Karen Tam

How Healthy Is North Carolina's Population?

by Ken Otterbourg

How healthy is North Carolina's population? The answer depends on which statistics you consider, but in the main the state's population has never ranked among the healthiest. Tar Heels exceed the national averages in deaths from heart disease, cancer, injuries, and infant mortality. What can the state do about its relatively poor showing in health?

> The only Business here is of raising Hogs, which is manag'd with the least Trouble, and affords the Diet they are most fond of. The Truth of it is, the Inhabitants of N Carolina devour so much Swine's flesh, that it fills them full of gross Humours. For want too of a constant Supply of Salt, they are commonly obliged to eat it Fresh, and that begets the highest taint of Scurvy. . . .
>
> — WILLIAM BYRD, 1728

It's been a good long while since scurvy has shown up as one of North Carolina's most pressing health problems, but the fact is that the overall health of the state's people is still not what it should be. The state's mortality rates—deaths per 100,000 population—exceed the national average on 10 key indicators: all causes, heart diseases, strokes, cancer, diabetes, pneumonia, pulmonary diseases, liver disease and cirrhosis, motor vehicle accidents, and all other kinds of injuries (see Table 1, p. 4).

Still, North Carolina's rankings are nowhere near the worst in the land. Two years ago, a Minneapolis-based insurer began a new ranking of the states. Northwestern National Life Insurance Co. compiled health statistics in 17 categories for each state, then tallied up the results. The states with the healthiest citizens: Hawaii, Minnesota, New Hampshire, and Utah. Those with the least healthy citizens: Mississippi, New Mexico, Alaska, and West Virginia.[1] North Carolina? In the middle of the pack at number 32 in 1990, but moving up two notches in the 1991 survey to 30, well behind Virginia, but ahead of most other states in the South Atlantic (see Table 2, p. 5). The state exceeded the national average in only three categories: access to prenatal care; unemployment rate (the jobless are less likely to have health care coverage); and number of acute illnesses per resident.

Being number 32 out of 50 isn't much for the state to brag about, but just how healthy are North Carolina's residents? Dr. Georjean Stoodt, director of the Division of Adult Health at the North Carolina Department of Environment, Health, and Natural Resources, couches it this way: "My baseline for comparison is what is demonstrably achievable, and are we there? And the answer is no."

As proof, she points to the state's high rate of preventable deaths and unenviable status as a sort-of buckle in the "stroke belt," a stretch of territory that takes in much of the southeast United States.[2]

Not everyone believes the state is making a poor showing in health care. "If we do rank 32nd among the states, as the Northwestern National Life study suggests, I can argue that we are making a strong showing, given the state's relative income, health care resources, and expenditures on health care," says Duncan Yaggy, chief planning officer at Duke University Medical Center. "A study I saw last week ranked North Carolina 44th in expenditures per capita for health care. If we ranked 32nd in health and 44th in expenditures for health care, doesn't that suggest that we are making a good showing?"

Adds Dr. Ronald H. Levine, state health director, "Compared to ourselves, we are healthier than ever before. Compared to the United States, we are not as healthy as we should be."

Another answer might be found in how North Carolinians rate themselves. A Carolina Poll conducted in March 1991 by the School of Journalism and Mass Communication and the Institute for Research in Social Sciences at UNC–Chapel Hill surveyed 509 adults. More than four-fifths, 81 percent, rated their health as excellent or good as opposed to fair or poor.[3] