment of educational programs to raise health care provider and public awareness about risk factors for stroke, particularly hypertension, diabetes, smoking, high cholesterol, and obesity. Because people

[82] STOP Act § 3, adding § 2801(a) to the Public Health Service Act (42 U.S.C. § 201 et seq.)

are unable to detect hypertension, high cholesterol, and diabetes without diagnostic tests, screening and diagnosis of those conditions must be emphasized; early recognition of risk factors increases the effectiveness of preventive intervention. Resources should be allocated to encourage education of patients and their families in pre-hospital and hospital care. Equally important is broad public education aimed at publicizing the warning signs of stroke and the necessity of contacting emergency personnel through the 9-1-1 system as soon as these symptoms appear.

As mentioned, educational programs must be culturally appropriate to Pennsylvania's diverse ethnic and racial makeup. For example, a recent report found "a serious need in the Latino community of Philadelphia for stroke prevention efforts which focus on education regarding the risk factors for stroke and the importance of diagnostic screenings and compliance with medical treatment."[83] The report advocates that educational programs directed at the Latino community be written in both Spanish and English, use colorful illustrations and non-technical terms, use group presentations and public service announcements on Spanish-language radio and television stations, and take into account cultural differences within the Latino community. Attention to these factors may improve the effectiveness of outreach programs among African Americans, Asian Americans, and recent immigrants, as well as Hispanic Americans. Moreover, educational materials should be made accessible to as many demographic groups as possible by means of assistive technology and other accommodations to the disabled, illiterate, and senior populations.

The number of strokes that occur while patients are hospitalized for other conditions is cause for concern. A multidisciplinary rapid response protocol should be developed to reduce the risk of suffering a stroke in this situation as well as to improve acute care should such a stroke occur. The protocols should help educate emergency, pre-hospital, and hospital personnel about stroke risks while in care and coordinate responses to this danger.

[83] Philadelphia Health Management Corporation, "Latinos at Risk for Stroke," (2002), 4. The study included six focus group interviews whose members were recruited by agencies that primarily serve the Latino communities of Kensington and North Philadelphia and data from the Philadelphia Household Health Survey, a telephone survey of representative households, Philadelphia BRFSS data, the national Health Interview Survey, the Latino Health Consortium's Resource Directory, and Health Promotion Council of Southeast Pennsylvania. Ibid., 1-4.

ACCESS TO BEST PREVENTIVE PRACTICES

The stroke office should establish a system to collect and disseminate best practices for preventive care, using the best available expertise of health care practitioners. Included in preventive best practices should be guidelines for disease management of associated conditions, particularly diabetes, hypertension, elevated cholesterol, and obesity.

Because patients tend to underuse preventive measures due to cost considerations, the stroke office should conduct a study of the adequacy of current insurance coverage for diagnostic services and preventive care, including the issue of whether or not mandatory coverage of these services would be feasible. Mandated coverage is a technique that must be used with great caution, in part because ERISA preemption of self-insured employers may cause the burden of the mandate to fall disproportionately upon small business.[84] Voluntary upgrades in coverage may be encouraged by state-supported research showing that it is cost-effective to provide preventive coverage. The stroke office may assist this by designating five or six preventive measures as subjects for a cost effectiveness study; these measures may include blood sugar and blood pressure screening and treatment. The office may mandate data collection and research if needed, using the capabilities of PHC4 as much as possible.[85]

RESEARCH AND INFORMATION

A stroke information clearinghouse should be established in order to coordinate the dissemination of stroke research and information. The clearinghouse can provide information for medical practitioners, researchers, public health organizations, and the public. It can provide background information for educational programs that address all sectors regarding aspects of stroke prevention. It can also collect stroke prevention research and coordinate information from state data collection agencies, third party payors, and others to help target the most effective use of resources. For example, the clearinghouse could gather clinical research, such as that currently being conducted by NINDS

[84] The Employee Retirement Income Security Act of 1974 (ERISA) (Pub.L. 93-406) (ERISA) effectively exempts self-insured employers from state regulation of health coverage. See §§ 4, 514; 29 U.S.C.A. §§ 1003, 1144 (West 1999).

[85] PHC4 was created by the Health Care Cost Containment Act (July 8, 1986 (P.L.408, No.89)). Its most important function is to collect, analyze and disseminate data relating to costs and quality of hospital treatment.

on basic neurology, use of warning signs to prevent stroke, and a possible vaccine for stroke.[86]

A stroke registry should be established in order to assist medical research into stroke treatment and prevention. A registry is a medical database on persons treated for a specific condition, collected in such a manner that the confidentiality of individual patients is preserved. A similar registry in this state for cancer patients has been established under the Pennsylvania Cancer Control, Prevention and Research Act.[87] The stroke office could determine how best to take advantage of the Paul Coverdell National Acute Stroke Registry[88] and guide efforts to collect additional information in Pennsylvania.

It is especially vital that population-based research be conducted to improve the effectiveness of educational programs, especially targeting populations that are underserved because of geographic, socioeconomic, or cultural factors. The data should be used to develop an array of approaches to address specific audiences in a culturally appropriate manner. Included in the population-based research should be continuous analysis of outcomes, including the monitoring of behavioral changes. Among the issues that should be addressed is the extent to which lack of insurance coverage, especially for uninsured and underinsured Pennsylvanians, may affect medical care for stroke and its precursor conditions.

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[86] See NINDS, "2002 Stroke Testimony" http://www.ninds.nih.gov/about_ninds/2002_stroke_testimony.htm (June 11, 2002).

[87] Act § 6; 35 P.S. § 5636 (West 1993).

[88] CDC, "Paul Coverdell National Acute Stroke Registry" http://www.cdc.gov/programs/chronic5.htm (August 13, 2002).

ACUTE CARE RECOMMENDATIONS

ACUTE CARE GOAL

The Commonwealth should establish as a goal that no Pennsylvania resident should be more than one hour away from a hospital with the capability of treating all acute strokes. This is a demanding goal, but it follows from the fact that there is only a limited time period—often as little as three to six hours—from the onset of stroke symptoms to irreversible damage due to death of brain cells. If a patient calls EMS one hour after onset of symptoms and EMS transports the patient to the hospital in 30 minutes,[89] the medical staff at the hospital may have only 1-1/2 hours to evaluate the patient and commence thrombolytic or other indicated therapy. Within this time frame the hospital must confirm the diagnosis of stroke,[90] notify relevant hospital staff, take a patient history, perform a physical exam (including diagnostic tests and blood work), perform and analyze a non-contrast CT scan, evaluate the tests and blood work, and prepare the patient for administration of the treatment (such as starting intravenous lines and obtaining informed consent).[91]

For an upgrade in treatment capability to be effective, it is essential that it be accompanied by a major effort at public education. Many stroke patients fail to get to the hospital within the needed time frame. A prominent recent study found that 46% of patients experiencing stroke symptoms arrived at the emergency room within three hours of onset of symptoms and 61% arrived within six hours.[92] AHA found that patients wait an average of 22 hours to get help for stroke symptoms.[93] Since a substantial proportion of patients fail to arrive within the three-hour time frame, it is of paramount importance that public education programs stress the necessity of calling EMS when a stroke is suspected. At the

[89] This is a somewhat better than average time frame for response to destination, i.e., from receipt of the emergency call to drop-off of the patient at the hospital. See appendix 4, table 5.

[90] Patients may easily confuse a stroke with an episode of low blood sugar (hypoglycemia).

[91] Joel Leon Telles and Kimberly Greene, "Protocol Design and Improving Acute Stroke Care," DVHC, 2001, 11-13.

[92] Clifton R. Lacy et al., "Delay in Presentation and Evaluation for Acute Stroke," *Stroke* 32 (2001): 63, 67.

[93] AHA, "Operation Stroke." See note 57 for URL.

same time, emergency room personnel must be trained to respond effectively to patients presenting stroke symptoms who arrive by other means.

STROKE RESPONSE PLAN

To mobilize the public health system of the Commonwealth to respond to the above goal, it is evident that a comprehensive stroke response plan will be necessary. The stroke office should conduct an inventory of all hospitals in the Commonwealth to assess whether all the resources necessary for hospitals to initiate effective stroke treatment are available and accessible to all residents of the Commonwealth within one hour's time. The inventory can be used to help hospitals obtain the necessary resources to meet that level of capability. Based on this inventory, PADOH can design a statewide stroke system to accomplish the one-hour access goal. The plan may draw upon the efforts of the Canadian provinces of Nova Scotia and Ontario, which have made substantial progress in formulating plans to coordinate levels of acute stroke care.[94]

TREATMENT STRUCTURE

While tPA can be beneficial in treating a large proportion of ischemic strokes, only 2-3% of stroke patients in Pennsylvania currently receive it. In response to the underutilization of tPA and other stroke therapies, the Brain Attack Coalition (BAC) has developed criteria to facilitate maximum utilization of the drug, taking into account that it must be administered quickly but is strongly contraindicated for patients with hemorrhagic stroke.[95] BAC criteria set forth standards for eleven major aspects of stroke care: acute stroke teams, written care protocols, emergency medical services, emergency department, stroke unit, neurological services, commitment and support of the medical organization, neuroimaging, laboratory services, outcomes and quality improvement, and educational programs. The BAC criteria for neurological

[94] Heart and Stroke Foundation of Nova Scotia, "Re-Organizing Stroke Care in Nova Scotia: Report of the Nova Scotia Integrated Stroke Strategy Committee," (Halifax: Heart and Stroke Foundation of Nova Scotia, 2002); Heart and Stroke Foundation of Ontario, "Building a Coordinated Stroke System: An Evaluation of the Coordinated Stroke Strategy Demonstration Project," (Toronto: Heart and Stroke Foundation of Ontario, 2001).

[95] Mark J. Alberts et al., "Recommendations for the Establishment of Primary Stroke Centers," *JAMA* 283 (2000): 3102–3109. BAC is a multidisciplinary group of representatives from major professional organizations involved with delivering stroke care.

services are quite stringent. "Primary stroke centers must have the capability of performing either a cranial computed tomographic scan or a brain magnetic resonance imaging scan within 25 minutes of the order being written. These imaging capabilities must be available 24 hours everyday."[96] Access to professional evaluation of neuroimaging can be facilitated by the use of telemedicine technology, which allows internet transmission of a patient's CT and MRI images to a qualified specialist.

The stroke office should inventory the capability of all Pennsylvania acute care hospitals to diagnose and initiate treatment for acute stroke. Again, hospitals with this capability should be within one hour of every resident of Pennsylvania. Where gaps exist, the stroke office should recommend a plan to develop that capability for all Pennsylvania locations. Hospitals that wish to develop a more comprehensive approach to the treatment of stroke should refer to published criteria available in the medical literature and from stroke advocacy groups. The stroke office should ensure that information about those hospitals that have the capability to diagnose and treat acute strokes should be publicly available.

Once the one-hour access goal is attained, acute care hospitals should designate as a quality indicator either compliance with BAC (or similar criteria certifying capability for treating all strokes) or entry into an arrangement for the transfer of appropriate patients to the nearest hospital capable of treating all acute strokes. In primary treatment centers, this structure would require each hospital to assess the patient's condition and decide whether to treat or transfer. The inventory and statewide stroke treatment system can help hospitals create their own arrangements by structuring the information flow regarding the capabilities of the providers. This stroke system would also reveal gaps in capability that need to be addressed.

Through the stroke office, the Commonwealth would keep an official record of providers who self-designate or who undergo voluntary independent certification by an appropriate certifying organization. The Commonwealth would then disseminate this information to EMS providers and other interested persons and organizations. Qualifying providers could then make known that they are self-designated or certified as stroke treatment centers.

The emphasis in acute care policy at this time should be on providing high-quality stroke care at all acute care hospitals.[97] A stroke center system (modeled on the trauma center system) that relies heavily on diversion to the specialized centers promotes rivalry rather than cooperation among care centers.

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[96] Ibid., 3106.

[97] Joel Leon Telles, "Hospital Stroke Care in the Delaware Valley," (Philadelphia: DVHC, 2000), 2.

More importantly, the time spent diverting a patient from one hospital to another is time during which the patient is denied sophisticated evaluation and care. At the same time, the stroke care community in Pennsylvania should leave open the possibility of reevaluating the stroke center model in light of developments on the national level.

PROMOTING IMPROVED CARE

The statewide informational clearinghouse or resource center should collect and disseminate information and guidelines concerning stroke treatment. The resource center would include the development of stroke treatment protocols and procedures for developing qualified stroke teams. The center would also serve as a repository of educational materials and technical information. Acute care is a particularly active area for new research. For instance, NINDS is pursuing research on the use of stem cells to treat stroke in animal models, use of hypothermia to improve outcome following aneurysm surgery, improvement in stroke imaging techniques, and procedures and drugs to protect the brain against further injury.[98] The stroke center's clearinghouse will facilitate the use of these new advances by Pennsylvania's medical profession.

In addition, a grant program should be established to fund regional cooperative arrangements to promote improved stroke care at the regional level. The leading example of this type of collaboration in Pennsylvania is the Delaware Valley Stroke Coalition described in the chapter on stroke organizations.[99] Grants should be made to maintain and improve regional programs of this kind in areas where these have been effective or hold promise to become effective and direct support to organizations should be used where such programs are not as strong, which is primarily in the less urban parts of the Commonwealth.

Funding for the resource center and the grant program could be drawn from a variety of public and private sources. If enacted, STOP legislation would provide for a grant program that might support these initiatives.

[98] NINDS, "2002 Stroke Testimony."
[99] See p. 42 of this report.

REHABILITATION RECOMMENDATIONS

CONTINUITY OF CARE

More than almost any other medical condition, stroke raises problems of continuity of care, because care may be provided to patients disabled by the disease over a long period of time in a variety of possible settings. Promoting continuity of care will help insure that effective rehabilitative services are provided in a consistent and timely manner.

The first decisions that may crucially affect the success of rehabilitation typically occur in the acute care hospital during the discharge planning for the stroke victim. Early intervention by rehabilitative professionals will often result in better outcomes. A physiatrist or other appropriately trained professional should be involved upon the initiation of treatment in the acute care facility to help formulate the treatment plan and to guide the selection of the best site for continued care, thereby helping to assure better continuity in the transition from acute care. Once a stroke patient is placed in a rehabilitative facility, a facility-based professional case manager should coordinate the therapists and nurses to assure continuity of care and achieve an effective team approach. Rehabilitation planning must include the patient's caregiver as a member of the team.

Through the stroke office, a consensus statement of best practices for assuring continuity of care should be adopted or, if necessary, developed, based on guidelines informed by leading research initiatives. To provide scientific evidence to promote informed clinical policy in rehabilitation, such studies must evaluate rehabilitative outcomes, advance measurement of outcomes, and evaluate emerging therapies and technologies.[100]

[100] U.S. Department of Veterans Affairs, Office of Research and Development, Health Services Research and Development Service (VAHSR&D), *Research Briefs* 1 (2001): 6. The Quality Enhancement Research Initiative of VAHSR&D funds a center to conduct outcomes research on stroke rehabilitation for veterans based on the principles stated in the text.

ACCESS TO APPROPRIATE CARE

In the opinion of advisory committee members, stroke victims are often placed in care that does not afford them the maximum opportunity to regain functional independence. It seems that many patients are assigned to nursing homes who could have returned home if they had been given intensive rehabilitation as soon as the patient could tolerate it. A study comparing assignment of stroke patients after hospitalization found that Medicare HMO patients were more likely to be discharged to nursing homes than fee-for-service patients, although mortality rates were not significantly different.[101] In order to determine the extent to which this is the case, the stroke office should study the use of the different placement alternatives for stroke rehabilitation.[102] The state of knowledge concerning the most effective attributes of rehabilitative therapy is currently inadequate for clinical or policy purposes.[103]

Health professionals should ensure that patient caregivers are afforded all possible support, including information and other assistance needed to obtain help from public agencies and community-based services.

INSURANCE COVERAGE

Issues relating to insurance coverage are especially urgent in the field of rehabilitation, particularly with respect to cognitive and speech therapy. The advisory committee recommends that the stroke office study the cost-effectiveness of stroke rehabilitation, especially when initiated early. There is substantial evidence that both intensive coordinated inpatient and ambulatory rehab programs can significantly reduce disability, length of stay, and institutionalization, thereby improving the quality of life of patients, while reducing overall costs.[104]

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[101] Sheldon M. Retchin, M.D. et al., "Outcomes of Stroke Patients in Medicare Fee for Service and Managed Care," *JAMA* 278 (1997): 119-24.

[102] For a list of alternative types of rehabilitation, see p. 33 of this report.

[103] Kramer, "Outcomes and Costs," 403.

[104] Heart and Stroke Foundation of Nova Scotia, "Re-Organizing Stroke Care in Nova Scotia," 21.

The rehabilitation alternatives under study would include inpatient levels, acute hospital, rehabilitative units and rehabilitation and nursing homes with an organized program. Data from PHC4 and functional independence measure scores from the Medicare Prospective Payment System program could be used in the study. PHC4 can collect data on rehabilitative outcomes to support this study.

Health plans differ in levels of coverage, and the stroke office should study the effect of those differences. For example, some plans do not cover speech therapy or they limit coverage of physical therapy to a specified number of days, typically 60. Advisory committee members with experience in treating stroke survivors firmly believe that rehabilitative coverage for stroke survivors is often inadequate, and lack of proper coverage condemns many survivors to premature loss of independence and dignity. A minimum standard for coverage of rehabilitation should be recommended. After evaluating the cost effectiveness and outcome of varying rehabilitative services, best practices can be formulated. The stroke office should assess rehabilitative coverage in health plans and the comparative impact on care of differing standards of coverage. This assessment should then be used as a basis for examining how effective the treatment under such a plan is for survivors of stroke.

STANDARDIZING REHABILITATION PLANS

The stroke office should promote awareness of evidence-based rehabilitation guidelines and protocols established by professional organizations. Guidelines are being developed by the Office of Research and Development of the federal Department of Veterans Affairs[105] and other public and private officials. These guidelines provide specific directives on medical management, patient assessment, referral, rehabilitation management, and reintegration into the community.[106] Because of the availability of these resources, it is unnecessary for the stroke office itself to design rehabilitative plans.

[105] VAHSR&D, Program Announcement: Stroke, "Investigator-Initiated Research Priorities in Stroke Prevention and Management" (1999).

[106] AHCPR, "Post-Stroke Rehabilitation: Assessment, Referral, and Patient Management" (AHCPR Pub. No. 95-0663) (Rockville, Md.: HHS, 1995), 2.

PATIENTS' RIGHTS

Patients under managed care are afforded some protection on utilization of procedures under the act of June 17, 1998 (P.L.464, No.68).[107] Act 68 only applies to managed care plans and their enrollees, however. While almost half of the citizens of Pennsylvania are enrolled in managed care plans, slightly more than half are not. Those in the other plans have varying appeal rights depending on the type of plan or employer group.[108] Even if a patient is under Act 68, the initial coverage decision may be made by a physician who is not a specialist in the relevant medical field. There are cases where the internal appeal stage of utilization review for an elderly stroke patient has been provided by an anesthesiologist or even a pediatrician. To ensure correct utilization of rehabilitation procedures, board certified specialists in appropriate specialties should be used upon the initial coverage determination, as well as at the grievance stage.

In a managed care plan, the patient may first informally inquire with the insurer. If not satisfied with the response, the patient may file a formal complaint or grievance. A grievance is the procedure for challenging the denial of coverage of a service or treatment based on lack of medial necessity and appropriateness of a health care service. Each plan has two levels of internal review to decide grievances. Upon exhaustion of internal review, a grievance may be considered by an external utilization review board. The grievance process requires the inclusion on the review panels at all stages of a specialist[109] in the same or similar specialty as that which would manage or consult on the medical service for the condition under appeal (although as we have mentioned, this requirement may not always be followed in the internal stages of review).[110] This or a similar structure of review should be available to all patients, not only those who are insured through managed care. Furthermore, compliance with Act 68 specialty review requirements in the internal review stages should be examined.

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[107] The quality health care accountability and protection provisions of "Act 68" comprise Article XXI of The Insurance Company Law of 1921, § 2101 et seq. (40 P.S. § 991.2101 et seq. (West 1999)).

[108] E-mail from Emilie Tierney to Commission staff (September 6, 2002, 1:17 p.m. EDT).

[109] The specialist by law must be a physician or, in limited circumstances, a psychologist.

[110] Insurance Company Law of 1921 §§ 2102, 2161, and 2162 (40 P.S. §§ 991.2102, 991.2161, and 991.2162 (West 1999)). Issues other than denial of coverage on the ground of lack of medical necessity are reviewable as a complaint; the procedure for a complaint is significantly different from that for a grievance. See Insurance Company Law of 1921 §§ 2102 and 2141-2143 (40 P.S. §§ 991.2102, 991.2141-991.2143 (West 1999)).

Public health education campaigns targeted at the elderly, stroke survivors, and caregivers for survivors should expand awareness of existing rights to coverage and the procedure for appealing denial of coverage. PADOH, the Insurance Department, or the Attorney General may assist a patient challenging denial of coverage.[111]

STANDARDS FOR UNACCREDITED FACILITIES

The subcommittee discussed the need to assure that facilities providing services are complying with quality standards and that services are subject to appropriate industry and professional standards. In the experience of advisory committee members, it is common for stroke patients to receive rehabilitative therapy from providers that are not licensed or certified and that lack adequate facilities, qualified personnel, or both. At present, there is no requirement that insurers contract only with providers certified in the field the insurer is paying for. Private insurers should contract only with facilities and providers that either are licensed in Pennsylvania to provide rehabilitative services or nationally accredited for the contracted services.

[111] However, assistance from the Insurance Department and PADOH is limited to informing enrollees about the appeal rights and process. Because PADOH or the Insurance Department may act as the appeal body for a third level complaint, it is not possible for either agency to advocate for the enrollee at the earlier levels of appeal. PADOH maintains a toll-free HMO HelpLine to provide information to patients and to refer issues to the plans as appropriate. E-mail supra note 108.

FUNDING SOURCES

PROPOSED STOP ACT

The Stroke Treatment and Ongoing Prevention (STOP) Act of 2002[112] has been introduced in Congress to create a program to lead the nation's fight against stroke. The goal of this legislation is to improve care of stroke victims throughout the nation (§ 2(b)).[113] If enacted, HHS would be directed to create a campaign aimed at promoting prevention of stroke and increasing the number of stroke victims who seek treatment immediately; this national educational and informational campaign is authorized to be appropriated $40 million for fiscal year 2002. (§ 2801). HHS would institute a grant program to enable states to develop care systems for stroke and provide technical assistance to the grantees (§ 2811). It would also expand the Paul Coverdell National Acute Stroke Registry and Clearinghouse and ensure the availability of published research on stroke or research prevention, diagnosis, treatment, and rehabilitation of stroke. The department would be authorized to study all phases of care and grant funds to public and private non-profit corporations (§ 2812).

HHS would grant funds to states to establish statewide stroke prevention, treatment, and rehabilitation systems (§ 2821(a)). Each grantee would oversee and implement a statewide system to train emergency medical services, ensure access to care of a standardized quality, and support facilities with smaller numbers of patients (§ 2821(b)). To receive a grant, a state would be required to match federal funds with non-federal contributions and adopt standards of care for stroke victims. After the first year the state's responsibility to match funds is phased in from a 1:3 state to federal ratio to an even match (§§ 2821(a), 2822, and 2823(c)). In adopting standards, a state must consider national standards, with the primary goal being the highest quality of care (§ 2823(c)). The authorization of appropriations for this program would be $50 million for fiscal year 2002,

[112] S. 1274, 107th Cong. (2002). The legislation passed the Senate on February 6, 2002. On March 5, 2002, it was referred to the Subcommittee on Health of the House Committee on Energy and Commerce. The House adjourned on November 22, 2002, without acting on this legislation.

[113] The substantive text of the proposed STOP Act is set forth in § 3 of the legislation. Succeeding references are to the sections of the Public Health Service Act that would be added by the legislation.

increasing to $125 million for fiscal year 2006. No more than 10% of a state's grant could be spent on administrative expenses (§ 2830).

TOBACCO SETTLEMENT ACT

In 2001, Pennsylvania created Tobacco Settlement Fund to appropriate money to be received from tobacco corporations, and the Tobacco Settlement Act[114] was enacted to allocate the distribution of the fund as follows:[115]

Health Endowment Account for Long-Term Hope	8%
Home and community-based services	13%
Prevention and cessation programs for tobacco use	12%
Health and related research	19%
Uncompensated care payment program	10%
Health investment insurance and Medicaid benefits[116]	30%
Expansion of PACENET	8%

The allocations for home and community-based services, health and related research, and the uncompensated care payment program are most helpful in funding services directed at treating and preventing stroke. As the tobacco settlement funds have been allocated, redirecting a larger share of these funds specifically to stroke programs would require displacement of existing allocations.

Home and Community-Based Services (§ 503). This appropriation to Department of Public Welfare (DPW) pays enrolled providers[117] to defray certain services in accordance with federal and state requirements. These services are afforded by the providers to funded individuals to maintain the latter in their homes.[118] The appropriation to PDA is used for home and community-based care services to assisted individuals[119] and for coordination of these services. The total aggregate amount of payments to enrolled providers and entities providing home

[114] Act of June 26, 2001 (P.L.755, No.77) (35 P.S. § 5701.101 et seq. (West Supp. 2002)).

[115] Ibid., § 306(b).

[116] The purchase of Medicaid benefits is for workers with disabilities.

[117] Enrolled providers are those who participate in the medical assistance program (§ 502).

[118] A funded individual is one who needs care equivalent to that provided by a nursing facility and is financially eligible for medical assistance (§ 502).

[119] An assisted individual is one who: 1) needs care equivalent to that provided by a nursing facility; 2) has monthly income at or below 300% of the federal benefit rate; and 3) has resources exceeding the resource eligibility requirements for medical assistance but below a resource level set by PDA and DPW at $40,000 or more (§ 502).

and community-based services to assisted individuals may not exceed federal and commonwealth appropriations to DPW and PDA from the Tobacco Settlement Fund. Many rehabilitative programs are designed for and available to outpatients and patients at home.

Commonwealth Universal Research Enhancement Program. This appropriation to PADOH will fund biomedical, clinical and health services research projects and related infrastructure (§ 903(a)). The Health Research Advisory Committee is directed to establish the research priorities by considering critical areas of research, demographic disparities in health status among the population and expected beneficial outcomes. These priorities must be reviewed annually and revised as necessary (§ 904(2)). No more than half of a grant may be spent for infrastructure (§ 907(c)). Stroke could potentially qualify as a research priority under this program.

Hospital Uncompensated Care Program. This annual appropriation is made to DPW to annually compensate hospitals for some care that had been uncompensated (§ 1103(a)). To apply for this compensation, a hospital must have a plan to serve the uninsured and meet designated criteria (§ 1104(b)). The Commonwealth appropriated $15 million to DPW for fiscal year 2001-02 for this program (§ 5101(a)(4)). The Hospital Extraordinary Expense Program is established to reimburse hospitals for inpatient services to uninsured patients when those expenses exceeded twice the hospital's average cost per stay for all patients (§ 1105(a)). This program could compensate hospitals for some of their uncompensated services to stroke patients.

Other Tobacco Settlement Programs. To fund services that less directly treat and prevent stroke, the allocations for efforts to prevent and cease tobacco use (Ch. 7), the HealthLink Program (Ch. 19) and the Community-Based Health Care Assistance Program (Ch. 21) may be beneficial. Since smoking is a modifiable risk factor for stroke, the tobacco prevention and cessation program may reduce the number of eventual stroke victims. The HealthLink Program grants matching funds to subsidize purchases of medical equipment by hospitals in sparsely populated counties. The Commonwealth appropriated $20 million to PADOH for 2001-02 for these grants. (§ 5101(a)(3)). The Community-Based Health Care Assistance Program funds improvements in access and delivery of health care to low-income residents by granting funds to support providers and collaboratives in locating, assessing and managing health care for low-income Pennsylvanians and to improve access to and delivery of health care to them. The Commonwealth appropriated $25 million to PADOH for 2001-02 for these grants (§ 5101(a)(3)).

OTHER PUBLIC FUNDING

In the present constrained fiscal environment, a variety of funding sources must be tapped to support a major initiative such as that outlined in this report, possibly including a dedicated lottery and the creation of public-private partnerships. The possibility of obtaining more funding through federal health programs should be vigorously pursued. In the General Appropriation Act of 2002, there were 92 separate line items related to health programs, not counting the appropriation to PADOH. It is not unreasonable for the General Assembly to consider including a line item earmarked for stroke prevention, acute care, and treatment.

The recent increase in the cigarette tax is one avenue that the General Assembly might consider. In order to make up for a $1.2 billion estimated shortfall in the Commonwealth's budget for Fiscal Year 2002-03, the General Assembly enacted amendments to the Tax Reform Code of 1971 that, among other revenue-raising measures, increased the cigarette tax per pack from $0.31 to $1.00.[120] The tax is expected to raise an additional $590.7 million in that fiscal year. After allocations to the Agricultural Conservation Easement Purchase Fund and the Children's Health Insurance Fund, $539.5 million is estimated to be available for the General Fund.[121] Once the current recession ends, the General Assembly could allocate a portion of the amounts raised by the increase in the cigarette tax to public health programs, including the stroke office and other PADOH programs that can help assist stroke prevention and care. Less than 1% of the cigarette tax revenue enhancement may suffice to fund the stroke office as described in this report. The allocation could be structured in much the same way as those already made to the funds mentioned in this paragraph in previous legislation.

[120] Act of June 29, 2002 (P.L.559, No.89), amending section 1206 of the Tax Reform Code of 1971 72 P.S. §§ 8206 (2002 Pa. Legis. Serv. (West)).

[121] Pennsylvania House of Representatives, "Bill Summary" for House Bill 1848 (P.N. 4197), July 2, 2002; Pennsylvania House of Representatives, Committee on Appropriations, "Fiscal Note on Conference Committee Report" for House Bill No. 1848 (P.N. 4197), June 28, 2002. The legislation referenced in those documents was enacted as 2002 Act No. 89.

ABBREVIATIONS AND ACRONYMS

AHA	American Heart Association
AHCPR	Agency for Health Care Policy and Research
ASA	American Stroke Association
ASTP	Acute Stroke Treatment Program
ATP	Acute Treatment Program
BAC	Brain Attack Coalition
BMI	Body Mass Index
BRFSS	Behavioral Risk Factor Surveillance System
CDC	Centers for Disease Control and Prevention
CHIP	Children's Health Insurance Program
CMS	Centers for Medicare and Medicaid Services
CT	Computed Tomography
CVD	Cardiovascular Disease
CVH	Cardiovascular Health
DPW	Department of Public Welfare
DVHC	Delaware Valley Healthcare Council
EMS	Emergency Medical Services
EMSO	Emergency Medical Services Office

ERISA	Employee Retirement Income Security Act
FDA	Food and Drug Administration
GWTG	Get With The Guidelines
HCFA	Health Care Financing Administration
HHS	U.S. Department of Health and Human Services
HMO	Health Maintenance Organization
KePRO	Keystone Peer Review Organization
MOU	Memorandum of Understanding
MRI	Magnetic Resonance Imaging
NCCDPHP	National Center for Chronic Disease Prevention and Health Promotion
NEMA	National Emergency Medicine Association
NHLBI	National Heart, Lung, and Blood Institute
NINDS	National Institute of Neurological Disorders and Stroke
NSA	National Stroke Association
PADOH	Pennsylvania Department of Health
PDA	Pennsylvania Department of Aging
PHC4	Pennsylvania Health Care Cost Containment Council
PHMC	Philadelphia Health Management Corporation
PSC	Philadelphia Stroke Council
SHIP	State Health Improvement Plan
SPARC	Stroke Prevention, Awareness, & Recognition Campaign
STEP	Stroke Treatment Enhancement Program

STOP	Stroke Treatment and Ongoing Prevention
TIA	Transient Ischemic Attack
tPA	Tissue Plasminogen Activator
VAHSR&D	Veterans Affairs Health Services Research and Development Service

APPENDICES

Appendix 1

HOUSE AMENDED
PRIOR PRINTER'S NOS. 1635, 2049 PRINTER'S NO. 2217

THE GENERAL ASSEMBLY OF PENNSYLVANIA

SENATE RESOLUTION

No. 130 Session of 2000

INTRODUCED BY MURPHY, SALVATORE, LEMMOND, HART, DENT, MUSTO, O'PAKE, STOUT, COSTA AND BOSCOLA, FEBRUARY 1, 2000

AS AMENDED, HOUSE OF REPRESENTATIVES, OCTOBER 10, 2000

A CONCURRENT RESOLUTION

Directing the Joint State Government Commission to create a stroke prevention task force and advisory committee to promote professional and public education and awareness and to improve the quality of care for stroke victims.

WHEREAS, Stroke is the number three killer of Americans, claiming the lives of approximately 25,000 Pennsylvanians each year; and

WHEREAS, Stroke is the number one cause of serious disability; and

WHEREAS, Pennsylvania's seniors are the population at the highest risk for stroke; and

WHEREAS, Persons 60 years of age and over comprise 20% of the population of this Commonwealth; and

WHEREAS, It is in the best interest of the Commonwealth to enable State residents to reduce the risks and effects of strokes so that they may continue to lead long, healthy and productive lives; and

WHEREAS, It is in the best interest of the State's residents

to be educated on healthy lifestyles to reduce the risk of stroke by increasing physical activity, increasing awareness of cardiovascular disease and high blood pressure and improving dietary habits; and

WHEREAS, It is in the best interest of the Commonwealth to gather and disseminate appropriate information to health care professionals to facilitate their provision of quality care to reduce the effects of strokes; and

WHEREAS, The adoption of guidelines for the care of stroke patients, including emergency stroke care, throughout this Commonwealth will enhance the ability of health care professionals to provide quality care; therefore be it

RESOLVED (the House of Representatives concurring), That the General Assembly direct the Joint State Government Commission to recommend ways to better publicize warning signs, encourage more people to increase the odds of recovery by seeking treatment as soon as they suffer symptoms, and to further study the issue of adopting criteria for designating stroke centers throughout this Commonwealth; and be it further

RESOLVED, That the General Assembly direct the Joint State Government Commission to create a stroke prevention task force consisting of two members appointed by the President pro tempore of the Senate, two members appointed by the Minority Leader of the Senate, two members appointed by the Speaker of the House of Representatives and two members appointed by the Minority Leader of the House of Representatives; and be it further

RESOLVED, That the task force create an advisory committee consisting of ~~15~~ 16 members. The committee shall be composed of one representative from and designated by each of the following: The Department of Health; the Hospital and Health Systems

Association of Pennsylvania; the Pennsylvania Chapter of the American College of Emergency Physicians; the American Stroke Association, a division of the American Heart Association; the Pennsylvania Psychological Association; THE HEALTH CARE COST CONTAINMENT COUNCIL; the health care insurance industry; rural health providers; a stroke institute associated with a university medical center; the Philadelphia Stroke Council; one member to represent the rehabilitation industry designated by the Pennsylvania Physical Therapy Association, the Speech-Language-Hearing Association, the Pennsylvania Association of Rehabilitation Facilities and the Pennsylvania Occupational Therapy Association, Inc. In addition, one member of the committee shall be chosen by the coordinated designation of the biotechnology and pharmaceutical industries. Finally, four members at large shall be designated by the task force upon the recommendation of the advisory committee from among the Pennsylvania Neurological Society, the Pennsylvania Chapter of the American College of Cardiology, the Pennsylvania Academy of Family Physicians, the Emergency Health Services Council, the Institute for Healthy Communities and the Pennsylvania Public Relations Society of America; and be it further

RESOLVED, That the task force study the feasibility of developing and implementing a comprehensive Statewide public education program on stroke prevention, targeted to high-risk populations and to geographic areas where there is a high incidence of stroke, which shall include information on:

(1) leading healthy lifestyle practices that reduce the risk of stroke;

(2) identifying the signs and symptoms of stroke and the action to be taken when these signs occur;

(3) determining what constitutes high-quality health care for stroke;

(4) adopting and disseminating guidelines on the treatment of stroke patients, including emergency stroke care, throughout this Commonwealth;

(5) taking such other actions that are consistent with the scope and purpose of this resolution to ensure that the public and health care providers are sufficiently informed of the most effective strategies for stroke prevention and to assist health care providers to utilize the most effective treatment strategies for stroke; and

(6) addressing means by which the guidelines may be revised to remain current with developing treatment methodologies;

and be it further

RESOLVED, That the task force, in accomplishing its missions, take into account guidelines that have been promulgated by nationally recognized organizations which deal with stroke; and be it further

RESOLVED, That in its deliberations the task force consider whether its activities would duplicate existing disease education and prevention programs in the Department of Health and other Federal and State agencies; and be it further

RESOLVED, That the task force and advisory committee recommend the adoption of stroke guidelines and an appropriate means of disseminating information to the professional community and the general public and study the need for the designation of stroke centers throughout this Commonwealth; and be it further

RESOLVED, That the task force and advisory committee recommend sources of funds to carry out its recommendations and

determine the adequacy of health insurance coverage for stroke patients; and be it further

~~RESOLVED, That the task force report its findings to the General Assembly no later than November 30, 2000.~~ <—

RESOLVED, THAT THE TASK FORCE REPORT ITS FINDINGS DIRECTLY TO THE GENERAL ASSEMBLY NO LATER THAN TWO YEARS AFTER ADOPTION OF THIS RESOLUTION. <—

Appendix 2

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Appendix 3

VITAL STATISTICS RELATED TO STROKE

Figure C-4
Vital Events Summary Chart

The following figures represent an average day of vital events in 2000 for Pennsylvania residents:

Population as of April 1, 2000	12,281,054
	Number Per Day
Live Births	400
Abortions	93
Deaths	356
By Cause of Death*	Number Per Day
Diseases of Heart	111
Cancer	82
Cerebrovascular Disease	24
Chronic Lower Respiratory Disease	17
Accidents	12
Nontransport Accidents	8
Motor Vehicle Accidents	4
Diabetes Mellitus	10
Influenza & Pneumonia	8
Nephritis, Nephrotic Syndrome & Nephrosis	7
Septicemia	7
Alzheimer's Disease	7
Intentional Self-harm (Suicide)	4
Chronic Liver Disease and Cirrhosis	3
Parkinson's Disease	3
All Other Causes	61

Table C-4A
Resident Deaths by Age and Sex, Number and Rate*:
Pennsylvania, 2000

Age Group (In Years)	Total		Male**		Female	
	Number	Rate	Number	Rate	Number	Rate
All Ages	130,092	10.6	61,583	10.4	68,509	10.8
Under 5	1,185	1.6	693	1.9	492	1.4
5 - 9	137	0.2	69	0.2	68	0.2
10 - 14	147	0.2	88	0.2	59	0.1
15 - 19	505	0.6	364	0.8	141	0.3
20 - 24	707	0.9	552	1.5	155	0.4
25 - 29	692	0.9	496	1.4	196	0.5
30 - 34	945	1.1	657	1.6	288	0.7
35 - 39	1,497	1.6	961	2.0	536	1.1
40 - 44	2,338	2.3	1,518	3.1	820	1.6
45 - 49	3,062	3.4	1,910	4.3	1,152	2.5
50 - 54	4,070	5.1	2,545	6.5	1,525	3.8
55 - 59	4,970	8.0	3,012	10.1	1,958	6.1
60 - 64	6,458	12.6	3,741	15.5	2,717	10.0
65 - 69	9,021	18.8	5,110	23.4	3,911	14.9
70 - 74	14,377	29.4	7,930	37.5	6,447	23.3
75 - 79	20,028	47.4	10,123	59.9	9,905	39.1
80 - 84	21,927	75.6	9,812	95.0	12,115	64.9
85 + ***	38,026	160.1	12,002	182.8	26,024	151.4

* Rate per 1,000 population for each specified age group and sex, 2000.
** Unknown sex included in the male category.
***Unknown age included in the 85+ age group.

Table C-8

Leading Causes of Death,
Pennsylvania Residents, 2000, 1990, 1980, 1970, 1960, 1950

Cause of Death*	2000		1990		1980		1970		1960		1950	
	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank
All Causes	130,092		121,081		123,233		126,564		121,163		110,212	
Diseases of Heart	40,446	1	43,204	1	50,677	1	52,476	1	51,431	1	43,793	1
Malignant Neoplasms	29,989	2	29,677	2	26,040	2	22,013	2	19,612	2	16,326	2
Cerebrovascular Disease	8,885	3	7,678	3	9,539	3	12,573	3	12,632	3	11,043	3
Chronic Lower Respiratory Disease	6,045	4	4,487	4	3,263	5	**		**		**	
Accidents	4,500	5	4,001	5	4,586	4	5,336	4	4,866	4	5,697	4
Diabetes Mellitus	3,781	6	3,082	7	2,599	7	2,819	6	2,779	8	2,418	10
Influenza and Pneumonia	3,047	7	3,876	6	2,869	6	3,466	5	3,889	5	3,116	6
Nephritis, Nephrotic Syndrome and Nephrosis	2,675	8	1,398	10	1,109		530		938		2,498	8
Septicemia	2,573	9	1,705	8	803		215		121		42	
Alzheimer's Disease	2,533	10	615		**		**		**		**	
Intentional Self-harm (Suicide)	1,348		1,446	9	1,317	10	1,337	10	1,099		1,001	
Chronic Liver Disease and Cirrhosis	1,079		1,232		1,625	9	1,846	9	1,321	9	1,099	
Atherosclerosis	644		756		1,837	8	2,320	8	2,899	7	2,723	7
Perinatal Conditions	552		824		1,194		2,391	7	3,820	6	3,835	5
Congenital Malformations, Deformations and Chromosomal Abnorm.	414		577		661		984		1,266	10	1,177	
Tuberculosis, All Forms	23		74		123		414		902		2,474	9
All Other	21,558		16,449		14,991		17,844		13,588		12,970	

* 2000 data based on the International Classification of Diseases, Tenth Revision.
1990 and 1980 data based on the International Classification of Diseases, Ninth Revision.
1970 data based on the International Classification of Diseases, Eighth Revision.
1960 data based on the International Classification of Diseases, Seventh Revision.
1950 data based on the International Classification of Diseases, Sixth Revision.

**Data not available or comparable.

Table C-10

Median Age at Death for Selected Leading Causes by Race, Hispanic Origin, and Sex
Pennsylvania Residents, 2000

	Median Age at Death											
	All Races			White*			Black			Hispanic Origin		
Cause of Death	Total	Male**	Female	Total	Male**	Female	Total	Male**	Female	Total	Male**	Female
All Causes	78.8	75.6	81.7	79.4	76.4	82.2	70.6	66.3	74.6	62.5	58.4	67.7
Diseases of Heart	81.3	77.6	84.4	81.8	78.1	84.8	74.7	70.7	78.0	71.6	68.4	77.7
Malignant Neoplasms	74.4	73.6	75.3	74.8	74.0	75.7	70.8	70.7	70.8	67.9	68.7	65.9
Cerebrovascular Disease	83.2	79.8	84.8	83.6	80.3	85.2	78.0	73.1	80.2	74.2	70.3	80.3
Chronic Lower Respiratory Dis.	78.9	78.1	79.7	79.1	78.4	79.9	75.3	74.3	76.6	70.0	69.8	71.0
Accidents	49.3	43.8	70.8	50.5	44.2	72.5	42.7	42.6	43.5	34.8	34.1	35.8
Nontransport Accidents	57.9	48.2	78.3	64.8	49.4	80.0	45.2	45.5	44.8	35.8	35.2	37.3
Motor Vehicle Accidents	38.8	36.5	44.3	39.2	37.1	45.1	31.4	29.0	38.3	34.0	30.2	34.6
Other Transport Accidents	43.2	39.0	54.1	44.3	38.5	55.5	43.3	43.5	-	-	-	-
Diabetes Mellitus	76.7	74.5	78.5	77.2	74.9	78.9	72.8	67.4	75.6	65.6	61.1	68.3
Influenza & Pneumonia	84.9	82.4	86.6	85.2	83.0	86.9	77.2	73.2	81.6	68.4	66.0	-
Nephritis, Nephrotic Syndrome and Nephrosis	80.5	79.3	81.6	81.3	80.0	82.4	73.2	72.0	76.4	75.9	67.9	85.3
Septicemia	79.7	77.3	81.9	80.5	77.9	82.4	74.5	73.1	75.8	68.3	68.9	64.5
Alzheimer's Disease	86.5	84.6	87.4	86.6	84.7	87.5	83.6	83.3	84.0	87.9	-	89.0
Intentional Self-harm (Suicide)	44.5	44.6	44.1	45.4	45.9	44.7	34.8	33.3	36.1	36.0	36.1	-
Chronic Liver Dis. and Cirrhosis	65.3	60.5	71.8	66.8	61.0	73.1	57.3	56.9	60.6	67.4	63.8	67.5
Assault (Homicide)	29.4	28.1	34.1	33.5	32.0	35.4	27.0	26.3	33.0	25.9	26.2	-
Atherosclerosis	86.4	82.5	88.2	86.6	82.6	88.5	80.6	-	82.2	-	-	-
HIV Disease	43.3	44.4	40.4	43.4	44.5	41.9	43.2	44.2	40.0	44.1	41.9	44.8

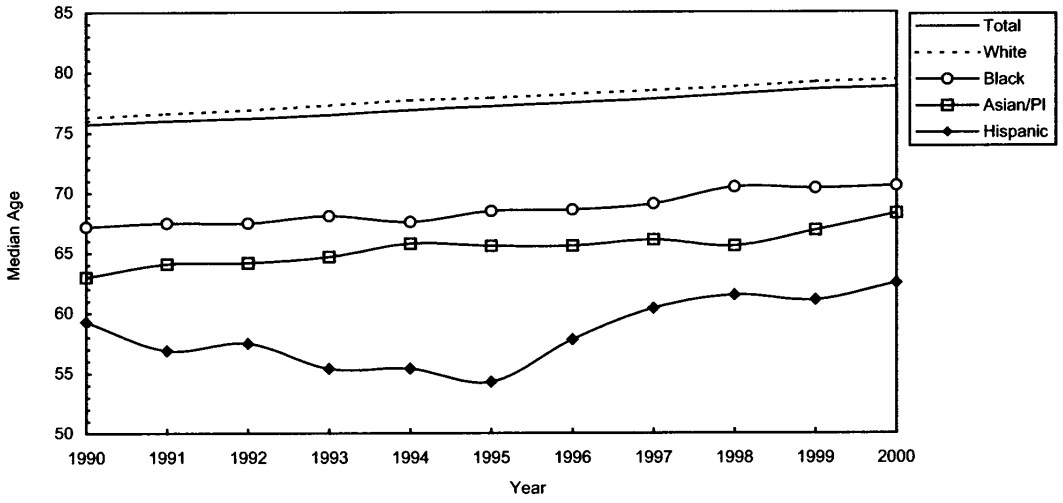
* Unknown race included in the white category.

**Unknown sex included in the male category.

Notes: Hispanic origin can be of any race.
Median age for categories with less than 10 deaths are not calculated and are indicated with a dash (-) .

Figure C-9

Median Age at Death by Race and Hispanic Origin
Pennsylvania Residents, 1990-2000



Note: Hispanic origin can be of any race.

Table C-11A

Selected Causes of Death by Age Group

Number and Rank: Pennsylvania Residents, 2000

Cause of Death	All Ages		Under 5 Years		5 - 24 Years		25 - 44 Years		45 - 64 Years		65 - 84 Years		85 Years & Over*	
	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank
All Causes	130,092		1,185		1,496		5,472		18,560		65,353		38,026	
Diseases of Heart	40,446	1	23	5	54	5	737	3	4,674	2	20,293	1	14,665	1
Malignant Neoplasms	29,989	2	21	6	110	4	852	2	6,556	1	17,949	2	4,501	2
Cerebrovascular Disease	8,885	3	7	9	10	8	142	7	681	4	4,346	3	3,699	3
Chronic Lower Respiratory Dis.	6,045	4	3		14	7	45		593	6	3,901	4	1,489	6
Accidents	4,500	5	73	3	667	1	1,284	1	819	3	1,043	9	614	10
Nontransport Accidents	2,838		53		213		764		493		767		548	
Motor Vehicle Accidents	1,473		19		402		472		276		242		62	
Other Transport Accidents	189		1		52		48		50		34		4	
Diabetes Mellitus	3,781	6	1		7	10	128	8	643	5	2,187	5	815	8
Influenza & Pneumonia	3,047	7	19	7	7	10	53		197		1,259	8	1,512	4
Nephritis, Nephrotic Syndrome and Nephrosis	2,675	8	5	10	1		46		258	10	1,517	6	848	7
Septicemia	2,573	9	10	8	6		64	10	336	9	1,348	7	809	9
Alzheimer's Disease	2,533	10	0		0		0		28		1,009	10	1,496	5
Intentional Self-harm (Suicide)	1,348		0		172	3	519	4	405	8	222		30	
Chronic Liver Dis. and Cirrhosis	1,079		0		1		110	9	424	7	475		69	
Parkinson's Disease	930		0		0		0		17		547		366	
Essential Hypertension and Hypertensive Renal Disease	833		0		0		11		97		405		320	
In Situ, Benign, and Uncertain Neoplasms	772		3		6		18		85		424		236	
Assault (Homicide)	649		27	4	218	2	288	5	79		33		4	
Atherosclerosis	644		0		0		1		21		259		363	
Perinatal Conditions	552		551	1	1		0		0		0		0	
HIV Disease	498		1		7	10	281	6	193		15		1	
Congenital Malformations, Deformations & Chromosomal Abnormalities	414		215	2	42	6	49		49		45		14	
Anemias	284		0		8	9	12		19		119		126	
Pneumoconiosis	227		0		0		0		4		140		83	
Disorders of Biliary Tract & Pancreas	226		0		1		24		54		91		56	
Nutritional Deficiencies	198		2		0		6		5		97		88	
Peptic Ulcer	177		0		1		5		18		81		72	
Phlebitis, Thrombophlebitis, Venous Embolism & Thrombosis	153		0		2		17		30		60		44	
Multiple Sclerosis	147		0		0		21		70		54		2	
Cholelithiasis & Other Disorders of Gallbladder	126		0		1		1		16		47		61	
Hernia	76		2		0		0		10		31		33	
Epilepsy	56		0		3		14		17		18		4	
All Other Causes	16,229		222		157		744		2,162		7,338		5,606	

*Unknown age included in the 85 years and over age group.

Table C-11B

Selected Causes of Death by Age Group - Males*

Number and Rank: Pennsylvania Residents, 2000

Cause of Death	All Ages		Under 5 Years		5 - 24 Years		25 - 44 Years		45 - 64 Years		65 - 84 Years		85 Years & Over**	
	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank
All Causes	61,583		693		1,073		3,632		11,208		32,975		12,002	
Diseases of Heart	18,858	1	12	5	35	5	519	2	3,226	2	10,668	1	4,398	1
Malignant Neoplasms	15,177	2	12	5	64	4	412	4	3,429	1	9,411	2	1,849	2
Cerebrovascular Disease	3,288	3	3		5	8	74	9	387	4	1,883	4	936	3
Chronic Lower Respiratory Dis.	2,901	4	1		7	7	22		315	7	1,925	3	631	4
Accidents	2,871	5	51	3	487	1	968	1	593	3	540	9	232	10
Nontransport Accidents	1,719		35		169		559		373		387		196	
Motor Vehicle Accidents	1,030		15		283		371		192		133		36	
Other Transport Accidents	122		1		35		38		28		20		0	
Diabetes Mellitus	1,644	6	0		4		84	7	336	5	986	5	234	9
Influenza & Pneumonia	1,353	7	11	7	1		38		121		652	7	530	5
Nephritis, Nephrotic Syndrome and Nephrosis	1,288	8	2		0		24		166	10	752	6	344	6
Septicemia	1,095	10	6	8	5	8	39	10	189	9	608	8	248	8
Alzheimer's Disease	723		0		0		0		10		376	10	337	7
Intentional Self-harm (Suicide)	1,105	9	0		146	3	415	3	329	6	188		27	
Chronic Liver Dis. and Cirrhosis	641		0		1		75	8	304	8	233		28	
Parkinson's Disease	507		0		0		0		12		327		168	
Essential Hypertension and Hypertensive Renal Disease	309		0		0		8		61		168		72	
In Situ, Benign, and Uncertain Neoplasms	360		2		4		8		44		214		88	
Assault (Homicide)	494		16	4	185	2	221	5	55		16		1	
Atherosclerosis	208		0		0		1		9		119		79	
Perinatal Conditions	320		319	1	1		0		0		0		0	
HIV Disease	370		1		5	8	193	6	157		13		1	
Congenital Malformations, Deformations & Chromosomal Abnormalities	214		119	2	23	6	28		24		18		2	
Anemias	100		0		3		6		12		40		39	
Pneumoconiosis	222		0		0		0		4		138		80	
Disorders of Biliary Tract & Pancreas	122		0		0		18		35		47		22	
Nutritional Deficiencies	58		1		0		3		2		34		18	
Peptic Ulcer	83		0		1		5		16		36		25	
Phlebitis, Thrombophlebitis, Venous Embolism & Thrombosis	58		0		1		12		15		22		8	
Multiple Sclerosis	50		0		0		8		27		14		1	
Cholelithiasis & Other Disorders of Gallbladder	47		0		1		0		8		21		17	
Hernia	26		2		0		0		3		12		9	
Epilepsy	26		0		2		8		10		5		1	
All Other Causes	7,065		135		92		443		1,309		3,509		1,577	

* Unknown sex included in the male category.

**Unknown age included in the 85 years and over age group.

Note: Rankings are not shown for causes with less than 5 deaths.

Table C-11C

Selected Causes of Death by Age Group - Females
Number and Rank: Pennsylvania Residents, 2000

Cause of Death	All Ages		Under 5 Years		5 - 24 Years		25 - 44 Years		45 - 64 Years		65 - 84 Years		85 Years & Over*	
	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank
All Causes	68,509		492		423		1,840		7,352		32,378		26,024	
Diseases of Heart	21,588	1	11	4	19	5	218	3	1,448	2	9,625	1	10,267	1
Malignant Neoplasms	14,812	2	9	6	46	2	440	1	3,127	1	8,538	2	2,652	3
Cerebrovascular Disease	5,597	3	4		5	9	68	6	294	4	2,463	3	2,763	2
Chronic Lower Respiratory Dis.	3,144	4	2		7	7	23		278	5	1,976	4	858	6
Accidents	1,629	8	22	3	180	1	316	2	226	6	503	10	382	10
Nontransport Accidents	1,119		18		44		205		120		380		352	
Motor Vehicle Accidents	443		4		119		101		84		109		26	
Other Transport Accidents	67		0		17		10		22		14		4	
Diabetes Mellitus	2,137	5	1		3		44	8	307	3	1,201	5	581	7
Influenza & Pneumonia	1,694	7	8	7	6	8	15		76	10	607	9	982	5
Nephritis, Nephrotic Syndrome and Nephrosis	1,387	10	3		1		22		92	9	765	6	504	9
Septicemia	1,478	9	4		1		25	10	147	7	740	7	561	8
Alzheimer's Disease	1,810	6	0		0		0		18		633	8	1,159	4
Intentional Self-harm (Suicide)	243		0		26	4	104	4	76	10	34		3	
Chronic Liver Dis. and Cirrhosis	438		0		0		35	9	120	8	242		41	
Parkinson's Disease	423		0		0		0		5		220		198	
Essential Hypertension and Hypertensive Renal Disease	524		0		0		3		36		237		248	
In Situ, Benign, and Uncertain Neoplasms	412		1		2		10		41		210		148	
Assault (Homicide)	155		11	4	33	3	67	7	24		17		3	
Atherosclerosis	436		0		0		0		12		140		284	
Perinatal Conditions	232		232	1	0		0		0		0		0	
HIV Disease	128		0		2		88	5	36		2		0	
Congenital Malformations, Deformations & Chromosomal Abnormalities	200		96	2	19	5	21		25		27		12	
Anemias	184		0		5	9	6		7		79		87	
Pneumoconiosis	5		0		0		0		0		2		3	
Disorders of Biliary Tract & Pancreas	104		0		1		6		19		44		34	
Nutritional Deficiencies	140		1		0		3		3		63		70	
Peptic Ulcer	94		0		0		0		2		45		47	
Phlebitis, Thrombophlebitis, Venous Embolism & Thrombosis	95		0		1		5		15		38		36	
Multiple Sclerosis	97		0		0		13		43		40		1	
Cholelithiasis & Other Disorders of Gallbladder	79		0		0		1		8		26		44	
Hernia	50		0		0		0		7		19		24	
Epilepsy	30		0		1		6		7		13		3	
All Other Causes	9,164		87		65		301		853		3,829		4,029	

*Unknown age included in the 85 years and over age group.

Note: Rankings are not shown for causes with less than 5 deaths.

Table C-11D

Selected Causes of Death by Age Group - White Race*

Number and Rank: Pennsylvania Residents, 2000

Cause of Death	All Ages		Under 5 Years		5 - 24 Years		25 - 44 Years		45 - 64 Years		65 - 84 Years		85 Years & Over**	
	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank
All Causes	117,508		808		1,164		4,238		15,515		59,790		35,993	
Diseases of Heart	37,216	1	18	5	41	5	584	3	3,936	2	18,658	1	13,979	1
Malignant Neoplasms	27,201	2	20	4	100	3	711	2	5,709	1	16,445	2	4,216	2
Cerebrovascular Disease	8,055	3	5	9	8	8	107	6	526	5	3,933	3	3,476	3
Chronic Lower Respiratory Dis.	5,665	4	1		9	7	29		523	6	3,685	4	1,418	6
Accidents	3,970	5	55	3	592	1	1,080	1	686	3	963	10	594	10
Nontransport Accidents	2,481		41		188		624		392		706		530	
Motor Vehicle Accidents	1,329		13		359		421		249		227		60	
Other Transport Accidents	160		1		45		35		45		30		4	
Diabetes Mellitus	3,347	6	1		4		105	7	534	4	1,948	5	755	8
Influenza & Pneumonia	2,807	7	13	6	7	9	36		153		1,168	7	1,430	5
Nephritis, Nephrotic Syndrome and Nephrosis	2,284	9	2		1		32		172	10	1,305	6	772	7
Septicemia	2,181	10	6	8	6	10	46	10	249	9	1,137	8	737	9
Alzheimer's Disease	2,458	8	0		0		0		25		971	9	1,462	4
Intentional Self-harm (Suicide)	1,250		0		149	2	468	4	391	7	215		27	
Chronic Liver Dis. and Cirrhosis	962		0		0		102	8	350	8	443		67	
Parkinson's Disease	903		0		0		0		16		527		360	
Essential Hypertension and Hypertensive Renal Disease	688		0		0		10		66		329		283	
In Situ, Benign, and Uncertain Neoplasms	740		3		5		17		79		408		228	
Assault (Homicide)	247		11	7	66	4	101	9	41		24		4	
Atherosclerosis	616		0		0		1		17		244		354	
Perinatal Conditions	361		360	1	1		0		0		0		0	
HIV Disease	206		1		3		115	5	85		2		0	
Congenital Malformations, Deformations & Chromosomal Abnormalities	347		175	2	30	6	43		45		40		14	
Anemias	238		0		3		1		12		107		115	
Pneumoconiosis	219		0		0		0		4		134		81	
Disorders of Biliary Tract & Pancreas	194		0		0		20		42		80		52	
Nutritional Deficiencies	173		1		0		4		3		84		81	
Peptic Ulcer	164		0		1		3		15		77		68	
Phlebitis, Thrombophlebitis, Venous Embolism & Thrombosis	127		0		2		10		20		52		43	
Multiple Sclerosis	132		0		0		16		61		53		2	
Cholelithiasis & Other Disorders of Gallbladder	122		0		1		1		15		45		60	
Hernia	74		2		0		0		9		30		33	
Epilepsy	46		0		3		13		16		11		3	
All Other Causes	14,515		134		132		583		1,715		6,672		5,279	

* Unknown race included in the white category.

**Unknown age included in the 85 years and over age group.

Note: Rankings are not shown for causes with less than 5 deaths.

Table C-11E

Selected Causes of Death by Age Group - Black Race
Number and Rank: Pennsylvania Residents, 2000

Cause of Death	All Ages		Under 5 Years		5 - 24 Years		25 - 44 Years		45 - 64 Years		65 - 84 Years		85 Years & Over*	
	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank
All Causes	12,039		359		312		1,170		2,899		5,335		1,964	
Diseases of Heart	3,113	1	4		13	4	149	4	705	2	1,583	1	659	1
Malignant Neoplasms	2,644	2	1		9	6	123	5	793	1	1,439	2	279	2
Cerebrovascular Disease	791	3	2		2		34	7	150	3	385	3	218	3
Chronic Lower Respiratory Dis.	363	9	2		5	7	15		68	10	206	5	67	7
Accidents	488	4	16	3	66	2	189	1	125	4	72	10	20	
Nontransport Accidents	340		10		23		134		99		56		18	
Motor Vehicle Accidents	122		6		38		43		21		12		2	
Other Transport Accidents	26		0		5		12		5		4		0	
Diabetes Mellitus	422	5	0		3		23	8	105	5	231	4	60	8
Influenza & Pneumonia	230		6	5	0		17	9	42		87	8	78	4
Nephritis, Nephrotic Syndrome and Nephrosis	374	8	3		0		13		82	8	206	5	70	6
Septicemia	381	7	4		0		17	9	86	7	203	7	71	5
Alzheimer's Disease	70		0		0		0		2		36		32	10
Intentional Self-harm (Suicide)	84		0		20	3	45	6	12		5		2	
Chronic Liver Dis. and Cirrhosis	112		0		1		7		72	9	30		2	
Parkinson's Disease	26		0		0		0		1		20		5	
Essential Hypertension and Hypertensive Renal Disease	142		0		0		0		30		75	9	37	9
In Situ, Benign, and Uncertain Neoplasms	30		0		1		1		5		15		8	
Assault (Homicide)	389	6	16	3	148	1	180	2	36		9		0	
Atherosclerosis	28		0		0		0		4		15		9	
Perinatal Conditions	183		183	1	0		0		0		0		0	
HIV Disease	288	10	0		4		165	3	105	5	13		1	
Congenital Malformations, Deformations & Chromosomal Abnormalities	59		35	2	10	5	6		4		4		0	
Anemias	45		0		5	7	11		6		12		11	
Pneumoconiosis	8		0		0		0		0		6		2	
Disorders of Biliary Tract & Pancreas	28		0		1		3		10		10		4	
Nutritional Deficiencies	20		1		0		2		1		10		6	
Peptic Ulcer	13		0		0		2		3		4		4	
Phlebitis, Thrombophlebitis, Venous Embolism & Thrombosis	26		0		0		7		10		8		1	
Multiple Sclerosis	15		0		0		5		9		1		0	
Cholelithiasis & Other Disorders of Gallbladder	4		0		0		0		1		2		1	
Hernia	2		0		0		0		1		1		0	
Epilepsy	10		0		0		1		1		7		1	
All Other Causes	1,651		86		24		155		430		640		316	

*Unknown age included in the 85 years and over age group.

Note: Rankings are not shown for causes with less than 5 deaths.

Table C-11F

Selected Causes of Death by Age Group - Hispanic Origin
Number and Rank: Pennsylvania Residents, 2000

Cause of Death	All Ages		Under 5 Years		5 - 24 Years		25 - 44 Years		45 - 64 Years		65 - 84 Years		85 Years & Over*	
	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank	Number	Rank
All Causes	1,308		71		83		236		302		457		159	
Diseases of Heart	283	1	2		3		22	4	72	1	129	1	55	1
Malignant Neoplasms	231	2	1		5	3	20	5	68	2	120	2	17	3
Cerebrovascular Disease	78	4	1		0		8	7	11	6	40	3	18	2
Chronic Lower Respiratory Dis.	37	8	0		2		2		6	10	25	4	2	
Accidents	127	3	1		31	1	69	1	18	4	8	9	0	
Nontransport Accidents	75		1		11		48		10		5		0	
Motor Vehicle Accidents	47		0		17		20		8		2		0	
Other Transport Accidents	5		0		3		1		0		1		0	
Diabetes Mellitus	41	7	0		0		4		16	5	18	5	3	
Influenza & Pneumonia	24		3		0		3		4		8	9	6	6
Nephritis, Nephrotic Syndrome and Nephrosis	31	10	1		0		1		7	8	11	7	11	4
Septicemia	28		2		1		3		7	8	10	8	5	7
Alzheimer's Disease	15		0		0		0		0		6		9	5
Intentional Self-harm (Suicide)	25		0		3		16	6	6	10	0		0	
Chronic Liver Dis. and Cirrhosis	29		0		0		5	8	9	7	14	6	1	
Parkinson's Disease	1		0		0		0		0		1		0	
Essential Hypertension and Hypertensive Renal Disease	5		0		0		0		1		4		0	
In Situ, Benign, and Uncertain Neoplasms	5		0		0		0		2		2		1	
Assault (Homicide)	56	5	2		24	2	25	2	3		1		1	
Atherosclerosis	2		0		0		0		0		2		0	
Perinatal Conditions	34	9	34	1	0		0		0		0		0	
HIV Disease	46	6	0		2		24	3	19	3	1		0	
Congenital Malformations, Deformations & Chromosomal Abnormalities	16		14	2	0		1		1		0		0	
Anemias	2		0		1		0		0		0		1	
Pneumoconiosis	3		0		0		0		0		3		0	
Disorders of Biliary Tract & Pancreas	1		0		0		1		0		0		0	
Nutritional Deficiencies	0		0		0		0		0		0		0	
Peptic Ulcer	2		0		0		0		1		1		0	
Phlebitis, Thrombophlebitis, Venous Embolism & Thrombosis	2		0		0		0		0		2		0	
Multiple Sclerosis	0		0		0		0		0		0		0	
Cholelithiasis & Other Disorders of Gallbladder	2		0		0		0		2		0		0	
Hernia	0		0		0		0		0		0		0	
Epilepsy	1		0		0		1		0		0		0	
All Other Causes	181		10		11		31		49		51		29	

*Unknown age included in the 85 years and over age group.

Note: Hispanic origin can be of any race.
Rankings are not shown for causes with less than 5 deaths.

Table C-12A

Resident Death Rates* for Selected Causes of Death by Age Group, Pennsylvania, 2000

Cause of Death	All Ages	Under 5 Years	5 - 24 Years	25 - 44 Years	45 - 64 Years	65 - 84 Years	85 Years & Over**
All Causes	1,059.3	162.8	45.5	156.0	654.3	3,886.4	16,006.4
Diseases of Heart	329.3	3.2	1.6	21.0	164.8	1,206.8	6,173.0
Malignant Neoplasms	244.2	2.9	3.3	24.3	231.1	1,067.4	1,894.6
Cerebrovascular Disease	72.3	1	0.3	4.0	24.0	258.4	1,557.0
Chronic Lower Respiratory Dis.	49.2	0.4	0.4	1.3	20.9	232.0	626.8
Accidents	36.6	10.0	20.3	36.6	28.9	62.0	258.5
Nontransport Accidents	23.1	7.3	6.5	21.8	17.4	45.6	230.7
Motor Vehicle Accidents	12.0	2.6	12.2	13.5	9.7	14.4	26.1
Other Transport Accidents	1.5	0.1	1.6	1.4	1.8	2.0	1.7
Diabetes Mellitus	30.8	0.1	0.2	3.6	22.7	130.1	343.1
Influenza & Pneumonia	24.8	2.6	0.2	1.5	6.9	74.9	636.5
Nephritis, Nephrotic Syndrome and Nephrosis	21.8	0.7	0.0	1.3	9.1	90.2	357.0
Septicemia	21.0	1.4	0.2	1.8	11.8	80.2	340.5
Alzheimer's Disease	20.6	-	-	-	1.0	60.0	629.7
Intentional Self-harm (Suicide)	11.0	-	5.2	14.8	14.3	13.2	12.6
Chronic Liver Dis. and Cirrhosis	8.8	-	0.0	3.1	14.9	28.2	29.0
Parkinson's Disease	7.6	-	-	-	0.6	32.5	154.1
Essential Hypertension and Hypertensive Renal Disease	6.8	-	-	0.3	3.4	24.1	134.7
In Situ, Benign, and Uncertain Neoplasms	6.3	0.4	0.2	0.5	3.0	25.2	99.3
Assault (Homicide)	5.3	3.7	6.6	8.2	2.8	2.0	1.7
Atherosclerosis	5.2	-	-	0.0	0.7	15.4	152.8
Perinatal Conditions	4.5	75.7	0.0	-	-	-	-
HIV Disease	4.1	0.1	0.2	8.0	6.8	0.9	0.4
Congenital Malformations, Deformations & Chromosomal Abnormalities	3.4	29.5	1.3	1.4	1.7	2.7	5.9
Anemias	2.3	-	0.2	0.3	0.7	7.1	53.0
Pneumoconiosis	1.8	-	-	-	0.1	8.3	34.9
Disorders of Biliary Tract & Pancreas	1.8	-	0.0	0.7	1.9	5.4	23.6
Nutritional Deficiencies	1.6	0.3	-	0.2	0.2	5.8	37.0
Peptic Ulcer	1.4	-	0.0	0.1	0.6	4.8	30.3
Phlebitis, Thrombophlebitis, Venous Embolism & Thrombosis	1.2	-	0.1	0.5	1.1	3.6	18.5
Multiple Sclerosis	1.2	-	-	0.6	2.5	3.2	0.8
Cholelithiasis & Other Disorders of Gallbladder	1.0	-	0.0	0.0	0.6	2.8	25.7
Hernia	0.6	0.3	-	-	0.4	1.8	13.9
Epilepsy	0.5	-	0.1	0.4	0.6	1.1	1.7
All Other Causes	132.1	30.5	4.8	21.2	76.2	436.4	2,359.8

* Rate per 100,000 population for each specified age group, 2000.

**Unknown age included in the 85 years and over age group.

Note: A dash indicates no deaths for that cause of death and age group.

Table C-12B

Resident Death Rates* for Selected Causes of Death by Age Group - Males, Pennsylvania, 2000**

Cause of Death	All Ages	Under 5 Years	5 - 24 Years	25 - 44 Years	45 - 64 Years	65 - 84 Years	85 Years & Over***
All Causes	1,038.6	186.1	64.1	209.0	813.8	4,698.0	18,281.8
Diseases of Heart	318.0	3.2	2.1	29.9	234.2	1,519.9	6,699.2
Malignant Neoplasms	256.0	3.2	3.8	23.7	249.0	1,340.8	2,816.5
Cerebrovascular Disease	55.5	0.8	0.3	4.3	28.1	268.3	1,425.7
Chronic Lower Respiratory Dis.	48.9	0.3	0.4	1.3	22.9	274.3	961.2
Accidents	48.4	13.7	29.1	55.7	43.1	76.9	353.4
Nontransport Accidents	29.0	9.4	10.1	32.2	27.1	55.1	298.6
Motor Vehicle Accidents	17.4	4.0	16.9	21.3	13.9	18.9	54.8
Other Transport Accidents	2.1	0.3	2.1	2.2	2.0	2.8	-
Diabetes Mellitus	27.7	-	0.2	4.8	24.4	140.5	356.4
Influenza & Pneumonia	22.8	3.0	0.1	2.2	8.8	92.9	807.3
Nephritis, Nephrotic Syndrome and Nephrosis	21.7	0.5	-	1.4	12.1	107.1	524.0
Septicemia	18.5	1.6	0.3	2.2	13.7	86.6	377.8
Alzheimer's Disease	12.2	-	-	-	0.7	53.6	513.3
Intentional Self-harm (Suicide)	18.6	-	8.7	23.9	23.9	26.8	41.1
Chronic Liver Dis. and Cirrhosis	10.8	-	0.1	4.3	22.1	33.2	42.7
Parkinson's Disease	8.6	-	-	-	0.9	46.6	255.9
Essential Hypertension and Hypertensive Renal Disease	5.2	-	-	0.5	4.4	23.9	109.7
In Situ, Benign, and Uncertain Neoplasms	6.1	0.5	0.2	0.5	3.2	30.5	134.0
Assault (Homicide)	8.3	4.3	11.0	12.7	4.0	2.3	1.5
Atherosclerosis	3.5	-	-	0.1	0.7	17.0	120.3
Perinatal Conditions	5.4	85.6	0.1	-	-	-	-
HIV Disease	6.2	0.3	0.3	11.1	11.4	1.9	1.5
Congenital Malformations, Deformations & Chromosomal Abnormalities	3.6	32.0	1.4	1.6	1.7	2.6	3.0
Anemias	1.7	-	0.2	0.3	0.9	5.7	59.4
Pneumoconiosis	3.7	-	-	-	0.3	19.7	121.9
Disorders of Biliary Tract & Pancreas	2.1	-	-	1.0	2.5	6.7	33.5
Nutritional Deficiencies	1.0	0.3	-	0.2	0.1	4.8	27.4
Peptic Ulcer	1.4	-	0.1	0.3	1.2	5.1	38.1
Phlebitis, Thrombophlebitis, Venous Embolism & Thrombosis	1.0	-	0.1	0.7	1.1	3.1	12.2
Multiple Sclerosis	0.8	-	-	0.5	2.0	2.0	1.5
Cholelithiasis & Other Disorders of Gallbladder	0.8	-	0.1	-	0.6	3.0	25.9
Hernia	0.4	0.5	-	-	0.2	1.7	13.7
Epilepsy	0.4	-	0.1	0.5	0.7	0.7	1.5
All Other Causes	119.1	36.2	5.5	25.5	95.0	499.9	2,402.1

* Rate per 100,000 male population for each specified age group, 2000.

** Unknown sex included in the male category.

***Unknown age included in the 85 years and over age group.

Note: A dash indicates no deaths for that cause of death and age group.

Table C-12C

Resident Death Rates* for Selected Causes of Death by Age Group - Females, Pennsylvania, 2000

Cause of Death	All Ages	Under 5 Years	5 - 24 Years	25 - 44 Years	45 - 64 Years	65 - 84 Years	85 Years & Over**
All Causes	1,078.6	138.5	26.2	103.9	503.8	3,304.9	15,137.5
Diseases of Heart	339.9	3.1	1.2	12.3	99.2	982.4	5,972.1
Malignant Neoplasms	233.2	2.5	2.8	24.8	214.3	871.5	1,542.6
Cerebrovascular Disease	88.1	1.1	0.3	3.8	20.1	251.4	1,607.2
Chronic Lower Respiratory Dis.	49.5	0.6	0.4	1.3	19.0	201.7	499.1
Accidents	25.6	6.2	11.1	17.8	15.5	51.3	222.2
Nontransport Accidents	17.6	5.1	2.7	11.6	8.2	38.8	204.7
Motor Vehicle Accidents	7.0	1.1	7.4	5.7	5.8	11.1	15.1
Other Transport Accidents	1.1	-	1.1	0.6	1.5	1.4	2.3
Diabetes Mellitus	33.6	0.3	0.2	2.5	21.0	122.6	338.0
Influenza & Pneumonia	26.7	2.3	0.4	0.8	5.2	62.0	571.2
Nephritis, Nephrotic Syndrome and Nephrosis	21.8	0.8	0.1	1.2	6.3	78.1	293.2
Septicemia	23.3	1.1	0.1	1.4	10.1	75.5	326.3
Alzheimer's Disease	28.5	-	-	-	1.2	64.6	674.2
Intentional Self-harm (Suicide)	3.8	-	1.6	5.9	5.2	3.5	1.7
Chronic Liver Dis. and Cirrhosis	6.9	-	-	2.0	8.2	24.7	23.8
Parkinson's Disease	6.7	-	-	-	0.3	22.5	115.2
Essential Hypertension and Hypertensive Renal Disease	8.3	-	-	0.2	2.5	24.2	144.3
In Situ, Benign, and Uncertain Neoplasms	6.5	0.3	0.1	0.6	2.8	21.4	86.1
Assault (Homicide)	2.4	3.1	2.0	3.8	1.6	1.7	1.7
Atherosclerosis	6.9	-	-	-	0.8	14.3	165.2
Perinatal Conditions	3.7	65.3	-	-	-	-	-
HIV Disease	2.0	-	0.1	5.0	2.5	0.2	-
Congenital Malformations, Deformations & Chromosomal Abnormalities	3.1	27.0	1.2	1.2	1.7	2.8	7.0
Anemias	2.9	-	0.3	0.3	0.5	8.1	50.6
Pneumoconiosis	0.1	-	-	-	-	0.2	1.7
Disorders of Biliary Tract & Pancreas	1.6	-	0.1	0.3	1.3	4.5	19.8
Nutritional Deficiencies	2.2	0.3	-	0.2	0.2	6.4	40.7
Peptic Ulcer	1.5	-	-	-	0.1	4.6	27.3
Phlebitis, Thrombophlebitis, Venous Embolism & Thrombosis	1.5	-	0.1	0.3	1.0	3.9	20.9
Multiple Sclerosis	1.5	-	-	0.7	2.9	4.1	0.6
Cholelithiasis & Other Disorders of Gallbladder	1.2	-	-	0.1	0.5	2.7	25.6
Hernia	0.8	-	-	-	0.5	1.9	14.0
Epilepsy	0.5	-	0.1	0.3	0.5	1.3	1.7
All Other Causes	144.3	24.5	4.0	17.0	58.5	390.8	2,343.6

* Rate per 100,000 female population for each specified age group, 2000.

**Unknown age included in the 85 years and over age group.

Note: A dash indicates no deaths for that cause of death and age group.

Table C-12D

Resident Death Rates* for Selected Causes of Death by Age Group - White Race, Pennsylvania, 2000**

Cause of Death	All Ages	Under 5 Years	5 - 24 Years	25 - 44 Years	45 - 64 Years	65 - 84 Years	85 Years & Over***
All Causes	1,120.8	141.4	43.8	142.9	616.4	3,861.6	16,179.6
Diseases of Heart	355.0	3.1	1.5	19.7	156.4	1,205.1	6,283.9
Malignant Neoplasms	259.4	3.5	3.8	24.0	226.8	1,062.1	1,895.2
Cerebrovascular Disease	76.8	0.9	0.3	3.6	20.9	254.0	1,562.5
Chronic Lower Respiratory Dis.	54.0	0.2	0.3	1.0	20.8	238.0	637.4
Accidents	37.9	9.6	22.3	36.4	27.3	62.2	267.0
Nontransport Accidents	23.7	7.2	7.1	21.0	15.6	45.6	238.2
Motor Vehicle Accidents	12.7	2.3	13.5	14.2	9.9	14.7	27.0
Other Transport Accidents	1.5	0.2	1.7	1.2	1.8	1.9	1.8
Diabetes Mellitus	31.9	0.2	0.2	3.5	21.2	125.8	339.4
Influenza & Pneumonia	26.8	2.3	0.3	1.2	6.1	75.4	642.8
Nephritis, Nephrotic Syndrome and Nephrosis	21.8	0.3	0.0	1.1	6.8	84.3	347.0
Septicemia	20.8	1.0	0.2	1.6	9.9	73.4	331.3
Alzheimer's Disease	23.4	-	-	-	1.0	62.7	657.2
Intentional Self-harm (Suicide)	11.9	-	5.6	15.8	15.5	13.9	12.1
Chronic Liver Dis. and Cirrhosis	9.2	-	-	3.4	13.9	28.6	30.1
Parkinson's Disease	8.6	-	-	-	0.6	34.0	161.8
Essential Hypertension and Hypertensive Renal Disease	6.6	-	-	0.3	2.6	21.2	127.2
In Situ, Benign, and Uncertain Neoplasms	7.1	0.5	0.2	0.6	3.1	26.4	102.5
Assault (Homicide)	2.4	1.9	2.5	3.4	1.6	1.6	1.8
Atherosclerosis	5.9	-	-	0.0	0.7	15.8	159.1
Perinatal Conditions	3.4	63.0	0.0	-	-	-	-
HIV Disease	2.0	0.2	0.1	3.9	3.4	0.1	-
Congenital Malformations, Deformations & Chromosomal Abnormalities	3.3	30.6	1.1	1.5	1.8	2.6	6.3
Anemias	2.3	-	0.1	0.0	0.5	6.9	51.7
Pneumoconiosis	2.1	-	-	-	0.2	8.7	36.4
Disorders of Biliary Tract & Pancreas	1.9	-	-	0.7	1.7	5.2	23.4
Nutritional Deficiencies	1.7	0.2	-	0.1	0.1	5.4	36.4
Peptic Ulcer	1.6	-	0.0	0.1	0.6	5.0	30.6
Phlebitis, Thrombophlebitis, Venous Embolism & Thrombosis	1.2	-	0.1	0.3	0.8	3.4	19.3
Multiple Sclerosis	1.3	-	-	0.5	2.4	3.4	0.9
Cholelithiasis & Other Disorders of Gallbladder	1.2	-	0.0	0.0	0.6	2.9	27.0
Hernia	0.7	0.3	-	-	0.4	1.9	14.8
Epilepsy	0.4	-	0.1	0.4	0.6	0.7	1.3
All Other Causes	138.4	23.4	5.0	19.7	68.1	430.9	2,373.0

* Rate per 100,000 white population for each specified age group, 2000.

** Unknown race included in the white category.

***Unknown age included in the 85 years and over age group.

Note: A dash indicates no deaths for that cause of death and age group.

Table C-12E

Resident Death Rates* for Selected Causes of Death by Age Group - Black Race, Pennsylvania, 2000

Cause of Death	All Ages	Under 5 Years	5 - 24 Years	25 - 44 Years	45 - 64 Years	65 - 84 Years	85 Years & Over**
All Causes	983.1	377.0	75.8	323.3	1,244.1	4,858.5	15,247.3
Diseases of Heart	254.2	4.2	3.2	41.2	302.6	1,441.6	5,116.1
Malignant Neoplasms	215.9	1.1	2.2	34.0	340.3	1,310.5	2,166.0
Cerebrovascular Disease	64.6	2.1	0.5	9.4	64.4	350.6	1,692.4
Chronic Lower Respiratory Dis.	29.6	2.1	1.2	4.1	29.2	187.6	520.1
Accidents	39.8	16.8	16.0	52.2	53.6	65.6	155.3
Nontransport Accidents	27.8	10.5	5.6	37.0	42.5	51.0	139.7
Motor Vehicle Accidents	10.0	6.3	9.2	11.9	9.0	10.9	15.5
Other Transport Accidents	2.1	-	1.2	3.3	2.1	3.6	-
Diabetes Mellitus	34.5	-	0.7	6.4	45.1	210.4	465.8
Influenza & Pneumonia	18.8	6.3	-	4.7	18.0	79.2	605.5
Nephritis, Nephrotic Syndrome and Nephrosis	30.5	3.2	-	3.6	35.2	187.6	543.4
Septicemia	31.1	4.2	-	4.7	36.9	184.9	551.2
Alzheimer's Disease	5.7	-	-	-	0.9	32.8	248.4
Intentional Self-harm (Suicide)	6.9	-	4.9	12.4	5.1	4.6	15.5
Chronic Liver Dis. and Cirrhosis	9.1	-	0.2	1.9	30.9	27.3	15.5
Parkinson's Disease	2.1	-	-	-	0.4	18.2	38.8
Essential Hypertension and Hypertensive Renal Disease	11.6	-	-	-	12.9	68.3	287.2
In Situ, Benign, and Uncertain Neoplasms	2.4	-	0.2	0.3	2.1	13.7	62.1
Assault (Homicide)	31.8	16.8	35.9	49.7	15.4	8.2	-
Atherosclerosis	2.3	-	-	-	1.7	13.7	69.9
Perinatal Conditions	14.9	192.2	-	-	-	-	-
HIV Disease	23.5	-	1.0	45.6	45.1	11.8	7.8
Congenital Malformations, Deformations & Chromosomal Abnormalities	4.8	36.8	2.4	1.7	1.7	3.6	-
Anemias	3.7	-	1.2	3.0	2.6	10.9	85.4
Pneumoconiosis	0.7	-	-	-	-	5.5	15.5
Disorders of Biliary Tract & Pancreas	2.3	-	0.2	0.8	4.3	9.1	31.1
Nutritional Deficiencies	1.6	1.1	-	0.6	0.4	9.1	46.6
Peptic Ulcer	1.1	-	-	0.6	1.3	3.6	31.1
Phlebitis, Thrombophlebitis, Venous Embolism & Thrombosis	2.1	-	-	1.9	4.3	7.3	7.8
Multiple Sclerosis	1.2	-	-	1.4	3.9	0.9	-
Cholelithiasis & Other Disorders of Gallbladder	0.3	-	-	-	0.4	1.8	7.8
Hernia	0.2	-	-	-	0.4	0.9	-
Epilepsy	0.8	-	-	0.3	0.4	6.4	7.8
All Other Causes	134.8	90.3	5.8	42.8	184.5	582.8	2,453.2

* Rate per 100,000 black population for each specified age group, 2000.

**Unknown age included in the 85 years and over age group.

Note: A dash indicates no deaths for that cause of death and age group.

Table C-12F

Resident Death Rates* for Selected Causes of Death by Age Group - Hispanic Origin, Pennsylvania, 2000

Cause of Death	All Ages	Under 5 Years	5 - 24 Years	25 - 44 Years	45 - 64 Years	65 - 84 Years	85 Years & Over**
All Causes	331.9	164.1	52.1	190.4	579.2	3,205.2	12,354.3
Diseases of Heart	71.8	4.6	1.9	17.7	138.1	904.8	4,273.5
Malignant Neoplasms	58.6	2.3	3.1	16.1	130.4	841.6	1,320.9
Cerebrovascular Disease	19.8	2.3	-	6.5	21.1	280.5	1,398.6
Chronic Lower Respiratory Dis.	9.4	-	1.3	1.6	11.5	175.3	155.4
Accidents	32.2	2.3	19.5	55.7	34.5	56.1	-
Nontransport Accidents	19.0	2.3	6.9	38.7	19.2	35.1	-
Motor Vehicle Accidents	11.9	-	10.7	16.1	15.3	14.0	-
Other Transport Accidents	1.3	-	1.9	0.8	-	7.0	-
Diabetes Mellitus	10.4	-	-	3.2	30.7	126.2	233.1
Influenza & Pneumonia	6.1	6.9	-	2.4	7.7	56.1	466.2
Nephritis, Nephrotic Syndrome and Nephrosis	7.9	2.3	-	0.8	13.4	77.1	854.7
Septicemia	7.1	4.6	0.6	2.4	13.4	70.1	388.5
Alzheimer's Disease	3.8	-	-	-	-	42.1	699.3
Intentional Self-harm (Suicide)	6.3	-	1.9	12.9	11.5	-	-
Chronic Liver Dis. and Cirrhosis	7.4	-	-	4.0	17.3	98.2	77.7
Parkinson's Disease	0.3	-	-	-	-	7.0	-
Essential Hypertension and Hypertensive Renal Disease	1.3	-	-	-	1.9	28.1	-
In Situ, Benign, and Uncertain Neoplasms	1.3	-	-	-	3.8	14.0	77.7
Assault (Homicide)	14.2	4.6	15.1	20.2	5.8	7.0	77.7
Atherosclerosis	0.5	-	-	-	-	14.0	-
Perinatal Conditions	8.6	78.6	-	-	-	-	-
HIV Disease	11.7	-	1.3	19.4	36.4	7.0	-
Congenital Malformations, Deformations & Chromosomal Abnormalities	4.1	32.4	-	0.8	1.9	-	-
Anemias	0.5	-	0.6	-	-	-	77.7
Pneumoconiosis	0.8	-	-	-	-	21.0	-
Disorders of Biliary Tract & Pancreas	0.3	-	-	0.8	-	-	-
Nutritional Deficiencies	-	-	-	-	-	-	-
Peptic Ulcer	0.5	-	-	-	1.9	7.0	-
Phlebitis, Thrombophlebitis, Venous Embolism & Thrombosis	0.5	-	-	-	-	14.0	-
Multiple Sclerosis	-	-	-	-	-	-	-
Cholelithiasis & Other Disorders of Gallbladder	0.5	-	-	-	3.8	-	-
Hernia	-	-	-	-	-	-	-
Epilepsy	0.3	-	-	0.8	-	-	-
All Other Causes	45.9	23.1	6.9	25.0	94.0	357.7	2,253.3

* Rate per 100,000 hispanic population for each specified age group, 2000.

**Unknown age included in the 85 years and over age group.

Note: A dash indicates no deaths for that cause of death and age group.
Hispanic origin can be of any race.

Table C-13

Number of Deaths, Age-Adjusted Death Rates and 95% Confidence Intervals for Selected Causes of Death Pennsylvania Residents, 2000 and Average Annual, 1996-2000 and Age-Adjusted Death Rates, United States, 2000

Cause of Death	Pennsylvania						United States
	2000			1996-2000			2000
	Number	Rate	CI (95%)	Number	Rate	CI (95%)	Rate
All Causes	130,092	887.0	882.2-891.8	641,276	879.3	877.2-881.5	872.4
Diseases of Heart	40,446	270.2	267.6-272.8	208,320	278.5	277.3-279.7	257.5
Malignant Neoplasms	29,989	205.8	203.5-208.1	150,181	209.1	208.0-210.2	200.5
Cerebrovascular Disease	8,885	58.7	57.5-59.9	42,547	56.2	55.7-56.7	60.2
Chronic Lower Respiratory Dis.	6,045	40.1	39.1-41.1	28,410	38.1	37.7-38.5	44.9
Accidents	4,500	34.6	33.6-35.6	22,575	34.8	34.4-35.3	33.9
Nontransport Accidents	2,838	21.2	20.4-22.0	*	*	*	17.6
Motor Vehicle Accidents	1,473	11.8	11.2-12.4	7,786	12.6	12.3-12.9	15.2
Other Transport Accidents	189	1.5	1.3-1.7	*	*	*	*
Diabetes Mellitus	3,781	25.7	24.9-26.5	18,095	24.8	24.4-25.2	24.9
Influenza & Pneumonia	3,047	20.2	19.5-20.9	19,361	25.4	25.0-25.8	24.3
Nephritis, Nephrotic Syndrome and Nephrosis	2,675	17.8	17.1-18.5	10,910	14.5	14.2-14.8	13.7
Septicemia	2,573	17.3	16.6-18.0	11,079	15.0	14.7-15.3	11.5
Alzheimer's Disease	2,533	16.4	15.8-17.0	7,596	9.7	9.5-9.9	17.8
Intentional Self-harm (Suicide)	1,348	10.7	10.1-11.3	6,791	11.1	10.8-11.4	10.3
Chronic Liver Dis. and Cirrhosis	1,079	7.8	7.3-8.3	5,351	8.0	7.8-8.2	9.5
Assault (Homicide)	649	5.5	5.1-5.9	3,409	5.8	5.6-6.0	5.8
Atherosclerosis	644	4.2	3.9-4.5	3,477	4.5	4.4-4.7	5.2
HIV Disease	498	4.1	3.7-4.5	3,094	5.3	5.1-5.5	5.2

* Not available.

Notes: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Rates are per 100,000.
CI = 95% confidence interval based on a formula for estimating the standard error or SE. See Technical Notes.
Data for 1999 and 2000 based on ICD-10 and 1996-1998 based on ICD-9 cause of death codes.
U.S. mortality data used to compute U.S. rates are preliminary.

Table C-20

Cerebrovascular Disease Deaths, Number and Rate*:
Pennsylvania and United States, 1950-2000

Year	Pennsylvania		United States		Year	Pennsylvania		United States	
	Number	Rate	Number	Rate		Number	Rate	Number	Rate
2000	8,885	72.3	166,028 **	60.3					
1999	8,547	71.3	167,366	61.4	1974	12,014	101.5	207,424	98.1
1998	8,208	68.4	158,448	58.6	1973	12,616	106.0	214,313	102.1
1997	8,325	69.3	159,791	59.7	1972	12,438	104.3	213,344	102.5
1996	8,582	71.2	159,942	60.3	1971	12,472	105.0	209,092	101.1
1995	8,206	68.0	157,991	60.1	1970	12,573	106.6	207,166	101.9
1994	8,380	69.5	153,306	58.9	1969	12,444	105.4	207,179	102.6
1993	7,819	65.0	150,108	58.2	1968	12,994	110.5	211,390	105.8
1992	7,657	63.8	143,769	56.4	1967	12,295	105.6	202,184	102.2
1991	7,587	63.4	143,481	56.9	1966	12,685	109.0	204,841	104.6
1990	7,678	64.6	144,088	57.9	1965	12,466	108.1	201,057	103.7
1989	7,683	63.8	145,551	58.6	1964	12,268	107.1	198,209	103.6
1988	8,036	67.0	150,517	61.2	1963	12,669	110.9	201,166	106.7
1987	8,019	67.2	149,835	61.6	1962	12,623	111.0	197,451	106.3
1986	7,961	67.0	149,643	62.1	1961	12,598	109.9	192,951	105.5
1985	8,175	68.9	153,050	64.1	1960	12,632	111.6	193,588	108.0
1984	8,334	70.0	154,327	65.3	1959	12,780	112.9	191,376	108.5
1983	8,384	70.6	155,598	66.5	1958	12,700	114.4	190,758	110.1
1982	8,559	72.0	157,710	68.0	1957	12,755	114.2	187,709	110.2
1981	8,913	75.1	163,504	71.3	1956	11,997	107.8	177,845	106.3
1980	9,539	80.4	170,225	75.1	1955	12,210	109.7	174,142	106.0
1979	9,132	77.8	169,488	77.0	1954	11,529	105.8	167,777	104.1
1978	9,559	81.4	175,629	80.5	1953	11,921	110.1	169,800	107.3
1977	10,356	87.9	181,934	84.1	1952	11,704	109.1	166,331	106.8
1976	10,749	90.6	188,623	87.9	1951	11,475	108.3	163,550	106.6
1975	11,311	95.6	194,038	91.1	1950	11,043	105.0	156,751	104.0

* Rate per 100,000 population.
**Preliminary data.
Note: Data for 1999-2000 based on ICD-10, 1979-1998 based on ICD-9, 1968-1978 based on ICD-8, 1958-1967 based on ICD-7, and 1950-1957 based on ICD-6 cause of death codes.

Figure C-20

Cerebrovascular Disease Death Rates
Pennsylvania and United States, 1950-2000

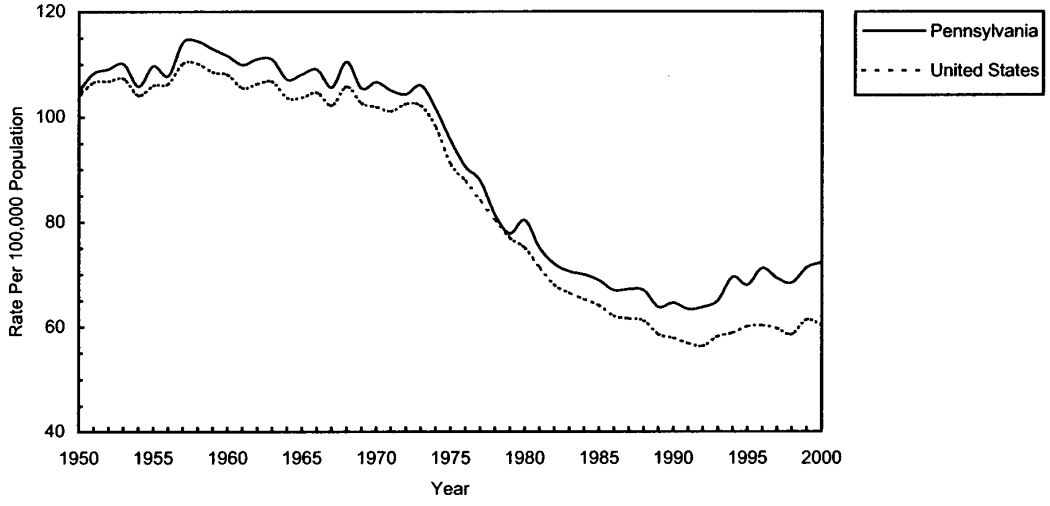


Table C-29

Average Annual Age-Adjusted Death Rates and 95% Confidence Intervals for Selected Causes of Death by County, Pennsylvania Residents, 1996-2000

County	Diseases of Heart		Malignant Neoplasms		Cerebrovascular Disease		Chronic Lower Respiratory Disease		Accidents	
	Rate	CI (95%)	Rate	CI (95%)	Rate	CI (95%)	Rate	CI (95%)	Rate	CI (95%)
All Counties	278.5	277.3-279.7	209.1	208.0-210.2	56.2	55.7-56.7	38.1	37.7-38.5	34.8	34.4-35.3
Adams	294.5	279.1-309.9	191.1	178.6-203.6	59.3	52.4-66.2	37.2	31.7-42.7	35.4	29.9-40.9
Allegheny	279.7	276.3-283.2	216.4	213.3-219.5	53.3	51.8-54.8	36.2	35.0-37.5	28.3	27.1-29.5
Armstrong	300.4	285.3-315.5	182.1	170.1-194.1	52.5	46.3-58.7	39.9	34.4-45.4	38.0	32.1-43.9
Beaver	279.5	270.2-288.8	210.9	202.8-219.0	45.5	41.8-49.2	36.1	32.8-39.4	27.4	24.2-30.6
Bedford	275.9	257.5-294.3	178.7	163.8-193.6	83.4	73.3-93.5	32.0	25.7-38.3	41.3	33.5-49.1
Berks	272.3	265.4-279.2	196.3	190.3-202.3	58.2	55.0-61.4	38.2	35.6-40.8	31.9	29.4-34.4
Blair	323.9	312.0-335.9	211.3	201.4-221.2	55.3	50.4-60.2	38.7	34.6-42.8	38.1	33.6-42.6
Bradford	299.1	281.6-316.7	190.7	176.5-204.9	45.4	38.6-52.2	48.5	41.5-55.6	33.5	27.2-39.9
Bucks	245.5	239.7-251.3	205.2	200.0-210.4	62.4	59.5-65.3	44.2	41.7-46.7	29.6	27.6-31.6
Butler	299.8	288.8-310.8	204.9	195.6-214.2	58.4	53.6-63.2	40.5	36.4-44.6	29.4	25.8-33.0
Cambria	277.6	268.1-287.1	194.8	186.5-203.1	47.8	43.9-51.7	36.3	32.9-39.7	34.5	30.8-38.2
Cameron	243.1	196.4-289.8	252.3	202.4-302.3	36.9 *	19.4-54.4	35.4 *	18.1-52.8	53.5 *	26.4-80.6
Carbon	328.2	310.7-345.8	215.2	200.8-229.6	49.2	42.4-56.0	29.9	24.7-35.1	40.5	33.6-47.4
Centre	239.6	226.2-253.0	171.2	160.0-182.4	57.1	50.5-63.7	36.3	31.1-41.5	29.8	25.3-34.3
Chester	239.5	232.6-246.4	196.7	190.6-202.8	53.8	50.5-57.1	35.3	32.7-38.0	29.6	27.2-32.0
Clarion	331.5	308.5-354.5	183.7	166.1-201.3	64.6	54.5-74.7	36.9	29.2-44.7	45.3	36.3-54.3
Clearfield	295.9	281.2-310.6	200.6	188.2-213.0	48.8	42.9-54.7	45.0	39.3-50.7	42.7	36.6-48.8
Clinton	272.3	251.2-293.4	212.2	193.2-231.2	55.4	46.0-64.8	46.4	37.7-55.1	29.9	22.3-37.5
Columbia	305.3	288.0-322.6	178.2	164.8-191.6	66.8	58.8-74.8	42.0	35.6-48.4	36.0	29.6-42.4
Crawford	275.0	261.1-289.0	208.8	196.4-221.2	65.4	58.6-72.2	41.6	36.2-47.0	41.2	35.4-47.0
Cumberland	263.8	254.6-273.0	185.6	177.9-193.3	58.3	54.0-62.6	41.6	38.0-45.2	29.9	26.7-33.1
Dauphin	281.2	272.5-289.9	203.2	195.7-210.7	49.9	46.2-53.6	38.9	35.7-42.2	32.0	28.9-35.1
Delaware	248.6	243.3-253.9	220.3	215.2-225.4	60.7	58.1-63.3	41.2	39.0-43.4	26.2	24.4-28.0
Elk	247.1	226.5-267.7	216.4	196.9-235.9	59.6	49.6-69.6	36.5	28.6-44.4	52.4	41.8-63.0
Erie	280.9	272.6-289.2	204.2	197.0-211.4	66.5	62.5-70.5	42.0	38.8-45.2	33.8	30.8-36.8
Fayette	318.7	307.7-329.7	208.1	199.0-217.2	59.7	55.1-64.3	40.3	36.4-44.2	41.5	37.0-46.0
Forest	404.3	339.4-469.2	227.7	179.0-276.4	90.3	58.5-122.1	32.6 *	14.9-50.3	46.7 *	20.3-73.1
Franklin	232.5	221.7-243.3	195.9	185.9-205.9	59.8	54.4-65.3	41.5	37.0-46.1	35.1	30.6-39.6
Fulton	234.9	201.8-268.0	180.8	151.7-209.9	43.0	28.6-57.5	35.3	22.2-48.4	59.5	41.7-77.3
Greene	323.7	301.5-345.9	214.8	196.2-233.4	43.8	35.8-51.8	45.8	37.4-54.2	34.3	26.5-42.1
Huntingdon	287.7	266.8-308.6	181.4	164.7-198.1	50.3	41.6-59.1	30.4	23.7-37.2	35.5	28.0-43.0
Indiana	301.6	286.4-316.8	198.3	185.8-210.8	49.6	43.5-55.7	33.1	28.1-38.1	38.2	32.7-43.8
Jefferson	314.5	294.8-334.2	188.2	172.6-203.8	65.4	56.5-74.3	40.8	33.7-47.9	35.6	28.2-43.0

(Continued)

Table C-29

Average Annual Age-Adjusted Death Rates and 95% Confidence Intervals for Selected Causes of Death by County, Pennsylvania Residents, 1996-2000

County	Diseases of Heart		Malignant Neoplasms		Cerebrovascular Disease		Chronic Lower Respiratory Disease		Accidents	
	Rate	CI (95%)	Rate	CI (95%)	Rate	CI (95%)	Rate	CI (95%)	Rate	CI (95%)
Juniata	300.0	269.9-330.1	211.6	186.1-237.1	64.0	50.2-77.9	33.8	23.7-43.9	51.1	38.1-64.1
Lackawanna	343.2	334.2-352.2	208.6	201.3-215.9	50.3	46.9-53.7	41.1	38.0-44.2	33.1	29.8-36.4
Lancaster	263.1	256.7-269.5	192.0	186.5-197.5	61.4	58.3-64.5	38.0	35.6-40.4	35.5	33.1-37.9
Lawrence	302.1	289.2-315.0	198.3	187.6-209.1	47.0	41.9-52.1	30.7	26.6-34.8	34.2	29.2-39.2
Lebanon	261.8	250.4-273.2	203.9	193.5-214.3	54.2	49.1-59.4	39.6	35.1-44.1	37.0	32.3-41.7
Lehigh	256.5	249.4-263.6	193.3	187.0-199.6	48.7	45.6-51.8	33.2	30.6-35.8	30.7	28.0-33.4
Luzerne	343.8	336.5-351.1	212.6	206.6-218.6	46.6	44.0-49.3	33.1	30.8-35.4	31.4	28.8-34.0
Lycoming	291.4	279.0-303.8	197.1	186.7-207.5	61.0	55.4-66.6	44.8	39.9-49.7	32.1	27.7-36.5
McKean	291.8	272.7-310.9	223.7	206.5-241.0	50.1	42.3-57.9	52.7	44.5-60.9	32.0	24.9-39.1
Mercer	287.7	276.2-299.2	195.8	186.1-205.5	54.8	49.9-59.7	42.4	38.0-46.8	38.9	34.2-43.6
Mifflin	302.3	282.6-322.0	177.7	162.4-193.1	64.8	55.8-73.9	41.8	34.5-49.1	36.0	28.5-43.5
Monroe	274.9	261.3-288.5	227.7	215.7-239.7	52.9	46.9-59.0	46.0	40.5-51.5	34.0	29.4-38.6
Montgomery	216.8	212.5-221.1	192.8	188.7-196.9	59.4	57.2-61.6	34.5	32.8-36.2	31.5	29.8-33.2
Montour	307.6	276.6-338.6	222.0	194.3-249.7	55.9	43.0-68.8	37.4	26.5-48.3	43.2	30.1-56.3
Northampton	257.3	249.3-265.3	200.5	193.3-207.7	47.0	43.6-50.4	35.0	32.1-37.9	27.3	24.6-30.0
Northumberland	305.4	292.5-318.3	202.1	191.3-212.9	58.3	52.8-63.9	39.7	35.1-44.3	37.9	32.7-43.2
Perry	307.7	283.5-331.9	195.6	176.7-214.5	59.4	48.6-70.2	43.7	34.6-52.8	44.9	35.8-54.0
Philadelphia	305.3	301.6-309.0	263.4	259.9-267.0	64.3	62.6-66.0	38.3	37.0-39.6	52.1	50.5-53.7
Pike	196.0	177.7-214.3	159.7	143.3-176.1	38.5	30.3-46.7	25.7	19.1-32.3	34.8	26.7-42.9
Potter	249.4	220.1-278.7	204.2	177.2-231.2	54.0	40.3-67.7	39.1	27.4-50.8	49.1	34.8-63.5
Schuylkill	324.9	314.5-335.3	217.5	208.6-226.4	53.9	49.7-58.1	38.4	34.8-42.0	42.0	37.7-46.4
Snyder	260.7	238.3-283.1	188.2	169.1-207.3	53.7	43.5-63.9	33.7	25.7-41.7	24.8	17.9-31.7
Somerset	301.0	286.5-315.5	182.9	171.3-194.5	54.3	48.2-60.4	38.1	33.0-43.2	43.7	37.6-49.8
Sullivan	263.3	220.4-306.2	252.1	207.2-297.0	59.8	39.1-80.5	56.5	35.9-77.1	46.8 *	23.9-69.7
Susquehanna	312.8	291.3-334.3	209.2	191.2-227.2	51.0	42.3-59.7	50.6	41.9-59.3	42.3	33.6-51.0
Tioga	283.5	262.8-304.2	197.5	180.0-215.0	65.6	55.7-75.5	41.8	33.9-49.7	38.4	30.1-46.7
Union	293.0	270.1-315.9	154.7	137.8-171.7	61.6	51.1-72.1	41.3	32.6-50.0	24.3	17.8-30.8
Venango	289.9	272.4-307.5	199.1	184.4-213.8	63.1	55.0-71.2	54.9	47.3-62.5	50.0	42.0-58.0
Warren	299.3	279.2-319.4	196.0	179.5-212.5	58.8	50.0-67.6	42.1	34.5-49.7	47.6	38.7-56.5
Washington	275.9	267.3-284.5	207.8	200.2-215.4	52.6	48.9-56.3	38.0	34.8-41.2	31.1	27.9-34.3
Wayne	330.9	310.5-351.3	221.4	204.4-238.4	63.1	54.2-72.0	37.6	30.7-44.5	43.7	35.2-52.2
Westmoreland	294.0	287.4-300.6	196.4	190.9-201.9	54.3	51.5-57.1	35.5	33.2-37.8	33.9	31.4-36.4
Wyoming	294.5	267.3-321.7	191.1	169.1-213.1	57.6	45.6-69.6	55.2	43.4-67.0	39.9	29.7-50.1
York	253.0	246.0-260.0	199.4	193.2-205.6	56.2	52.9-59.5	39.1	36.3-41.9	37.0	34.3-39.7

* Based on less than 20 events - statistically unreliable.

Notes: Age-adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Rates are per 100,000.
CI = 95% confidence interval based on a formula for estimating the standard error or SE. See Technical Notes.
Data for 1999 and 2000 based on ICD-10 and 1996-1998 based on ICD-9 cause of death codes.
See Table C-34 for corresponding 1996-2000 number of deaths.

Figure C-34

Average Annual Age-Adjusted Death Rates for Cerebrovascular Disease by County
Pennsylvania Residents, 1996-2000

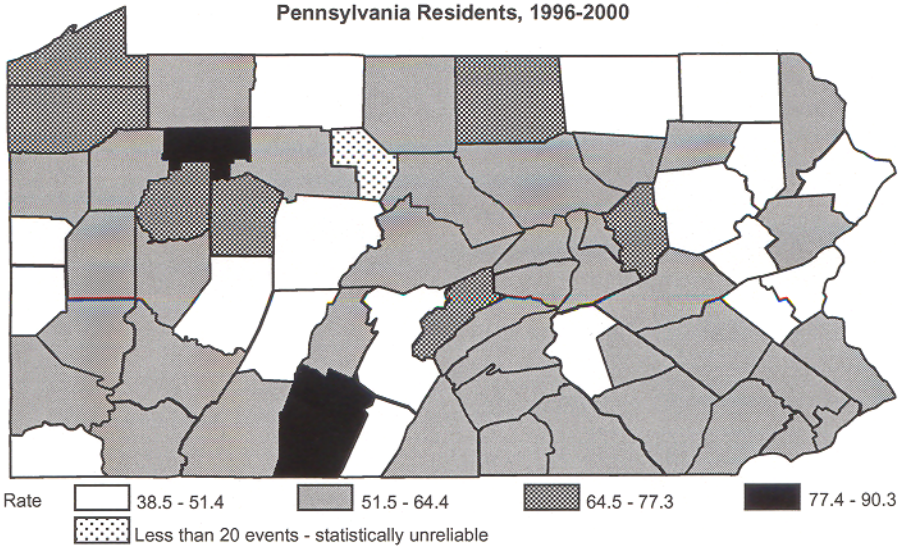


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Table C-33 (Continued)

Selected Causes of Death by County, Pennsylvania Residents, 2000

County	Cerebrovascular Disease	Chronic Lower Respiratory Dis.	Accidents			Diabetes Mellitus	Influenza & Pneumonia
			Non-Transport	Motor Vehicle	Other Transport		
All Counties	8,885	6,045	2,838	1,473	189	3,781	3,047
Adams	54	38	11	16	2	33	12
Allegheny	998	674	329	77	15	433	366
Armstrong	57	43	13	16	6	34	20
Beaver	115	98	37	24	4	57	50
Bedford	65	22	7	11	1	17	9
Berks	286	179	65	47	2	102	112
Blair	102	71	29	25	1	45	46
Bradford	33	37	7	8	1	23	12
Bucks	347	297	134	61	7	118	99
Butler	129	84	22	21	4	49	41
Cambria	129	80	54	21	2	77	44
Cameron	2	4	1	2	0	5	1
Carbon	35	32	17	11	0	24	14
Centre	67	43	22	12	1	28	50
Chester	226	160	60	62	4	70	95
Clarion	30	21	14	8	1	6	7
Clearfield	59	53	17	20	0	31	21
Clinton	23	20	8	6	0	13	13
Columbia	60	24	5	11	1	23	9
Crawford	72	54	13	23	4	42	18
Cumberland	133	102	35	17	4	42	43
Dauphin	150	106	36	34	1	71	66
Delaware	469	295	132	38	5	140	134
Elk	27	14	1	13	1	16	9
Erie	199	140	56	50	3	87	52
Fayette	148	93	35	25	4	75	48
Forest	3	3	2	1	0	1	1
Franklin	100	77	13	23	5	51	28
Fulton	7	3	1	6	0	2	4
Greene	30	23	3	8	0	14	10
Huntingdon	33	20	4	7	0	11	14
Indiana	60	30	20	13	1	25	35
Jefferson	38	33	2	13	3	14	13
Juniata	17	8	8	8	0	7	6
Lackawanna	159	137	66	15	14	86	67
Lancaster	310	195	87	58	4	135	99
Lawrence	78	49	21	15	0	40	18
Lebanon	103	66	26	12	2	28	37
Lehigh	204	152	75	40	1	101	71
Luzerne	240	148	70	34	10	164	91
Lycoming	82	84	20	19	2	38	19
McKean	28	46	2	5	0	18	14
Mercer	103	75	25	35	0	70	45
Mifflin	40	24	10	0	0	12	14
Monroe	64	60	27	34	0	27	35
Montgomery	576	357	199	66	10	153	203
Montour	17	8	2	6	0	7	5
Northampton	164	106	42	25	3	86	53
Northumberland	73	59	24	7	0	40	30
Perry	19	21	9	8	3	14	4
Philadelphia	1,144	674	587	116	29	446	373
Pike	17	10	5	3	2	6	2
Potter	13	5	6	3	0	3	4
Schuylkill	151	94	30	31	4	59	36
Snyder	28	13	6	3	0	16	13
Somerset	62	53	16	16	1	19	11
Sullivan	6	7	2	3	0	3	6
Susquehanna	23	21	8	7	1	25	14
Tioga	24	25	9	7	0	13	12
Union	27	20	5	7	0	8	11
Venango	40	31	12	14	1	30	16
Warren	29	23	8	8	1	15	10
Washington	172	110	42	25	4	74	55
Wayne	38	27	7	15	2	13	4
Westmoreland	319	201	68	35	11	132	100
Wyoming	18	19	8	8	0	9	5
York	211	144	101	55	1	105	68

Table C-34

Selected Causes of Death by County, Number and Average Annual Rate*: Pennsylvania Residents, 1996-2000

County	Diseases of Heart		Malignant Neoplasms		Cerebrovascular Disease		Chronic Lower Respiratory Disease		Accidents	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
All Counties	208,320	345.2	150,181	248.8	42,547	70.5	28,410	47.1	22,575	37.4
Adams	1,412	323.7	902	206.8	284	65.1	178	40.8	161	36.9
Allegheny	25,224	395.1	18,374	287.8	4,872	76.3	3,246	50.8	2,054	32.2
Armstrong	1,518	414.7	881	240.7	272	74.3	202	55.2	157	42.9
Beaver	3,494	379.3	2,591	281.3	579	62.9	466	50.6	284	30.8
Bedford	864	348.9	551	222.5	262	105.8	100	40.4	107	43.2
Berks	5,952	331.7	4,136	230.5	1,293	72.1	834	46.5	619	34.5
Blair	2,823	432.9	1,758	269.6	489	75.0	339	52.0	273	41.9
Bradford	1,116	357.7	693	222.1	171	54.8	182	58.3	107	34.3
Bucks	6,881	234.0	5,955	202.5	1,726	58.7	1,242	42.2	850	28.9
Butler	2,836	332.0	1,870	218.9	559	65.4	377	44.1	261	30.6
Cambria	3,267	419.7	2,135	274.3	573	73.6	428	55.0	334	42.9
Cameron	104	363.3	98	342.3	17	59.4	16	55.9	15	52.4
Carbon	1,343	456.7	861	292.8	203	69.0	125	42.5	131	44.6
Centre	1,232	185.2	904	135.9	288	43.3	188	28.3	169	25.4
Chester	4,620	218.7	3,947	186.8	1,026	48.6	682	32.3	604	28.6
Clarion	796	380.3	420	200.7	158	75.5	87	41.6	97	46.3
Clearfield	1,566	386.5	1,012	249.8	264	65.2	236	58.2	190	46.9
Clinton	640	344.6	479	257.9	133	71.6	110	59.2	59	31.8
Columbia	1,199	374.4	678	211.7	267	83.4	167	52.1	122	38.1
Crawford	1,493	333.7	1,091	243.9	360	80.5	226	50.5	192	42.9
Cumberland	3,131	298.8	2,211	211.0	694	66.2	501	47.8	333	31.8
Dauphin	3,986	322.6	2,800	226.6	713	57.7	550	44.5	408	33.0
Delaware	8,512	312.3	7,103	260.6	2,108	77.3	1,399	51.3	785	28.8
Elk	554	318.3	472	271.2	136	78.1	82	47.1	94	54.0
Erie	4,372	313.6	3,088	221.5	1,047	75.1	657	47.1	488	35.0
Fayette	3,237	444.7	2,005	275.4	637	87.5	411	56.5	330	45.3
Forest	149	602.3	84	339.6	31	125.3	13	52.6	12	48.5
Franklin	1,779	277.7	1,483	231.5	462	72.1	320	50.0	238	37.2
Fulton	193	267.1	148	204.8	34	47.0	28	38.7	43	59.5
Greene	818	393.7	513	246.9	115	55.4	113	54.4	75	36.1
Huntingdon	730	324.3	453	201.3	127	56.4	78	34.7	86	38.2
Indiana	1,519	341.2	971	218.1	254	57.0	168	37.7	182	40.9
Jefferson	981	423.8	558	241.1	207	89.4	128	55.3	90	38.9
Juniata	382	344.7	264	238.2	82	74.0	43	38.8	59	53.2
Lackawanna	5,605	532.8	3,120	296.6	841	79.9	668	63.5	389	37.0
Lancaster	6,516	284.3	4,687	204.5	1,533	66.9	947	41.3	827	36.1
Lawrence	2,113	444.6	1,308	275.2	332	69.9	217	45.7	182	38.3
Lebanon	2,013	341.2	1,484	251.5	425	72.0	299	50.7	237	40.2
Lehigh	5,005	332.2	3,596	238.7	963	63.9	648	43.0	513	34.0
Luzerne	8,611	543.7	4,822	304.4	1,189	75.1	810	51.1	557	35.2
Lycoming	2,127	359.6	1,381	233.5	450	76.1	324	54.8	201	34.0
McKean	894	383.1	646	276.8	158	67.7	157	67.3	79	33.8
Mercer	2,423	398.6	1,563	257.1	472	77.6	360	59.2	268	44.1
Mifflin	905	386.1	515	219.7	197	84.0	127	54.2	89	38.0
Monroe	1,565	246.5	1,392	219.2	294	46.3	272	42.8	210	33.1
Montgomery	9,917	274.3	8,464	234.1	2,745	75.9	1,571	43.5	1,261	34.9
Montour	378	422.1	246	274.7	72	80.4	45	50.3	42	46.9
Northampton	3,990	306.8	3,015	231.8	734	56.4	545	41.9	386	29.7
Northumberland	2,148	454.4	1,337	282.8	424	89.7	283	59.9	200	42.3
Perry	620	281.6	410	186.2	117	53.1	89	40.4	94	42.7
Philadelphia	25,940	355.3	21,152	289.7	5,533	75.8	3,185	43.6	3,861	52.9
Pike	439	214.1	365	178.0	85	41.4	58	28.3	71	34.6
Potter	278	320.9	220	253.9	60	69.3	43	49.6	45	51.9
Schuylkill	3,728	496.2	2,312	307.7	633	84.3	441	58.7	358	47.7
Snyder	522	274.8	374	196.9	107	56.3	68	35.8	49	25.8
Somerset	1,649	411.1	955	238.1	302	75.3	211	52.6	198	49.4
Sullivan	145	468.5	121	391.0	32	103.4	29	93.7	16	51.7
Susquehanna	810	384.5	521	247.3	133	63.1	129	61.2	91	43.2
Tioga	721	347.0	489	235.4	170	81.8	108	52.0	83	40.0
Union	629	305.8	320	155.6	133	64.7	87	42.3	54	26.3
Venango	1,048	361.6	708	244.3	233	80.4	201	69.3	150	51.7
Warren	855	388.4	545	247.6	170	77.2	119	54.1	111	50.4
Washington	3,953	385.3	2,844	277.2	758	73.9	546	53.2	358	34.9
Wayne	1,009	440.4	655	285.9	193	84.2	115	50.2	102	44.5
Westmoreland	7,622	409.0	4,917	263.8	1,424	76.4	934	50.1	725	38.9
Wyoming	450	309.8	289	198.9	88	60.6	84	57.8	59	40.6
York	4,969	265.7	3,919	209.5	1,104	59.0	768	41.1	700	37.4

*Rate per 100,000 population for each county, 1996-2000.

Note: Data for 1999 and 2000 based on ICD-10 and 1996-1998 based on ICD-9 cause of death codes.

Table C-42

Selected Causes of Death for Selected Municipalities

Number and Average Annual Rate*: Pennsylvania Residents, 1996-2000

Municipality	Diseases of Heart		Malignant Neoplasms		Cerebrovascular Disease		Chronic Lower Respiratory Disease		Accidents	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
State Total	208,320	345.2	150,181	248.8	42,547	70.5	28,410	47.1	22,575	37.4
Allentown	1,896	370.7	1,323	258.7	368	71.9	253	49.5	194	37.9
Altoona	1,061	425.5	791	317.2	176	70.6	149	59.8	112	44.9
Bethel Park	462	277.9	387	232.8	102	61.4	61	36.7	36	21.7
Bethlehem	1,283	365.2	998	284.1	238	67.7	165	47.0	120	34.2
Chester	582	293.7	542	273.5	161	81.2	93	46.9	63	31.8
Easton	513	399.2	311	242.0	70	54.5	53	41.2	43	33.5
Erie	1,982	383.7	1,358	262.9	503	97.4	275	53.2	208	40.3
Harrisburg	1,007	408.0	687	278.3	166	67.3	138	55.9	112	45.4
Hazleton	780	665.7	371	316.6	119	101.6	85	72.5	51	43.5
Johnstown	822	650.5	586	463.8	143	113.2	106	83.9	97	76.8
Lancaster	889	330.2	601	223.2	168	62.4	144	53.5	143	53.1
Lebanon	454	380.1	348	291.4	103	86.2	80	67.0	72	60.3
McKeesport	755	645.5	412	352.3	112	95.8	80	68.4	62	53.0
Monroeville	543	383.1	389	274.5	103	72.7	70	49.4	44	31.0
New Castle	769	583.7	459	348.4	110	83.5	77	58.4	73	55.4
Norristown	496	331.8	452	302.3	113	75.6	96	64.2	92	61.5
Philadelphia	25,940	355.3	21,152	289.7	5,533	75.8	3,185	43.6	3,861	52.9
Pittsburgh	7,240	424.1	5,228	306.2	1,347	78.9	903	52.9	669	39.2
Plum	292	220.1	243	183.1	59	44.5	47	35.4	24	18.1
Pottstown	410	382.2	313	291.8	104	96.9	79	73.6	67	62.5
Reading	1,209	318.8	880	232.1	242	63.8	190	50.1	149	39.3
Scranton	2,400	635.6	1,269	336.1	378	100.1	329	87.1	157	41.6
State College	191	97.0	145	73.7	46	23.4	26	13.2	24	12.2
West Mifflin	518	461.9	377	336.2	90	80.3	59	52.6	43	38.3
Wilkes Barre	1,311	606.0	736	340.2	199	92.0	128	59.2	85	39.3
Williamsport	530	348.3	359	235.9	114	74.9	95	62.4	55	36.1
York	684	339.0	506	250.8	148	73.4	114	56.5	118	58.5
All Other Areas	153,301	333.8	108,958	237.2	31,532	68.7	21,330	46.4	15,801	34.4

*Rate per 100,000 population for each specified area, 1996-2000.

Note: Data for 1999-2000 based on ICD-10 and 1996-1998 based on ICD-9 cause of death codes.

Appendix 4

STROKE TREATMENT DATA

DISCLAIMER BY PHC4

The Pennsylvania Health Care Cost Containment Council (PHC4) is an independent state agency responsible for addressing the problem of escalating health costs, ensuring the quality of health care, and increasing access to health care for all citizens regardless of ability to pay. PHC4 has provided data to this entity in an effort to further PHC4's mission of educating the public and containing health care costs in Pennsylvania.

PHC4, its agents and staff, have made no representation, guarantee, or warranty, express or implied, that the data: financial, patient, payor, and physician specific information provided to this entity, are error-free, or that the use of the data will avoid differences of opinion or interpretation.

This analysis was not prepared by PHC4. This analysis was done by the Joint State Government Commission. PHC4, its agents and staff, bear no responsibility or liability for the results of the analysis, which are solely the opinion of this entity.

NOTE: Due to rounding, table detail may not sum to total.

Table 1

EMERGENCY MEDICAL SERVICES
PATIENTS PRELIMINARILY IDENTIFIED WITH STROKE BY AGE AND SEX
PENNSYLVANIA 1998-2000

Age/Sex	1998 Strokes	1998 Percentage of total	1999 Strokes	1999 Percentage of total	2000 Strokes	2000 Percentage of total
Age						
10 and under	28	0.1%	26	0.1%	26	0.1%
11-19	29	0.1	56	0.3	29	0.2
20-24	34	0.2	35	0.2	32	0.2
25-29	37	0.2	37	0.2	35	0.2
30-34	67	0.3	56	0.3	66	0.4
35-39	136	0.7	117	0.6	134	0.7
40-44	235	1.2	237	1.2	186	1.0
45-49	363	1.9	365	1.9	340	1.9
50-54	539	2.8	515	2.7	522	2.9
55-59	740	3.8	699	3.6	674	3.7
60-64	981	5.0	1,013	5.2	916	5.0
65-69	1,645	8.4	1,559	8.1	1,379	7.6
70-74	2,733	14.0	2,514	13.0	2,240	12.3
75-79	3,519	18.0	3,381	17.5	3,551	19.5
80-84	3,635	18.6	3,717	19.2	3,448	18.9
85 and over	4,305	22.0	4,522	23.4	4,207	23.1
Unknown/not listed	519	2.7	488	2.5	453	2.5
Total[1]	19,545	100.0	19,337	100.0	18,238	100.0
Sex						
Male	8,274	42.3	8,109	41.7	7,892	41.2
Female	10,856	55.5	10,981	56.4	10,886	56.9
Unknown/not listed	427	2.2	366	1.9	356	1.9
Total	19,557	100.0	19,456	100.0	19,134	100.0

1. 1,027 patients were not included due to probable error in age data.

SOURCE: Data provided by the Pennsylvania Department of Health, Emergency Medical Services Office, October 2001.

Table 2

EMERGENCY MEDICAL SERVICES
PATIENTS PRELIMINARILY IDENTIFIED WITH STROKE BY REGION[1]
PENNSYLVANIA 1998-2000

Region	2000 Percentage of total population	1998 Strokes	1998 Percentage of total	1999 Strokes	1999 Percentage of total	2000 Strokes	2000 Percentage of total
One	18.7%	4,517	23.1%	4,528	23.3%	4,455	23.3%
Two	9.3	1,793	9.2	1,716	8.8	1,910	10.0
Three	4.1	1,293	6.6	1,237	6.4	848	4.4
Four	5.2	1,310	6.7	1,310	6.7	1,409	7.4
Five	14.5	2,457	12.6	2,964	15.2	3,271	17.1
Six	7.4	1,865	9.5	1,929	9.9	1,662	8.7
Seven	9.5	2,299	11.8	1,902	9.8	2,243	11.7
Eight	19.0	2,889	14.8	3,075	15.8	3,191	16.7
Nine	12.4	938	4.8	697	3.6	92	0.5
Unknown/not listed	--	196	1.0	98	0.5	53	0.3
Total	100.0	19,557	100.0	19,456	100.0	19,134	100.0

1. See PHC4's facility region code map.

SOURCE: Stroke Data--Provided by the Pennsylvania Department of Health, Emergency Medical Services Office, October 2001. Population Data--U.S. Census Bureau, Census 2000 Summary File 1, Matrices PCT12 and P13.

PENNSYLVANIA HEALTH CARE COST CONTAINMENT COUNCIL'S FACILITY REGION CODE MAP

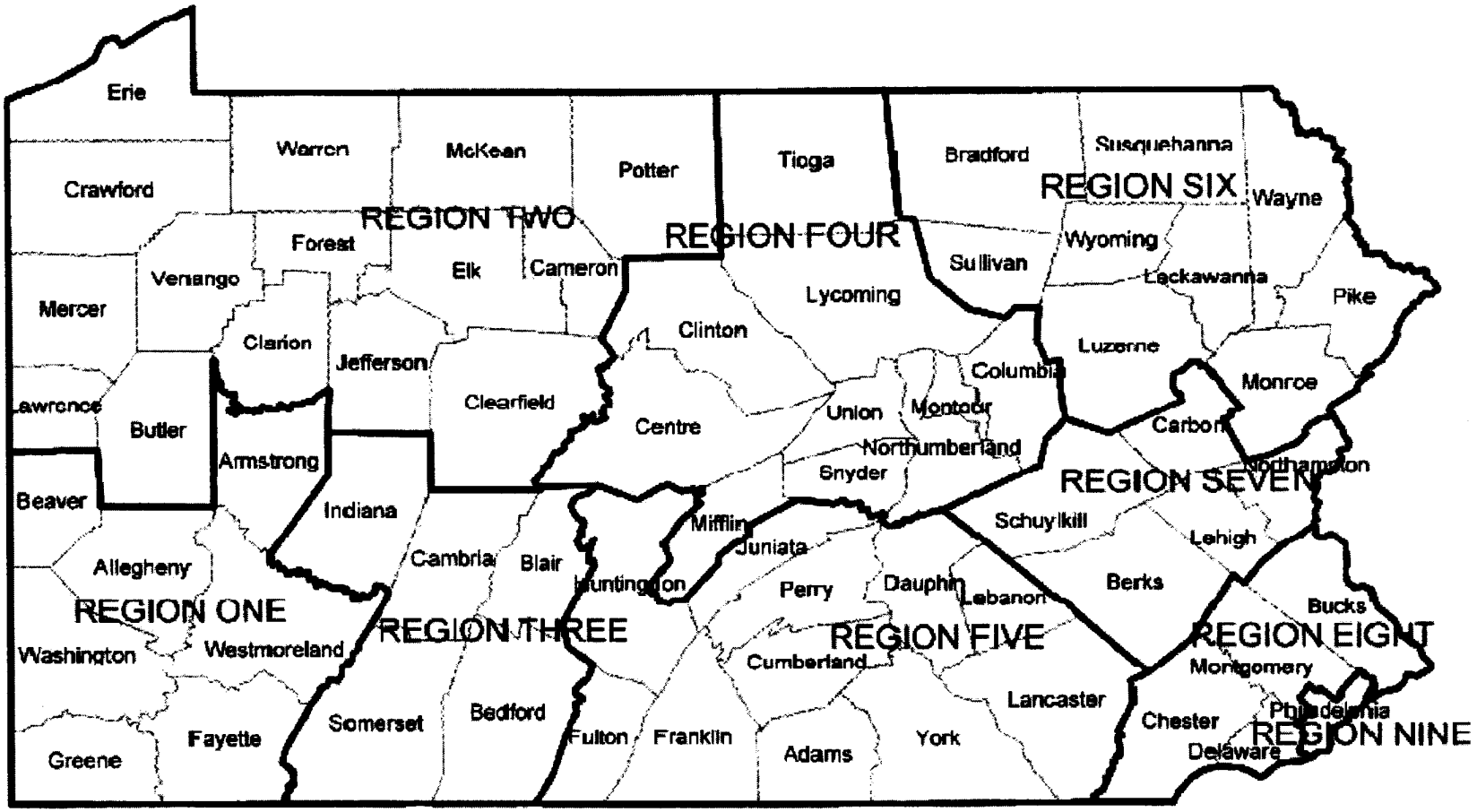

Table 3

EMERGENCY MEDICAL SERVICES
PATIENTS PRELIMINARILY IDENTIFIED WITH STROKE BY COUNTY
PENNSYLVANIA 1998-2000

County	1998 Strokes	1998 Percentage of total	1999 Strokes	1999 Percentage of total	2000 Strokes	2000 Percentage of total
Adams	123	0.6%	159	0.8%	207	1.1%
Allegheny	2,580	13.2	2,579	13.3	2,350	12.3
Armstrong	122	0.6	95	0.5	277	1.4
Beaver	285	1.5	255	1.3	210	1.1
Bedford	102	0.5	118	0.6	80	0.4
Berks	674	3.4	463	2.4	598	3.1
Blair	208	1.1	259	1.3	208	1.1
Bradford	175	0.9	114	0.6	27	0.1
Bucks	635	3.2	464	2.4	484	2.5
Butler	333	1.7	269	1.4	340	1.8
Cambria	561	2.9	477	2.5	296	1.5
Cameron	6	0.0	3	0.0	21	0.1
Carbon	142	0.7	168	0.9	188	1.0
Centre	218	1.1	211	1.1	184	1.0
Chester	449	2.3	809	4.2	804	4.2
Clarion	45	0.2	70	0.4	34	0.2
Clearfield	80	0.4	74	0.4	157	0.8
Clinton	110	0.6	101	0.5	127	0.7
Columbia	172	0.9	206	1.1	145	0.8
Crawford	176	0.9	129	0.7	149	0.8
Cumberland	374	1.9	402	2.1	396	2.1
Dauphin	367	1.9	451	2.3	498	2.6
Delaware	957	4.9	884	4.5	877	4.6
Elk	18	0.1	11	0.1	59	0.3
Erie	506	2.6	580	3.0	416	2.2
Fayette	295	1.5	255	1.3	228	1.2
Forest	8	0.0	10	0.1	2	0.0
Franklin	199	1.0	263	1.4	275	1.4
Fulton	26	0.1	23	0.1	26	0.1
Greene	105	0.5	96	0.5	99	0.5
Huntingdon	83	0.4	90	0.5	48	0.3
Indiana	180	0.9	161	0.8	157	0.8
Jefferson	49	0.3	16	0.1	70	0.4
Juniata	48	0.2	79	0.4	54	0.3
Lackawanna	417	2.1	533	2.7	504	2.6
Lancaster	564	2.9	544	2.8	753	3.9
Lawrence	125	0.6	111	0.6	125	0.7
Lebanon	151	0.8	155	0.8	190	1.0
Lehigh	601	3.1	564	2.9	664	3.5
Luzerne	629	3.2	802	4.1	688	3.6
Lycoming	116	0.6	139	0.7	234	1.2
McKean	52	0.3	2	0.0	65	0.3
Mercer	180	0.9	174	0.9	205	1.1
Mifflin	104	0.5	85	0.4	157	0.8
Monroe	240	1.2	147	0.8	139	0.7
Montgomery	848	4.3	918	4.7	1,026	5.4
Montour	37	0.2	41	0.2	34	0.2
Northampton	521	2.7	432	2.2	504	2.6

County	1998 Strokes	1998 Percentage of total	1999 Strokes	1999 Percentage of total	2000 Strokes	2000 Percentage of total
Northumberland	243	1.2	265	1.4	237	1.2
Perry	70	0.4	88	0.5	87	0.5
Philadelphia[1]	938	4.8	697	3.6	92	0.5
Pike	68	0.3	79	0.4	62	0.3
Potter	7	0.0	8	0.0	45	0.2
Schuylkill	361	1.8	275	1.4	289	1.5
Snyder	104	0.5	71	0.4	73	0.4
Somerset	242	1.2	222	1.1	107	0.6
Sullivan	38	0.2	35	0.2	17	0.1
Susquehanna	93	0.5	69	0.4	44	0.2
Tioga	97	0.5	82	0.4	115	0.6
Union	109	0.6	109	0.6	103	0.5
Venango	116	0.6	139	0.7	136	0.7
Warren	92	0.5	120	0.6	86	0.4
Washington	341	1.7	376	1.9	379	2.0
Wayne	151	0.8	100	0.5	106	0.6
Westmoreland	789	4.0	872	4.5	912	4.8
Wyoming	54	0.3	50	0.3	75	0.4
York	452	2.3	710	3.6	737	3.9
Unknown/not listed	196	1.0	98	0.5	53	0.3
Total	19,557	100.0	19,456	100.0	19,134	100.0

1. Due to coding changes and other technical difficulties, Philadelphia county data for 2000 is unreliable.

SOURCE: Stroke Data--Provided by the Pennsylvania Department of Health, Emergency Medical Services Office, October 2001.

Table 4

EMERGENCY MEDICAL SERVICES
PATIENTS PRELIMINARILY IDENTIFIED WITH STROKE BY COUNTY
AND EVENT PREVALENCE RATIO
PENNSYLVANIA 1998-2000

County	1998-2000 Strokes	1998-2000 Percentage of total strokes	2000 Percentage of total population	Event prevalence ratio[1]
Adams	489	0.84%	0.74%	1.14
Allegheny	7,509	12.91	10.44	1.24
Armstrong	494	0.85	0.59	1.44
Beaver	750	1.29	1.48	0.87
Bedford	300	0.52	0.41	1.27
Berks	1,735	2.98	3.04	0.98
Blair	675	1.16	1.05	1.10
Bradford	316	0.54	0.51	1.06
Bucks	1,583	2.72	4.87	0.56
Butler	942	1.62	1.42	1.14
Cambria	1,334	2.29	1.24	1.85
Cameron	30	0.05	0.05	1.00
Carbon	498	0.86	0.48	1.79
Centre	613	1.05	1.11	0.95
Chester	2,062	3.55	3.53	1.01
Clarion	149	0.26	0.34	0.76
Clearfield	311	0.53	0.68	0.78
Clinton	338	0.58	0.31	1.87
Columbia	523	0.90	0.52	1.73
Crawford	454	0.78	0.74	1.05
Cumberland	1,172	2.02	1.74	1.16
Dauphin	1,316	2.26	2.05	1.10
Delaware	2,718	4.67	4.49	1.04
Elk	88	0.15	0.29	0.52
Erie	1,502	2.58	2.29	1.13
Fayette	778	1.34	1.21	1.11
Forest	20	0.03	0.04	0.75
Franklin	737	1.27	1.05	1.21
Fulton	75	0.13	0.12	1.08
Greene	300	0.52	0.33	1.58
Huntingdon	221	0.38	0.37	1.03
Indiana	498	0.86	0.73	1.18
Jefferson	135	0.23	0.37	0.62
Juniata	181	0.31	0.19	1.63
Lackawanna	1,454	2.50	1.74	1.44
Lancaster	1,861	3.20	3.83	0.84
Lawrence	361	0.62	0.77	0.81
Lebanon	496	0.85	0.98	0.87
Lehigh	1,829	3.15	2.54	1.24
Luzerne	2,119	3.64	2.60	1.40
Lycoming	489	0.84	0.98	0.86
McKean	119	0.20	0.37	0.54
Mercer	559	0.96	0.98	0.98
Mifflin	346	0.60	0.38	1.58
Monroe	526	0.90	1.13	0.80
Montgomery	2,792	4.80	6.11	0.79
Montour	112	0.19	0.15	1.27
Northampton	1,457	2.51	2.17	1.16

County	1998-2000 Strokes	1998-2000 Percentage of total strokes	2000 Percentage of total population	Event prevalence ratio[1]
Northumberland	745	1.28	0.77	1.66
Perry	245	0.42	0.36	1.17
Philadelphia[2]	1,727	2.97	12.36	0.24
Pike	209	0.36	0.38	0.95
Potter	60	0.10	0.15	0.67
Schuylkill	925	1.59	1.22	1.30
Snyder	248	0.43	0.31	1.39
Somerset	571	0.98	0.65	1.51
Sullivan	90	0.15	0.05	3.00
Susquehanna	206	0.35	0.34	1.03
Tioga	294	0.51	0.34	1.50
Union	321	0.55	0.34	1.62
Venango	391	0.67	0.47	1.43
Warren	298	0.51	0.36	1.42
Washington	1,096	1.88	1.65	1.14
Wayne	357	0.61	0.39	1.56
Westmoreland	2,573	4.42	3.01	1.47
Wyoming	179	0.31	0.23	1.35
York	1,899	3.27	3.11	1.05
Unknown/not listed	347	0.60	--	--
Total	58,147	100.00	100.00	1.00

1. The event prevalence ratio is calculated by dividing the 1998-2000 percentage of stroke patients transported by EMS by the 2000 percentage of total population.

2. Due to coding changes and other technical difficulties, Philadelphia county data for 2000 is unreliable.

SOURCE: Stroke Data--Provided by the Pennsylvania Department of Health, Emergency Medical Services Office, October 2001. Population Data--U.S. Census Bureau, Census 2000 Summary File 1, Matrices PCT12 and P13.

Table 5

EMERGENCY MEDICAL SERVICES
PATIENTS PRELIMINARILY IDENTIFIED WITH STROKE BY TIME
PENNSYLVANIA 1998-2000

Time in minutes	1998 Strokes	1998 Percentage of total	1999 Strokes	1999 Percentage of total	2000 Strokes	2000 Percentage of total
Response time						
1-5	6,098	31.2%	6,188	31.8%	6,074	31.7%
6-10	7,716	39.5	7,685	39.5	7,732	40.4
11-15	2,896	14.8	2,956	15.2	2,876	15.0
16-20	1,154	5.9	1,108	5.7	1,062	5.6
21-25	459	2.3	457	2.3	411	2.1
26-30	224	1.1	233	1.2	234	1.2
31-60	272	1.4	262	1.3	283	1.5
Over one hour	67	0.3	56	0.3	58	0.3
Unknown or not listed	671	3.4	511	2.6	404	2.1
Total	19,557	100.0	19,456	100.0	19,134	100.0
Time at scene						
1-5	760	3.9	715	3.7	778	4.1
6-10	2,939	15.0	2,820	14.5	2,801	14.6
11-15	5,370	27.5	5,352	27.5	5,264	27.5
16-20	4,795	24.5	4,946	25.4	4,900	25.6
21-25	2,583	13.2	2,639	13.6	2,547	13.3
26-30	1,146	5.9	1,132	5.8	1,015	5.3
31-60	751	3.8	741	3.8	676	3.5
Over one hour	52	0.3	38	0.2	22	0.1
Unknown or not listed	1,161	5.9	1,073	5.5	1,131	5.9
Total	19,557	100.0	19,456	100.0	19,134	100.0

Time in minutes	1998 Strokes	1998 Percentage of total	1999 Strokes	1999 Percentage of total	2000 Strokes	2000 Percentage of total
Time to destination						
1-5	3,094	15.8	3,187	16.4	2,776	14.5
6-10	4,904	25.1	4,822	24.8	4,760	24.9
11-15	3,554	18.2	3,695	19.0	3,720	19.4
16-20	2,380	12.2	2,397	12.3	2,521	13.2
21-25	1,517	7.8	1,487	7.6	1,570	8.2
26-30	1,021	5.2	997	5.1	1,014	5.3
31-60	1,372	7.0	1,308	6.7	1,259	6.6
Over one hour	200	1.0	202	1.0	124	0.6
Unknown or not listed	1,515	7.7	1,361	7.0	1,390	7.3
Total	19,557	100.0	19,456	100.0	19,134	100.0
Response to destination						
1-10	654	3.3	705	3.6	805	4.2
11-20	1,236	6.3	1,238	6.4	1,204	6.3
21-30	4,556	23.3	4,500	23.1	4,389	22.9
31-40	5,640	28.8	5,773	29.7	5,611	29.3
41-50	3,636	18.6	3,594	18.5	3,575	18.7
51-60	1,798	9.2	1,794	9.2	1,782	9.3
Over one hour	1,779	9.1	1,748	9.0	1,686	8.8
Unknown or not listed	258	1.3	104	0.5	82	0.4
Total	19,557	100.0	19,456	100.0	19,134	100.0

SOURCE: Data provided by the Pennsylvania Department of Health, Emergency Medical Services Office, October 2001.

Table 6

EMERGENCY MEDICAL SERVICES
TOTAL RESPONSE TO DESTINATION TIME OVER ONE HOUR FOR
PATIENTS PRELIMINARILY IDENTIFIED WITH STROKE BY COUNTY
PENNSYLVANIA 1998-2000

	1998		1999		2000		1998-2000	
County	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total
Adams								
Over one hour	16	13.0%	3	1.9%	8	3.9%	27	5.5%
Total	123		159		207		489	
Allegheny								
Over one hour	255	9.9	299	11.6	218	9.3	772	10.3
Total	2,580		2,579		2,350		7,509	
Armstrong								
Over one hour	27	22.1	21	22.1	43	15.5	91	18.4
Total	122		95		277		494	
Beaver								
Over one hour	27	9.5	45	17.6	24	11.4	96	12.8
Total	285		255		210		750	
Bedford								
Over one hour	21	20.6	24	20.3	22	27.5	67	22.3
Total	102		118		80		300	
Berks								
Over one hour	28	4.2	34	7.3	30	5.0	92	5.3
Total	674		463		598		1,735	
Blair								
Over one hour	11	5.3	13	5.0	9	4.3	33	4.9
Total	208		259		208		675	
Bradford								
Over one hour	48	27.4	33	28.9	9	33.3	90	28.5
Total	175		114		27		316	
Bucks								
Over one hour	11	1.7	5	1.1	13	2.7	29	1.8
Total	635		464		484		1,583	
Butler								
Over one hour	47	14.1	43	16.0	50	14.7	140	14.9
Total	333		269		340		942	
Cambria								
Over one hour	38	6.8	28	5.9	24	8.1	90	6.7
Total	561		477		296		1,334	
Cameron								
Over one hour	2	33.3	2	66.7	13	61.9	17	56.7
Total	6		3		21		30	
Carbon								
Over one hour	22	15.5	16	9.5	12	6.4	50	10.0
Total	142		168		188		498	
Centre								
Over one hour	24	11.0	16	7.6	29	15.8	69	11.3
Total	218		211		184		613	
Chester								
Over one hour	13	2.9	16	2.0	21	2.6	50	2.4
Total	449		809		804		2,062	
Clarion								
Over one hour	7	15.6	13	18.6	7	20.6	27	18.1
Total	45		70		34		149	

County	1998 Strokes	1998 Percentage of total	1999 Strokes	1999 Percentage of total	2000 Strokes	2000 Percentage of total	1998-2000 Strokes	1998-2000 Percentage of total
Clearfield								
Over one hour	17	21.3	15	20.3	20	12.7	52	16.7
Total	80		74		157		311	
Clinton								
Over one hour	17	15.5	20	19.8	24	18.9	61	18.0
Total	110		101		127		338	
Columbia								
Over one hour	12	7.0	21	10.2	22	15.2	55	10.5
Total	172		206		145		523	
Crawford								
Over one hour	23	13.1	19	14.7	27	18.1	69	15.2
Total	176		129		149		454	
Cumberland								
Over one hour	13	3.5	12	3.0	9	2.3	34	2.9
Total	374		402		396		1,172	
Dauphin								
Over one hour	46	12.5	52	11.5	71	14.3	169	12.8
Total	367		451		498		1,316	
Delaware								
Over one hour	4	0.4	9	1.0	7	0.8	20	0.7
Total	957		884		877		2,718	
Elk								
Over one hour	1	5.6	3	27.3	5	8.5	9	10.2
Total	18		11		59		88	
Erie								
Over one hour	23	4.5	51	8.8	10	2.4	84	5.6
Total	506		580		416		1,502	
Fayette								
Over one hour	51	17.3	41	16.1	33	14.5	125	16.1
Total	295		255		228		778	
Forest								
Over one hour	5	62.5	5	50.0	2	100.0	12	60.0
Total	8		10		2		20	
Franklin								
Over one hour	14	7.0	21	8.0	14	5.1	49	6.6
Total	199		263		275		737	
Fulton								
Over one hour	5	19.2	8	34.8	2	7.7	15	20.0
Total	26		23		26		75	
Greene								
Over one hour	19	18.1	22	22.9	17	17.2	58	19.3
Total	105		96		99		300	
Huntingdon								
Over one hour	20	24.1	31	34.4	13	27.1	64	29.0
Total	83		90		48		221	
Indiana								
Over one hour	39	21.7	38	23.6	35	22.3	112	22.5
Total	180		161		157		498	
Jefferson								
Over one hour	8	16.3	5	31.3	8	11.4	21	15.6
Total	49		16		70		135	
Juniata								
Over one hour	9	18.8	8	10.1	5	9.3	22	12.2
Total	48		79		54		181	
Lackawanna								
Over one hour	16	3.8	15	2.8	15	3.0	46	3.2
Total	417		533		504		1,454	

County	1998 Strokes	1998 Percentage of total	1999 Strokes	1999 Percentage of total	2000 Strokes	2000 Percentage of total	1998-2000 Strokes	1998-2000 Percentage of total
Lancaster								
Over one hour	37	6.6	29	5.3	61	8.1	127	6.8
Total	564		544		753		1,861	
Lawrence								
Over one hour	21	16.8	27	24.3	28	22.4	76	21.1
Total	125		111		125		361	
Lebanon								
Over one hour	6	4.0	3	1.9	4	2.1	13	2.6
Total	151		155		190		496	
Lehigh								
Over one hour	22	3.7	10	1.8	13	2.0	45	2.5
Total	601		564		664		1,829	
Luzerne								
Over one hour	37	5.9	39	4.9	30	4.4	106	5.0
Total	629		802		688		2,119	
Lycoming								
Over one hour	9	7.8	14	10.1	23	9.8	46	9.4
Total	116		139		234		489	
McKean								
Over one hour	7	13.5	0	0.0	3	4.6	10	8.4
Total	52		2		65		119	
Mercer								
Over one hour	27	15.0	17	9.8	24	11.7	68	12.2
Total	180		174		205		559	
Mifflin								
Over one hour	8	7.7	4	4.7	16	10.2	28	8.1
Total	104		85		157		346	
Monroe								
Over one hour	47	19.6	27	18.4	24	17.3	98	18.6
Total	240		147		139		526	
Montgomery								
Over one hour	11	1.3	15	1.6	15	1.5	41	1.5
Total	848		918		1,026		2,792	
Montour								
Over one hour	3	8.1	7	17.1	8	23.5	18	16.1
Total	37		41		34		112	
Northampton								
Over one hour	18	3.5	10	2.3	17	3.4	45	3.1
Total	521		432		504		1,457	
Northumberland								
Over one hour	18	7.4	12	4.5	13	5.5	43	5.8
Total	243		265		237		745	
Perry								
Over one hour	33	47.1	39	44.3	38	43.7	110	44.9
Total	70		88		87		245	
Philadelphia[1]								
Over one hour	33	3.5	6	0.9	4	4.3	43	2.5
Total	938		697		92		1,727	
Pike								
Over one hour	35	51.5	37	46.8	34	54.8	106	50.7
Total	68		79		62		209	
Potter								
Over one hour	1	14.3	4	50.0	10	22.2	15	25.0
Total	7		8		45		60	
Schuylkill								
Over one hour	44	12.2	34	12.4	31	10.7	109	11.8
Total	361		275		289		925	

County	1998 Strokes	1998 Percentage of total	1999 Strokes	1999 Percentage of total	2000 Strokes	2000 Percentage of total	1998-2000 Strokes	1998-2000 Percentage of total
Snyder								
Over one hour	36	34.6	12	16.9	25	34.2	73	29.4
Total	104		71		73		248	
Somerset								
Over one hour	45	18.6	41	18.5	16	15.0	102	17.9
Total	242		222		107		571	
Sullivan								
Over one hour	21	55.3	22	62.9	7	41.2	50	55.6
Total	38		35		17		90	
Susquehanna								
Over one hour	18	19.4	14	20.3	6	13.6	38	18.4
Total	93		69		44		206	
Tioga								
Over one hour	24	24.7	25	30.5	16	13.9	65	22.1
Total	97		82		115		294	
Union								
Over one hour	13	11.9	7	6.4	11	10.7	31	9.7
Total	109		109		103		321	
Venango								
Over one hour	6	5.2	19	13.7	9	6.6	34	8.7
Total	116		139		136		391	
Warren								
Over one hour	7	7.6	10	8.3	7	8.1	24	8.1
Total	92		120		86		298	
Washington								
Over one hour	31	9.1	45	12.0	47	12.4	123	11.2
Total	341		376		379		1,096	
Wayne								
Over one hour	45	29.8	27	27.0	28	26.4	100	28.0
Total	151		100		106		357	
Westmoreland								
Over one hour	72	9.1	75	8.6	164	18.0	311	12.1
Total	789		872		912		2,573	
Wyoming								
Over one hour	11	20.4	6	12.0	10	13.3	27	15.1
Total	54		50		75		179	
York								
Over one hour	39	8.6	54	7.6	53	7.2	146	7.7
Total	452		710		737		1,899	
Unknown/not listed								
Over one hour	55	28.1	50	51.0	20	37.7	125	36.0
Total	196		98		53		347	
Total								
Over one hour	1,779	9.1	1,748	9.0	1,686	8.8	5,213	9.0
Total	19,557		19,456		19,134		58,147	

1. Due to coding changes and other technical difficulties, Philadelphia county data for 2000 is unreliable.

SOURCE: Stroke Data--Provided by the Pennsylvania Department of Health, Emergency Medical Services Office, October 2001.

Table 7

EMERGENCY MEDICAL SERVICES
PATIENTS PRELIMINARILY IDENTIFIED WITH STROKE BY PULSE, GLASGOW SCORE AND MEDICATION
PENNSYLVANIA 1998-2000

	1998		1999		2000	
	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total
Is diastolic pulse palpable						
Yes	2,864	14.6%	2,780	14.3%	2,642	13.8%
No	16,693	85.4	16,676	85.7	16,492	86.2
Total	19,557	100.0	19,456	100.0	19,134	100.0
Glasgow Coma Score						
0-3	1,401	7.2	1,372	7.1	1,339	7.0
4-6	1,181	6.0	1,161	6.0	1,038	5.4
7-9	1,598	8.2	1,635	8.4	1,500	7.8
10-12	3,278	16.8	3,130	16.1	3,110	16.3
13-15	12,098	61.9	12,158	62.5	12,145	63.5
Unknown or not listed	1	0.0	0	0.0	2	0.0
Total	19,557	100.0	19,456	100.0	19,134	100.0
Medication received						
Yes	1,239	6.3	1,332	6.8	1,673	8.7
No	18,318	93.7	18,124	93.2	17,461	91.3
Total	19,557	100.0	19,456	100.0	19,134	100.0

SOURCE: Data provided by the Pennsylvania Department of Health, Emergency Medical Services Office, October 2001.

Table 8

TOTAL INPATIENT STROKES BY SEX, RACE AND ETHNIC DESCENT
PENNSYLVANIA RESIDENTS 1994-2000

	Year													
	1994		1995		1996		1997		1998		1999		2000	
Sex, race or ethnic descent	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total
Sex														
Male	19,387	45.3%	20,075	45.3%	20,635	45.1%	20,006	45.1%	18,987	44.8%	18,014	44.0%	18,189	44.5%
Female	23,374	54.7	24,229	54.7	25,153	54.9	24,333	54.9	23,344	55.1	22,904	56.0	22,649	55.5
Unknown or not listed	2	0.0	0	0.0	0	0.0	0	0.0	8	0.0	11	0.0	1	0.0
Total	42,763	100.0	44,304	100.0	45,788	100.0	44,339	100.0	42,339	100.0	40,929	100.0	40,839	100.0
Race														
White	33,784	79.0	35,680	80.5	37,015	80.8	35,530	80.1	33,352	78.8	31,671	77.4	31,662	77.5
Black	4,720	11.0	4,890	11.0	5,269	11.5	5,135	11.6	4,555	10.8	4,211	10.3	4,152	10.2
Asian or Pacific Island	166	0.4	122	0.3	163	0.4	139	0.3	156	0.4	131	0.3	185	0.5
Other	342	0.8	284	0.6	390	0.9	456	1.0	425	1.0	351	0.9	327	0.8
Unknown or not listed	3,751	8.8	3,328	7.5	2,951	6.4	3,079	6.9	3,851	9.1	4,565	11.2	4,513	11.1
Total	42,763	100.0	44,304	100.0	45,788	100.0	44,339	100.0	42,339	100.0	40,929	100.0	40,839	100.0
Ethnic Descent														
Hispanic origin	457	1.1	538	1.2	691	1.5	590	1.3	481	1.1	418	1.0	436	1.1
Other origin	42,245	98.8	43,691	98.6	45,075	98.4	43,578	98.3	41,668	98.4	40,400	98.7	40,395	98.9
Unknown or not listed	61	0.1	75	0.2	22	0.0	171	0.4	190	0.4	111	0.3	8	0.0
Total	42,763	100.0	44,304	100.0	45,788	100.0	44,339	100.0	42,339	100.0	40,929	100.0	40,839	100.0
Percentage change	--		3.6%		3.3%		-3.2%		-4.5%		-3.3%		-0.2%	

SOURCE: Data provided by the Pennsylvania Health Care Cost Containment Council, August 2001.

Table 9

TOTAL INPATIENT STROKES BY AGE
PENNSYLVANIA RESIDENTS 1994-2000

Age	Year							1994 Percentage of total	2000 Percentage of total
	1994	1995	1996	1997	1998	1999	2000		
10 and under	122	123	124	142	112	142	124	0.3%	0.3%
11-19	75	86	81	76	78	80	76	0.2	0.2
20-24	77	79	96	77	78	81	79	0.2	0.2
25-29	126	150	92	146	129	136	124	0.3	0.3
30-34	227	265	238	250	228	177	221	0.5	0.5
35-39	393	407	526	450	449	413	403	0.9	1.0
40-44	590	675	669	741	737	718	678	1.4	1.7
45-49	956	1,007	1,191	1,124	1,108	1,079	1,114	2.2	2.7
50-54	1,428	1,612	1,589	1,633	1,577	1,567	1,574	3.3	3.9
55-59	1,870	2,008	2,153	2,236	2,028	2,087	2,145	4.4	5.3
60-64	3,087	3,171	3,268	2,979	2,865	2,601	2,864	7.2	7.0
65-69	5,194	5,110	5,235	4,863	4,269	3,913	3,833	12.1	9.4
70-74	7,014	7,237	7,191	6,847	6,381	6,077	5,832	16.4	14.3
75-79	7,853	8,155	8,365	8,100	7,879	7,458	7,549	18.4	18.5
80-84	7,021	7,196	7,523	7,412	7,234	6,957	6,984	16.4	17.1
85 and over	6,726	7,020	7,447	7,262	7,186	7,442	7,239	15.7	17.7
Unknown or not listed	4	3	0	1	1	1	0	0.0	0.0
Total	42,763	44,304	45,788	44,339	42,339	40,929	40,839	100.0	100.0

SOURCE: Data provided by the Pennsylvania Health Care Cost Containment Council, August 2001.

Table 10

TOTAL INPATIENT STROKES BY REGION[1]
PENNSYLVANIA RESIDENTS 1994-2000

	Year														
	2000	1994		1995		1996		1997		1998		1999		2000	
Region	Percentage of total population	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total
One	18.7%	10,679	25.0%	10,999	24.8%	11,148	24.3%	10,823	24.4%	10,435	24.6%	9,961	24.3%	9,913	24.3%
Two	9.3	2,919	6.8	2,780	6.3	2,931	6.4	2,852	6.4	2,747	6.5	2,929	7.2	2,805	6.9
Three	4.1	1,871	4.4	1,776	4.0	1,904	4.2	1,980	4.5	1,845	4.4	1,873	4.6	1,848	4.5
Four	5.2	1,822	4.3	1,905	4.3	2,037	4.4	2,090	4.7	2,119	5.0	1,996	4.9	2,019	4.9
Five	14.5	4,406	10.3	4,591	10.4	5,027	11.0	4,802	10.8	4,681	11.1	4,768	11.6	4,547	11.1
Six	7.4	3,774	8.8	3,822	8.6	3,799	8.3	3,703	8.4	3,611	8.5	3,482	8.5	3,340	8.2
Seven	9.5	3,372	7.9	3,682	8.3	3,793	8.3	3,906	8.8	3,625	8.6	3,497	8.5	3,737	9.2
Eight	19.0	7,249	17.0	7,510	17.0	7,536	16.5	7,102	16.0	7,049	16.6	6,312	15.4	6,340	15.5
Nine	12.4	6,671	15.6	7,239	16.3	7,613	16.6	7,081	16.0	6,227	14.7	6,111	14.9	6,290	15.4
Total	100.0	42,763	100.0	44,304	100.0	45,788	100.0	44,339	100.0	42,339	100.0	40,929	100.0	40,839	100.0

1. See PHC4's facility region code map.

SOURCE: Stroke Data--Provided by the Pennsylvania Health Care Cost Containment Council, August 2001. Population Data--U.S. Census Bureau, Census 2000 Summary File 1, Matrices PCT12 and P13.

Table 11

TOTAL INPATIENT STROKES BY ADMISSION TYPE
PENNSYLVANIA RESIDENTS 1994-2000

	Year													
	1994		1995		1996		1997		1998		1999		2000	
Admission type	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total
Emergency	27,058	63.3%	27,928	63.0%	28,814	62.9%	27,131	61.2%	25,645	60.6%	24,925	60.9%	25,215	61.7%
Urgent	9,139	21.4	9,329	21.1	9,503	20.8	9,629	21.7	9,276	21.9	9,065	22.1	8,715	21.3
Elective	6,526	15.3	6,981	15.8	7,439	16.2	7,425	16.7	6,878	16.2	6,588	16.1	6,894	16.9
Newborn	14	0.0	10	0.0	7	0.0	17	0.0	14	0.0	19	0.0	10	0.0
Unknown or not listed	26	0.1	56	0.1	25	0.1	137	0.3	526	1.2	332	0.8	5	0.0
Total	42,763	100.0	44,304	100.0	45,788	100.0	44,339	100.0	42,339	100.0	40,929	100.0	40,839	100.0

SOURCE: Data provided by the Pennsylvania Health Care Cost Containment Council, August 2001.

Table 12

TOTAL INPATIENT STROKES BY ADMISSION TYPE AND SOURCE
PENNSYLVANIA RESIDENTS 1994-2000

	Year													
	1994		1995		1996		1997		1998		1999		2000	
Admission type and source	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total
Emergency, urgent or elective														
Transfer from psych, substance abuse or rehab hospital	3	0.0%	1	0.0%	2	0.0%	10	0.0%	8	0.0%	0	0.0%	0	0.0%
Physician referral	8,425	19.7	8,407	19.0	8,279	18.1	7,244	16.3	7,271	17.2	6,840	16.7	5,890	14.4
Clinic referral	475	1.1	496	1.1	583	1.3	637	1.4	548	1.3	439	1.1	389	1.0
HMO referral	116	0.3	146	0.3	179	0.4	174	0.4	214	0.5	229	0.6	185	0.5
Transfer from a hospital	5,333	12.5	5,860	13.2	6,504	14.2	6,689	15.1	6,308	14.9	5,899	14.4	6,339	15.5
Transfer from a skilled nursing facility	849	2.0	892	2.0	824	1.8	874	2.0	750	1.8	693	1.7	682	1.7
Transfer from another health care facility	973	2.3	922	2.1	1,036	2.3	896	2.0	881	2.1	932	2.3	1,101	2.7
Emergency room	26,343	61.6	27,458	62.0	28,318	61.9	27,764	62.6	26,296	62.1	25,830	63.1	26,236	64.3
Court/law enforcement	4	0.0	4	0.0	8	0.0	3	0.0	5	0.0	2	0.0	6	0.0
Transfer from a critical access hospital	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0
Unknown or not listed	228	0.5	108	0.2	48	0.1	31	0.1	44	0.1	45	0.1	1	0.0
Total	42,749	100.0	44,294	100.0	45,781	100.0	44,322	100.0	42,325	100.0	40,910	100.0	40,829	100.0
Newborn														
Normal delivery	11	78.6	6	60.0	4	57.1	14	82.4	8	57.1	13	68.4	9	90.0
Premature delivery	0	0.0	2	20.0	2	28.6	1	5.9	1	7.1	0	0.0	0	0.0
Sick baby	2	14.3	0	0.0	1	14.3	1	5.9	4	28.6	0	0.0	0	0.0
Extramural birth	0	0.0	2	20.0	0	0.0	1	5.9	1	7.1	0	0.0	1	10.0
Unknown or not listed	1	7.1	0	0.0	0	0.0	0	0.0	0	0.0	6	31.6	0	0.0
Total	14	100.0	10	100.0	7	100.0	17	100.0	14	100.0	19	100.0	10	100.0
Grand total	42,763	--	44,304	--	45,788	--	44,339	--	42,339	--	40,929	--	40,839	--

SOURCE: Data provided by the Pennsylvania Health Care Cost Containment Council, August 2001.

Table 13

TOTAL INPATIENT STROKES BY PRINCIPAL DIAGNOSIS
PENNSYLVANIA RESIDENTS 1994-2000

	Year													
	1994		1995		1996		1997		1998		1999		2000	
Principal diagnosis	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total
Cerebral hemorrhage	4,146	12.9%	4,254	12.6%	4,441	12.5%	4,513	13.2%	4,508	13.6%	4,450	13.9%	4,555	14.2%
Subarachnoid hemorrhage	1,183	3.7	1,350	4.0	1,383	3.9	1,246	3.7	1,311	4.0	1,244	3.9	1,297	4.0
Cerebral embolism	2,230	6.9	2,548	7.5	2,401	6.8	2,315	6.8	2,189	6.6	2,127	6.7	2,316	7.2
Cerebral thrombosis	1,695	5.3	1,576	4.7	1,240	3.5	1,051	3.1	843	2.5	837	2.6	710	2.2
Occlusion and stenosis, pre-cerebral and cerebral	18,101	56.1	19,086	56.4	20,502	57.8	19,761	57.9	18,740	56.6	17,806	55.7	17,597	54.7
Acute cerebrovascular disease	4,888	15.2	5,011	14.8	5,476	15.5	5,236	15.3	5,524	16.7	5,500	17.2	5,676	17.7
Total	32,243	100.0	33,825	100.0	35,443	100.0	34,122	100.0	33,115	100.0	31,964	100.0	32,151	100.0

SOURCE: Data provided by the Pennsylvania Health Care Cost Containment Council, August 2001.

Table 14

TOTAL INPATIENT STROKES BY PRINCIPAL DIAGNOSIS, SECONDARY DIAGNOSIS AND UNIQUE PATIENTS
PENNSYLVANIA RESIDENTS 1994-2000

	Year													
	1994		1995		1996		1997		1998		1999		2000	
	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total
Principal diagnosis	32,243	75.4%	33,825	76.3%	35,443	77.4%	34,122	77.0%	33,115	78.2%	31,964	78.1%	32,151	78.7%
Secondary diagnosis	10,520	24.6	10,479	23.7	10,345	22.6	10,217	23.0	9,224	21.8	8,965	21.9	8,688	21.3
Total	42,763	100.0	44,304	100.0	45,788	100.0	44,339	100.0	42,339	100.0	40,929	100.0	40,839	100.0
Unique stroke patients[1]	35,050	82.0%	34,318	77.5%	34,123	74.5%	32,307	72.9%	30,435	71.9%	28,944	70.7%	28,830	70.6%
Total	42,763	100.0	44,304	100.0	45,788	100.0	44,339	100.0	42,339	100.0	40,929	100.0	40,839	100.0

NOTE: A principal diagnosis of stroke refers to the main reason for the hospitalization. A secondary diagnosis of stroke was an additional condition that existed at admission or was discovered during the hospitalization.

1. A patient is only counted for the first hospitalization in the year of their first stroke.

SOURCE: Data provided by the Pennsylvania Health Care Cost Containment Council, August 2001.

Table 15

TOTAL INPATIENT STROKES BY PRINCIPAL
AND MOST COMMON SECONDARY DIAGNOSIS 1-3
PENNSYLVANIA RESIDENTS 2000

Principal and most common secondary diagnosis	2000 Strokes	2000 Percentage of total
Cerebral hemorrhage--4,555 strokes		
Essential hypertension, unspecified	1,326	29.1%
Atrial fibrillation	666	14.6
Other convulsions: convulsive disorder NOS, fits NOS, seizures NOS	435	9.5
Urinary tract infection, site not specified	347	7.6
Acute respiratory failure	342	7.5
Chronic airway obstruction, not elsewhere classified	323	7.1
Diabetes mellitus without mention of complication	302	6.6
Congestive heart failure	298	6.5
Hemiplegia, unspecified	294	6.5
Coronary atherosclerosis of native coronary artery	195	4.3
Other diagnosis	7,708	--
Unknown or not listed	1,429	--
Subarachnoid hemorrhage--1,297 strokes		
Essential hypertension, unspecified	232	17.9
Obstructive hydrocephalus	207	16.0
Acute respiratory failure	142	10.9
Other convulsions: convulsive disorder NOS, fits NOS, seizures NOS	107	8.2
Urinary tract infection, site not specified	87	6.7
Other: presence of neuropacemaker or other electronic device	82	6.3
Atrial fibrillation	75	5.8
Chronic airway obstruction, not elsewhere classified	59	4.5
Tobacco use disorder	54	4.2
Congestive heart failure	49	3.8
Other diagnosis	2,026	--
Unknown or not listed	771	--
Cerebral embolism--2,316 strokes		
Atrial fibrillation	1,102	47.6
Essential hypertension, unspecified	447	19.3
Congestive heart failure	336	14.5
Hemiplegia, unspecified	233	10.1
Aphasia	210	9.1
Urinary tract infection, site not specified	157	6.8
Chronic airway obstruction, not elsewhere classified	154	6.6
Diabetes mellitus without mention of complication	139	6.0
Coronary atherosclerosis of native coronary artery	121	5.2
Mitral valve disorders	108	4.7
Other diagnosis	3,700	--
Unknown or not listed	241	--

	2000	
	Strokes	Percentage of total
Cerebral thrombosis--710 strokes		
Essential hypertension, unspecified	204	28.7
Atrial fibrillation	111	15.6
Hemiplegia, unspecified	96	13.5
Diabetes mellitus without mention of complication	70	9.9
Aphasia	63	8.9
Congestive heart failure	55	7.7
Urinary tract infection, site not specified	52	7.3
Chronic airway obstruction, not elsewhere classified	51	7.2
Coronary atherosclerosis of native coronary artery	39	5.5
Other convulsions: convulsive disorder NOS, fits NOS, seizures NOS	30	4.2
Other diagnosis	1,224	--
Unknown or not listed	135	--
Occlusion and stenosis, pre-cerebral and cerebral--17,597 strokes		
Essential hypertension, unspecified	5,616	31.9
Atrial fibrillation	2,346	13.3
Hemiplegia, unspecified	1,964	11.2
Diabetes mellitus without mention of complication	1,876	10.7
Congestive heart failure	1,578	9.0
Chronic airway obstruction, not elsewhere classified	1,363	7.7
Urinary tract infection, site not specified	1,289	7.3
Aphasia	1,119	6.4
Coronary atherosclerosis of native coronary artery	1,028	5.8
Other convulsions: convulsive disorder NOS, fits NOS, seizures NOS	823	4.7
Other diagnosis	30,529	--
Unknown or not listed	3,260	--
Acute cerebrovascular disease--5,676 strokes		
Essential hypertension, unspecified	1,576	27.8
Hemiplegia, unspecified	948	16.7
Atrial fibrillation	760	13.4
Diabetes mellitus without mention of complication	570	10.0
Congestive heart failure	490	8.6
Chronic airway obstruction, not elsewhere classified	413	7.3
Aphasia	404	7.1
Urinary tract infection, site not specified	380	6.7
Other speech disturbance	324	5.7
Coronary atherosclerosis of native coronary artery	316	5.6
Other diagnosis	9,544	--
Unknown or not listed	1,303	--

SOURCE: Data provided by the Pennsylvania Health Care Cost Containment Council, August 2001.

Table 16

TOTAL INPATIENT STROKES BY PRINCIPAL AND SELECTED SECONDARY DIAGNOSIS
PENNSYLVANIA RESIDENTS 1994-2000

Principal and selected secondary diagnosis	Year													
	1994		1995		1996		1997		1998		1999		2000	
	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total
Cerebral hemorrhage														
Diabetes mellitus	635	15.3%	699	16.4%	794	17.9%	817	18.1%	817	18.1%	884	19.9%	886	19.5%
Diabetes with peripheral circulatory disorders	7	0.2	10	0.2	7	0.2	5	0.1	10	0.2	0	0.0	10	0.2
Essential hypertension	2,107	50.8	2,238	52.6	2,415	54.4	2,403	53.2	2,484	55.1	2,436	54.7	2,660	58.4
Pure hypercholesterolemia, mixed, other and unspecified hyperlipidemia	123	3.0	149	3.5	182	4.1	177	3.9	249	5.5	304	6.8	422	9.3
Total	4,146		4,254		4,441		4,513		4,508		4,450		4,555	
Subarachnoid hemorrhage														
Diabetes mellitus	93	7.9	124	9.2	112	8.1	103	8.3	113	8.6	94	7.6	141	10.9
Diabetes with peripheral circulatory disorders	1	0.1	0	0.0	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0
Essential hypertension	493	41.7	583	43.2	537	38.8	500	40.1	514	39.2	518	41.6	527	40.6
Pure hypercholesterolemia, mixed, other and unspecified hyperlipidemia	32	2.7	39	2.9	50	3.6	39	3.1	56	4.3	60	4.8	79	6.1
Total	1,183		1,350		1,383		1,246		1,311		1,244		1,297	
Cerebral embolism														
Diabetes mellitus	535	24.0	593	23.3	571	23.8	594	25.7	503	23.0	521	24.5	550	23.7
Diabetes with peripheral circulatory disorders	7	0.3	6	0.2	8	0.3	11	0.5	9	0.4	6	0.3	6	0.3
Essential hypertension	935	41.9	1,105	43.4	1,106	46.1	1,139	49.2	1,001	45.7	1,056	49.6	1,215	52.5
Pure hypercholesterolemia, mixed, other and unspecified hyperlipidemia	134	6.0	167	6.6	183	7.6	208	9.0	212	9.7	251	11.8	378	16.3
Total	2,230		2,548		2,401		2,315		2,189		2,127		2,316	

Principal and selected secondary diagnosis	Year													
	1994		1995		1996		1997		1998		1999		2000	
	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total
Cerebral thrombosis														
Diabetes mellitus	495	29.2	511	32.4	372	30.0	358	34.1	255	30.2	230	27.5	221	31.1
Diabetes with peripheral circulatory disorders	5	0.3	3	0.2	1	0.1	4	0.4	1	0.1	0	0.0	1	0.1
Essential hypertension	779	46.0	800	50.8	646	52.1	557	53.0	448	53.1	472	56.4	395	55.6
Pure hypercholesterolemia, mixed, other and unspecified hyperlipidemia	135	8.0	134	8.5	107	8.6	124	11.8	112	13.3	116	13.9	112	15.8
Total	1,695		1,576		1,240		1,051		843		837		710	
Occlusion and stenosis, pre-cerebral and cerebral														
Diabetes mellitus	5,275	29.1	5,676	29.7	6,305	30.8	6,270	31.7	5,902	31.5	5,621	31.6	5,453	31.0
Diabetes with peripheral circulatory disorders	53	0.3	66	0.3	60	0.3	70	0.4	72	0.4	52	0.3	64	0.4
Essential hypertension	9,086	50.2	9,877	51.7	11,069	54.0	11,059	56.0	10,542	56.3	10,444	58.7	10,673	60.7
Pure hypercholesterolemia, mixed, other and unspecified hyperlipidemia	1,341	7.4	1,574	8.2	1,889	9.2	2,201	11.1	2,375	12.7	2,526	14.2	3,098	17.6
Total	18,101		19,086		20,502		19,761		18,740		17,806		17,597	
Acute cerebrovascular disease														
Diabetes mellitus	1,428	29.2	1,429	28.5	1,550	28.3	1,514	28.9	1,571	28.4	1,645	29.9	1,638	28.9
Diabetes with peripheral circulatory disorders	22	0.5	15	0.3	17	0.3	13	0.2	20	0.4	14	0.3	10	0.2
Essential hypertension	2,300	47.1	2,389	47.7	2,654	48.5	2,636	50.3	2,846	51.5	2,899	52.7	3,079	54.2
Pure hypercholesterolemia, mxed, other and unspecified hyperlipidemia	352	7.2	371	7.4	424	7.7	519	9.9	599	10.8	652	11.9	861	15.2
Total	4,888		5,011		5,476		5,236		5,524		5,500		5,676	
Grand total	32,243	--	33,825	--	35,443	--	34,122	--	33,115	--	31,964	--	32,151	--

SOURCE: Data provided by the Pennsylvania Health Care Cost Containment Council, August 2001.

Table 17

TOTAL INPATIENT STROKES BY PRINCIPAL DIAGNOSIS AND PROCEDURE
PENNSYLVANIA RESIDENTS 1994-2000

	Year													
	1994		1995		1996		1997		1998		1999		2000	
Principal diagnosis and procedure	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total
Cerebral hemorrhage														
Computerized axial tomography (CAT) of head	357	8.6%	276	6.5%	305	6.9%	248	5.5%	232	5.1%	209	4.7%	181	4.0%
Continuous mechanical ventilation for less than 96 consecutive hours	260	6.3	247	5.8	291	6.6	282	6.2	294	6.5	282	6.3	313	6.9
Incision of cerebral meninges	320	7.7	345	8.1	349	7.9	367	8.1	364	8.1	378	8.5	351	7.7
Insertion of endotracheal tube	192	4.6	158	3.7	169	3.8	190	4.2	191	4.2	234	5.3	179	3.9
No procedure	1,621	39.1	1,694	39.8	1,837	41.4	1,936	42.9	1,936	42.9	1,981	44.5	2,202	48.3
Other incision of brain: amygdalohippocampotomy, Drainage of intracerebral hematoma, Incision of brain NOS	174	4.2	199	4.7	228	5.1	201	4.5	186	4.1	175	3.9	171	3.8
Other procedure	1,222	29.5	1,335	31.4	1,262	28.4	1,289	28.6	1,305	28.9	1,191	26.8	1,158	25.4
Total	4,146	100.0	4,254	100.0	4,441	100.0	4,513	100.0	4,508	100.0	4,450	100.0	4,555	100.0
Subarachnoid hemorrhage														
Angiography of: basilar artery, carotid (internal), Posterior cerebral circulation, vertebral artery	92	7.8	74	5.5	87	6.3	96	7.7	100	7.6	84	6.8	105	8.1
Arteriography of cerebral arteries	128	10.8	138	10.2	151	10.9	121	9.7	143	10.9	127	10.2	136	10.5
Clipping of aneurysm	321	27.1	374	27.7	367	26.5	344	27.6	353	26.9	323	26.0	294	22.7
Continuous mechanical ventilation for less than 96 consecutive hours	67	5.7	92	6.8	84	6.1	76	6.1	67	5.1	80	6.4	63	4.9
No procedure	203	17.2	241	17.9	239	17.3	209	16.8	248	18.9	248	19.9	324	25.0
Other procedure	332	28.1	384	28.4	396	28.6	358	28.7	352	26.8	336	27.0	327	25.2
Temporary tracheostomy: tracheotomy for assistance in breathing	40	3.4	47	3.5	59	4.3	42	3.4	48	3.7	46	3.7	48	3.7
Total	1,183	100.0	1,350	100.0	1,383	100.0	1,246	100.0	1,311	100.0	1,244	100.0	1,297	100.0

Table 17--(continued)

Principal diagnosis and procedure	1994 Strokes	1994 Percentage of total	1995 Strokes	1995 Percentage of total	1996 Strokes	1996 Percentage of total	1997 Strokes	1997 Percentage of total	1998 Strokes	1998 Percentage of total	1999 Strokes	1999 Percentage of total	2000 Strokes	2000 Percentage of total
	Year													
Cerebral embolism														
Arteriography of cerebral arteries	40	1.8	55	2.2	43	1.8	62	2.7	38	1.7	41	1.9	64	2.8
Computerized axial tomography (CAT) of head	197	8.8	183	7.2	154	6.4	153	6.6	95	4.3	105	4.9	80	3.5
Diagnostic ultrasound of heart: echocardiography, intravascular ultrasound of heart	97	4.3	126	4.9	110	4.6	120	5.2	147	6.7	167	7.9	214	9.2
Magnetic resonance imaging (MRI) of brain and brain stem	60	2.7	59	2.3	67	2.8	74	3.2	54	2.5	82	3.9	80	3.5
No procedure	1,209	54.2	1,412	55.4	1,363	56.8	1,251	54.0	1,179	53.9	1,091	51.3	1,253	54.1
Other procedure	544	24.4	603	23.7	536	22.3	555	24.0	571	26.1	522	24.5	525	22.7
Percutaneous [endoscopic] gastrostomy [PEG]: percutaneous transabdominal gastrostomy	83	3.7	110	4.3	128	5.3	100	4.3	105	4.8	119	5.6	100	4.3
Total	2,230	100.0	2,548	100.0	2,401	100.0	2,315	100.0	2,189	100.0	2,127	100.0	2,316	100.0
Cerebral thrombosis														
Arteriography of cerebral arteries	30	1.8	22	1.4	27	2.2	23	2.2	16	1.9	28	3.3	17	2.4
Computerized axial tomography (CAT) of head	226	13.3	194	12.3	121	9.8	76	7.2	43	5.1	32	3.8	31	4.4
Diagnostic ultrasound of heart: echocardiography, intravascular ultrasound of heart	19	1.1	30	1.9	31	2.5	31	2.9	26	3.1	31	3.7	26	3.7
Magnetic resonance imaging (MRI) of brain and brain stem	50	2.9	52	3.3	42	3.4	33	3.1	25	3.0	32	3.8	35	4.9
No procedure	955	56.3	915	58.1	705	56.9	661	62.9	532	63.1	515	61.5	453	63.8
Other procedure	341	20.1	299	19.0	267	21.5	189	18.0	167	19.8	147	17.6	121	17.0
Percutaneous [endoscopic] gastrostomy [PEG]: percutaneous transabdominal gastrostomy	74	4.4	64	4.1	47	3.8	38	3.6	34	4.0	52	6.2	27	3.8
Total	1,695	100.0	1,576	100.0	1,240	100.0	1,051	100.0	843	100.0	837	100.0	710	100.0

Principal diagnosis and procedure	1994 Strokes	1994 Percentage of total	1995 Strokes	1995 Percentage of total	1996 Strokes	1996 Percentage of total	1997 Strokes	1997 Percentage of total	1998 Strokes	1998 Percentage of total	1999 Strokes	1999 Percentage of total	2000 Strokes	2000 Percentage of total
	Year													
Occlusion and stenosis, pre-cerebral and cerebral														
Computerized axial tomography (CAT) of head	1,892	10.5	1,868	9.8	1,967	9.6	1,674	8.5	1,307	7.0	1,124	6.3	1,014	5.8
Diagnostic ultrasound of heart: echocardiography, intravascular ultrasound of heart	301	1.7	403	2.1	542	2.6	537	2.7	725	3.9	622	3.5	626	3.6
Endarterectomy: embolectomy, patch graft, temp. bypass during procedure, thrombectomy	380	2.1	509	2.7	438	2.1	410	2.1	366	2.0	306	1.7	266	1.5
Magnetic resonance imaging (MRI) of brain and brain stem	740	4.1	707	3.7	813	4.0	754	3.8	730	3.9	747	4.2	766	4.4
No procedure	10,372	57.3	11,009	57.7	11,952	58.3	11,779	59.6	11,265	60.1	10,909	61.3	11,182	63.5
Other procedure	3,864	21.3	4,001	21.0	4,136	20.2	3,985	20.2	3,765	20.1	3,515	19.7	3,245	18.4
Percutaneous [endoscopic] gastrostomy [PEG]: Percutaneous transabdominal gastrostomy	552	3.0	589	3.1	654	3.2	622	3.1	582	3.1	583	3.3	498	2.8
Total	18,101	100.0	19,086	100.0	20,502	100.0	19,761	100.0	18,740	100.0	17,806	100.0	17,597	100.0
Acute cerebrovascular disease														
Computerized axial tomography (CAT) of head	453	9.3	339	6.8	366	6.7	364	7.0	342	6.2	267	4.9	284	5.0
Diagnostic ultrasound of heart: echocardiography, intravascular ultrasound of heart	115	2.4	133	2.7	188	3.4	194	3.7	192	3.5	154	2.8	145	2.6
Magnetic resonance imaging (MRI) of brain and brain stem	88	1.8	82	1.6	93	1.7	99	1.9	98	1.8	113	2.1	133	2.3
No procedure	3,274	67.0	3,539	70.6	3,909	71.4	3,746	71.5	3,976	72.0	4,066	73.9	4,257	75.0
Other physical therapy	83	1.7	121	2.4	92	1.7	63	1.2	70	1.3	39	0.7	24	0.4
Other procedure	766	15.7	699	13.9	711	13.0	676	12.9	734	13.3	740	13.5	747	13.2
Percutaneous [endoscopic] gastrostomy [PEG]: percutaneous transabdominal gastrostomy	109	2.2	98	2.0	117	2.1	94	1.8	112	2.0	121	2.2	86	1.5
Total	4,888	100.0	5,011	100.0	5,476	100.0	5,236	100.0	5,524	100.0	5,500	100.0	5,676	100.0
Grand total	32,243	--	33,825	--	35,443	--	34,122	--	33,115	--	31,964	--	32,151	--

SOURCE: Data provided by the Pennsylvania Health Care Cost Containment Council, August 2001.

Table 18

TOTAL INPATIENT PRINCIPAL STROKES BY PROCEDURE AND OUTCOME
PENNSYLVANIA RESIDENTS 1994-2000

	Year													
	1994		1995		1996		1997		1998		1999		2000	
Procedure and outcome	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total
Total occurrences														
Patient expired	3,716	11.5%	3,560	10.5%	3,589	10.1%	3,311	9.7%	3,204	9.7%	3,140	9.8%	3,105	9.7%
Patient discharged	28,510	88.4	30,251	89.4	31,853	89.9	30,811	90.3	29,911	90.3	28,824	90.2	29,046	90.3
Unknown or not listed	17	0.1	14	0.1	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0
All patients	32,243	100.0	33,825	100.0	35,443	100.0	34,122	100.0	33,115	100.0	31,964	100.0	32,151	100.0
No procedure performed														
Patient expired	1,484	8.4	1,394	7.4	1,408	7.0	1,287	6.6	1,214	6.3	1,141	6.1	1,196	6.1
Patient discharged	16,150	91.6	17,416	92.6	18,597	93.0	18,295	93.4	17,922	93.7	17,669	93.9	18,475	93.9
Unknown or not listed	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
All patients	17,634	100.0	18,810	100.0	20,005	100.0	19,582	100.0	19,136	100.0	18,810	100.0	19,671	100.0
Possible under-reported procedures[1]														
Patient expired	217	16.2	251	19.6	195	16.6	214	18.8	202	18.6	210	19.0	243	21.9
Patient discharged	1,126	83.8	1,030	80.3	978	83.4	925	81.2	882	81.4	893	81.0	868	78.1
Unknown or not listed	0	0.0	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
All patients	1,343	100.0	1,282	100.0	1,173	100.0	1,139	100.0	1,084	100.0	1,103	100.0	1,111	100.0

NOTE: A principal diagnosis of stroke refers to the main reason for the hospitalization. A secondary diagnosis of stroke was an additional condition that existed at admission or was discovered during the hospitalization.

1. PHC4 forms provide six procedure fields for collecting procedures; if more than six procedures are performed, the additional ones are not reflected. The set of "possible under-reported procedures" comprise those records where procedures are shown for all six allotted data fields.

SOURCE: Data provided by the Pennsylvania Health Care Cost Containment Council, August 2001.

Table 19

TOTAL INPATIENT STROKES BY PRINCIPAL DIAGNOSIS
WHEN ANY PROCEDURE IS TREATMENT BY THROMBOLYTIC AGENT
INCLUDING TISSUE PLASMINOGEN ACTIVATOR (TPA)[1]
PENNSYLVANIA RESIDENTS 1998-2000

	1998		1999		2000	
	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total
Cerebral hemorrhage						
Procedure	0	0.0%	4	0.1%	5	0.1%
Total	4,508		4,450		4,555	
Subarachnoid hemorrhage						
Procedure	1	0.1	3	0.2	4	0.3
Total	1,311		1,244		1,297	
Cerebral embolism						
Procedure	8	0.4	37	1.7	48	2.1
Total	2,189		2,127		2,316	
Cerebral thrombosis						
Procedure	4	0.5	15	1.8	8	1.1
Total	843		837		710	
Occlusion and stenosis, pre-cerebral and cerebral						
Procedure	21	0.1	121	0.7	131	0.7
Total	18,740		17,806		17,597	
Acute cerebrovascular disease						
Procedure	8	0.1	15	0.3	30	0.5
Total	5,524		5,500		5,676	
Other						
Procedure	5	0.1	66	0.7	75	0.9
Total	9,224		8,965		8,688	
Grand total						
Procedure	47	0.1	261	0.6	301	0.7
Total	42,339		40,929		40,839	

1. Treatment by thrombolytic agent may be underestimated. The use of a thrombolytic agent does not affect reimbursement, so it may not be coded for all cases. Further, PHC4 collects six procedure codes; if the thrombolytic code is sequenced beyond this code limit, it is not captured in PHC4 data.

SOURCE: Data provided by the Pennsylvania Health Care Cost Containment Council, August 2001.

Table 20

TOTAL INPATIENT STROKES BY DISCHARGE STATUS
PENNSYLVANIA RESIDENTS 1994-2000

	Year													
	1994		1995		1996		1997		1998		1999		2000	
Discharge status	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total
Home or self care	16,685	39.0%	16,545	37.3%	16,986	37.1%	15,868	35.8%	14,553	34.4%	12,618	30.8%	12,834	31.4%
Another short term general hospital for Inpatient care	1,802	4.2	1,938	4.4	1,929	4.2	1,836	4.1	1,840	4.3	1,879	4.6	1,645	4.0
Skilled nursing facility	7,553	17.7	8,566	19.3	9,649	21.1	10,207	23.0	10,124	23.9	9,860	24.1	9,366	22.9
Intermediate care facility	581	1.4	612	1.4	554	1.2	499	1.1	576	1.4	591	1.4	689	1.7
Another institution for inpatient care or outpatient services	6,821	16.0	7,301	16.5	7,382	16.1	7,200	16.2	6,986	16.5	6,848	16.7	7,285	17.8
Organized home health service organization	3,557	8.3	3,712	8.4	3,723	8.1	3,537	8.0	3,310	7.8	4,175	10.2	4,072	10.0
Left against medical advice or discontinued care	149	0.3	131	0.3	140	0.3	147	0.3	117	0.3	112	0.3	147	0.4
Home IV provider	0	0.0	25	0.1	1	0.0	3	0.0	22	0.1	48	0.1	61	0.1
Expired	5,421	12.7	5,312	12.0	5,348	11.7	5,003	11.3	4,766	11.3	4,731	11.6	4,672	11.4
Unknown or not listed	194	0.5	162	0.4	76	0.2	39	0.1	45	0.1	67	0.2	68	0.2
Total	42,763	100.0	44,304	100.0	45,788	100.0	44,339	100.0	42,339	100.0	40,929	100.0	40,839	100.0

SOURCE: Data provided by the Pennsylvania Health Care Cost Containment Council, August 2001.

Table 21

TOTAL INPATIENT ADMISSIONS FOR STROKE TREATMENT BY FACILITY TYPE
PENNSYLVANIA RESIDENTS 1994-2000

Facility type	Year													
	1994		1995		1996		1997		1998		1999		2000	
	Admissions	Percentage of total	Admissions	Percentage of total	Admissions	Percentage of total	Admissions	Percentage of total	Admissions	Percentage of total	Admissions	Percentage of total	Admissions	Percentage of total
Specialty general acute care	78	0.2%	332	0.7%	169	0.4%	201	0.5%	174	0.4%	227	0.6%	233	0.6%
Long term acute care hospital	0	0.0	1	0.0	134	0.3	127	0.3	139	0.3	121	0.3	120	0.3
Psychiatric	27	0.1	16	0.0	13	0.0	18	0.0	13	0.0	11	0.0	8	0.0
Rehabilitation	3,739	8.7	4,089	9.2	4,194	9.2	4,202	9.5	4,213	10.0	3,889	9.5	4,237	10.4
Ambulatory surgery center	10	0.0	13	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Specialty hospital	1,078	2.5	1,066	2.4	160	0.3	113	0.3	23	0.1	18	0.0	1	0.0
General acute care facility	37,800	88.4	38,728	87.4	41,112	89.8	39,678	89.5	37,777	89.2	36,663	89.6	36,240	88.7
State owned psychiatric facility	0	0.0	1	0.0	6	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Unknown or not listed	31	0.1	58	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	42,763	100.0	44,304	100.0	45,788	100.0	44,339	100.0	42,339	100.0	40,929	100.0	40,839	100.0

SOURCE: Data provided by the Pennsylvania Health Care Cost Containment Council, August 2001.

Table 22

AVERAGE LENGTH OF STAY OF PRINCIPAL STROKE PATIENTS BY FACILITY
PENNSYLVANIA RESIDENTS 1994-2000

	Year						
	1994	1995	1996	1997	1998	1999	2000
Facility	Days	Days	Days	Days	Days	Days	Days
General acute care facility							
Patient expired	8.3	7.8	7.0	6.2	5.9	5.9	5.8
Patient discharged	10.0	9.0	8.1	7.6	7.4	7.0	6.8
All patients	9.8	8.9	8.0	7.5	7.2	6.9	6.7
Rehabilitation							
Patient expired	19.3	8.5	7.6	19.2	16.3	21.8	9.6
Patient discharged	24.4	30.1	23.5	23.3	24.3	23.8	22.0
All patients	24.3	30.1	23.4	23.3	24.2	23.8	22.0
All facilities[1]							
Patient expired	8.3	7.8	7.1	6.3	5.9	6.0	5.9
Patient discharged	10.9	10.6	9.4	8.9	8.9	8.6	8.4
All patients	10.6	10.3	9.2	8.6	8.6	8.3	8.1

NOTE: A principal diagnosis of stroke refers to the main reason for the hospitalization. A secondary diagnosis of stroke was an additional condition that existed at admission or was discovered during the hospitalization.

1. Includes general acute care, rehabilitation, and a small number of other health care facilities.

SOURCE: Data provided by the Pennsylvania Health Care Cost Containment Council, August 2001.

Table 23

TOTAL INPATIENT STROKES BY SUMMARY CHARGES
PENNSYLVANIA RESIDENTS 1994-2000

	Year													
	1994		1995		1996		1997		1998		1999		2000	
Summary charges	Amount	Percent-age of total	Amount	Percent-age of total	Amount	Percent-age of total	Amount	Percent-age of total	Amount	Percent-age of total	Amount	Percent-age of total	Amount	Percent-age of total
Room & board	$270,107,091	27.9%	$268,345,954	25.9%	$264,198,445	24.7%	$237,231,259	18.2%	$228,213,441	21.9%	$219,953,810	20.4%	$221,664,486	19.1%
Ancillary	381,456,141	39.3	411,318,715	39.7	429,087,450	40.2	650,851,846	50.0	426,348,333	40.9	442,912,213	41.0	480,943,364	41.4
Drug	69,994,263	7.2	73,531,832	7.1	77,091,935	7.2	77,793,492	6.0	100,037,381	9.6	108,153,305	10.0	113,443,848	9.8
Equipment	65,333,634	6.7	67,975,347	6.6	71,140,244	6.7	71,412,913	5.5	74,917,886	7.2	78,255,998	7.2	82,694,387	7.1
Specialty	148,977,852	15.4	173,574,746	16.8	184,194,811	17.2	215,313,269	16.5	206,413,035	19.8	230,930,122	21.4	263,936,642	22.7
Miscellaneous	33,615,440	3.5	40,050,912	3.9	42,677,092	4.0	48,542,627	3.7	6,259,544	0.6	474,968	0.0	216,788	0.0
Total	969,484,420	100.0	1,034,797,506	100.0	1,068,389,977	100.0	1,301,145,407	100.0	1,042,189,620	100.0	1,080,680,416	100.0	1,162,899,515	100.0
Professional fees	3,367,934	--	3,844,139	--	4,675,594	--	4,924,962	--	3,723,406	--	3,360,734	--	3,318,143	--
Non-covered	25,261,427	--	17,379,677	--	16,629,354	--	16,415,635	--	18,753,876	--	21,229,030	--	19,166,055	--

SOURCE: Data provided by the Pennsylvania Health Care Cost Containment Council, August 2001.

Table 24

TOTAL INPATIENT STROKES BY SOURCE OF PAYMENT
PENNSYLVANIA RESIDENTS 1994-2000

	Year													
	1994		1995		1996		1997		1998		1999		2000	
Source of payment	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total	Strokes	Percentage of total
Primary payer														
Uninsured	797	1.9%	446	1.0%	261	0.6%	331	0.7%	545	1.3%	502	1.2%	368	0.9%
Medicare	31,796	74.4	32,252	72.8	32,841	71.7	31,120	70.2	28,794	68.0	28,282	69.1	30,048	73.6
Medicaid	1,510	3.5	1,903	4.3	2,180	4.8	2,058	4.6	1,715	4.1	1,771	4.3	2,006	4.9
Blue Cross	3,514	8.2	3,642	8.2	4,089	8.9	4,686	10.6	4,812	11.4	4,613	11.3	4,820	11.8
Commercial	2,724	6.4	3,238	7.3	4,172	9.1	4,920	11.1	4,609	10.9	4,539	11.1	3,074	7.5
Employer funded plans	27	0.1	29	0.1	93	0.2	144	0.3	190	0.4	156	0.4	9	0.0
Government	87	0.2	101	0.2	168	0.4	141	0.3	144	0.3	116	0.3	224	0.5
Unknown or not listed	2,308	5.4	2,693	6.1	1,984	4.3	939	2.1	1,530	3.6	950	2.3	290	0.7
Total	42,763	100.0	44,304	100.0	45,788	100.0	44,339	100.0	42,339	100.0	40,929	100.0	40,839	100.0
Secondary payer														
Uninsured	830	1.9	833	1.9	585	1.3	766	1.7	970	2.3	1,268	3.1	1,489	3.6
Medicare	10,555	24.7	10,785	24.3	11,144	24.3	10,940	24.7	10,803	25.5	10,874	26.6	10,709	26.2
Medicaid	1,953	4.6	2,276	5.1	2,420	5.3	2,141	4.8	1,761	4.2	2,105	5.1	2,347	5.7
Blue Cross	11,161	26.1	11,678	26.4	11,067	24.2	10,272	23.2	8,693	20.5	8,043	19.7	7,863	19.3
Commercial	6,043	14.1	6,336	14.3	6,595	14.4	5,401	12.2	5,279	12.5	4,732	11.6	4,863	11.9
Employer funded plans	36	0.1	33	0.1	116	0.3	305	0.7	273	0.6	264	0.6	76	0.2
Government	54	0.1	39	0.1	73	0.2	105	0.2	114	0.3	129	0.3	203	0.5
Unknown or not listed	12,131	28.4	12,324	27.8	13,788	30.1	14,409	32.5	14,446	34.1	13,514	33.0	13,289	32.5
Total	42,763	100.0	44,304	100.0	45,788	100.0	44,339	100.0	42,339	100.0	40,929	100.0	40,839	100.0
Tertiary payer														
Uninsured	1,610	3.8	1,455	3.3	999	2.2	1,214	2.7	1,357	3.2	1,961	4.8	3,347	8.2
Medicare	1,578	3.7	1,600	3.6	1,945	4.2	2,003	4.5	1,917	4.5	1,714	4.2	1,944	4.8
Medicaid	1,095	2.6	1,150	2.6	1,253	2.7	1,116	2.5	1,055	2.5	1,013	2.5	1,158	2.8
Blue Cross	4,787	11.2	4,866	11.0	4,938	10.8	4,180	9.4	4,146	9.8	4,000	9.8	3,605	8.8
Commercial	4,285	10.0	4,270	9.6	4,131	9.0	3,396	7.7	3,244	7.7	3,067	7.5	2,736	6.7
Employer funded plans	31	0.1	24	0.1	44	0.1	62	0.1	102	0.2	180	0.4	34	0.1
Government	20	0.0	28	0.1	19	0.0	20	0.0	43	0.1	40	0.1	78	0.2
Unknown or not listed	29,357	68.7	30,911	69.8	32,459	70.9	32,348	73.0	30,475	72.0	28,954	70.7	27,937	68.4
Total	42,763	100.0	44,304	100.0	45,788	100.0	44,339	100.0	42,339	100.0	40,929	100.0	40,839	100.0

SOURCE: Data provided by the Pennsylvania Health Care Cost Containment Council, August 2001.

Appendix 5

PROPOSED STROKE PREVENTION, EDUCATION AND TREATMENT ACT

Section 1. Short title.

This act shall be known and may be cited as the Stroke Prevention, Education and Treatment Act.

Section 2. Definitions.

The following words and phrases when used in this act shall have the meanings given to them in this section unless the context clearly indicates otherwise:

"Council." The advisory council to the office, created by section 4 (relating to advisory council).

"Department." The department of health.

"Governmental agency." Includes a political subdivision.

"Office." The office of stroke prevention and education created by section 3 (relating to office of stroke prevention and education).

"Secretary." The secretary of health.

Section 3. Office of stroke prevention and education.

The office of stroke prevention and education shall be established in the department. The department shall provide office space and staff assistance for the office and the council.

Section 4. Advisory council.

(a) Creation and duties.—The advisory council on stroke prevention and education shall be established to assist and direct the office in the performance of its duties.

(b) Membership.—The membership of the council shall consist of the following:

(1) The secretary or a designee.

(2) The secretary of aging or a designee.

(3) The secretary of education or a designee.

(4) The insurance commissioner or a designee.

(5) The secretary of public welfare or a designee.

(6) The physician general or a designee.

(7) The executive director of the Pennsylvania health care cost containment council or a designee.

(8) A representative of the Pennsylvania emergency health services council.

(9) A representative of the brain injury association of Pennsylvania.

(10) A representative of the Pennsylvania academy of family physicians.

(11) A representative of the Pennsylvania chapter of American college of emergency physicians.

(12) A representative of the Pennsylvania chapter of the American college of cardiology.

(13) A representative of the Pennsylvania neurosurgical society.

(14) A Pennsylvania representative of the American academy of neurology.

(15) A representative of the Pennsylvania psychological association.

(16) A representative of the Pennsylvania/West Virginia geriatrics society.

(17) A representative of the Delaware valley geriatrics society.

(18) A representative of the Pennsylvania nurses association.

(19) A representative of the Pennsylvania association of rehabilitation facilities.

(20) A representative of the Pennsylvania hospital and healthsystem association.

(21) A representative of the Philadelphia stroke council.

(22) A representative of the Pennsylvania chapter of the American heart association.

(23) A representative of the Pennsylvania office of AARP.

(24) A designee of the Governor's advisory commission on African American affairs.

(25) A designee of the commission for women.

(26) A designee of the Governor's advisory commission on Latino affairs.

(27) A representative of the Pennsylvania medical society.

(28) A representative of the Pennsylvania osteopathic medical association.

(29) A representative of the Pennsylvania physical therapy association.

(30) A Pennsylvania representative of the child neurology society.

(31) A representative of a university research facility in Pennsylvania specializing in biotechnology, who shall be designated by the president pro tempore of the Senate.

(32) A representative of a health insurance corporation, who shall be designated by the speaker of the House of Representatives.

(33) A small employer, who shall be designated by the minority leader of the Senate.

(34) An employer that provides health benefits to its employees through a self-insurance program, who shall be designated by the minority leader of the House of Representatives.

(c) Appointment.—The secretary shall appoint the members of the council as designated by the entities set forth in subsection (b)(8) through (30). The secretary shall appoint the chair and vice-chair of the council from among its members. Members shall serve for a term of four years and may be reappointed at the discretion of the appointing entity.

(d) Reimbursement for expenses.—Members of the council shall serve without compensation, other than reimbursement of travel and other actual expenses reasonably incurred in the performance of their duties.

(e) Replacement members.—A member may serve until a replacement is appointed. A replacement member shall be appointed in the same manner as the initial member and shall serve for the remainder of an unexpired term.

(f) Meetings.—The council shall meet at least annually and may meet at other times at the call of the chair to conduct its official business. A majority of the voting members of the council constitutes a quorum. The council may make official recommendations to the department only by affirmative vote of a majority of a quorum.

Section 5. Duties of office.

(a) General rule.—The office shall do all of the following:

(1) Develop and implement a comprehensive statewide public education program on stroke prevention, targeted to high-risk populations and to geographic areas where there is a high incidence of stroke, including information developed or compiled by the office on all of the following:

(i) Healthy lifestyle practices that reduce the risk of stroke.

(ii) Signs and symptoms of stroke and action to be taken when signs occur.

(iii) Determinants of high-quality health care for stroke.

(iv) Other information the council considers appropriate for inclusion in the public education program.

(2) Develop or compile for primary care physicians recommendations that address risk factors for stroke, appropriate screening for risk factors, early signs of stroke, and treatment strategies.

(3) Develop or compile for physicians and emergency health care providers recommendations on the initial treatment of stroke.

(4) Develop or compile for physicians and other health care providers recommendations on the long-term treatment of stroke.

(5) Develop or compile for physicians, long-term care providers and rehabilitation providers recommendations on rehabilitation of stroke patients.

(6) Consult with interested organizations and individuals, including those who are not represented on the council.

(7) Assist the department in the development of comprehensive plans regarding stroke and related health issues.

(8) Assist the department in administering the stroke registry established by section 6 (relating to stroke registry).

(9) Assist the department in awarding grants pursuant to section 7 (relating to grant program).

(10) Make recommendations to the Governor and the General Assembly regarding the expenditure of Commonwealth funds to support the purposes of this act.

(11) Take other actions consistent with the purpose of the office to ensure that the public and health care providers are informed with regard to the most effective treatment strategies for stroke prevention and treatment.

(b) Use of information.—The council may use information developed or made available by other public or private entities to meet the requirements of subsection (a).

(c) Dissemination of information.—The department shall make information developed or compiled by the office available to the public and disseminate to the appropriate persons the recommendations developed or compiled by the office.

(d) Gifts and grants.—The department and the office may solicit and receive gifts and grants from any public or private source to advance the purposes of this act.

Section 6. Stroke registry.

(a) Establishment.—The office shall establish a system for the statewide collection and dissemination of data on cases of stroke, including the medical and occupational history of patients, the medical classification of the stroke and such other data as is necessary to effectuate the purposes of this act as determined by the office upon consideration of the advice of the council.

(b) Duty to report.—Persons in charge of hospitals and laboratories shall report cases of stroke on forms furnished by the department in accordance with department regulations adopted upon consideration of the advice of the council.

(c) Confidentiality.—The reports required pursuant to this section shall be confidential and not open to public inspection or dissemination; however, the department and those with whom the department contracts may collect and analyze the data from these reports. The department may permit the use of reports and the data contained in them for specific research purposes, but the department shall ensure that the use is limited to those purposes and that confidentiality of individually identifiable information is strictly preserved.

Section 7. Grant program.

(a) General rule.—The council shall recommend to the department through the office the awarding of grants and contracts to qualified associations, nonprofit organizations or government agencies in order to plan, establish or conduct programs in stroke prevention, care, education, training and research.

(b) Eligible areas.—Grants and contracts may be recommended for any of the following relating to stroke:

(1) Patient registry.

(2) Screening and prevention.

(3) Epidemiology and biostatistical studies.

(4) Community outreach programs.

(5) Rehabilitation.

(6) Communication and planning among institutions.

(7) Public education and information.

(8) Training.

(9) Clinical research.

(c) Priorities.—The council shall determine the priorities for funding grants and contracts among the areas set forth in subsection (b).

(d) Criteria.—In recommending grants and contracts for programs, the council shall consider the feasibility of the research proposal and the relevancy of the proposal to the department's stroke plan.

(e) Award.—The secretary shall award grants and contracts only from those recommended by the council to qualified associations, nonprofit organizations and governmental agencies in order to plan, establish or conduct programs in stroke prevention, education, training and clinical research. The secretary may request additional recommendations to the board.

(f) Conflict of interest.—A member of the council may not participate in any discussion or decision to recommend a grant or contract to any association, organization or governmental agency with which the member is associated as a member of the governing body or as an employee, or with which the member has entered into any contractual arrangement.

Section 8. Report.

The office shall prepare an annual report under the direction of the council describing its actions under this act. The report may include recommendations as the office deems appropriate. The office shall submit the report to the Governor, the secretary, and the General Assembly.

APPENDIX 6 – STATEMENT BY THE PENNSYLVANIA DEPARTMENT OF HEALTH

Commonwealth of Pennsylvania

DEPARTMENT OF HEALTH

HARRISBURG

ROBERT S. ZIMMERMAN, JR., MPH
SECRETARY OF HEALTH

November 12, 2002

Mr. David L. Hostetter
Executive Director
Joint State Government Commission
Room 108 Finance Building
Harrisburg, Pennsylvania 17120

Dear Mr. Hostetter:

Stroke remains the third leading cause of death and the leading cause of disability in Pennsylvania. In the year 2000, 8,885 Pennsylvanians lost their lives to stroke. Recognizing the tremendous burden wrought by stroke in the Commonwealth, the Pennsylvania Department of Health has long targeted stroke prevention and education as a state priority. The Department commends the Advisory Committee on Stroke Prevention and Treatment for its tireless efforts to bring this issue to the forefront.

The Department has reviewed the recommendations of the Task Force and is supportive of many of the recommendations. Because of issues of duplication and fragmentation, the Department does not support, via legislation, a separate Office of Stroke Prevention and Education, or Advisory Council. In addition, the Department suggests that prior to legislatively creating a stroke registry, an adequate determination of the need for and use of the registry should occur. This feasibility study should provide an analysis of both costs and benefits of such a stroke registry.

Through the State Health Improvement Process we remain committed to working with community partners to develop creative solutions to health problems in the Commonwealth. As such, the Department will seek to have representation of the Task Force on the newly forming Pennsylvania Cardiovascular Health Consortium (PCHC) which will be developing and implementing the first-ever comprehensive cardiovascular plan for the Commonwealth. A key element of this plan will focus on stroke prevention and education.

The Pennsylvania Department of Health respectfully requests this statement be included in the final Stroke Prevention Task Force Report as an addendum to the report.

Sincerely,

Robert S. Zimmerman, Jr.

POST OFFICE BOX 90, HARRISBURG, PA 17108 717-787-6436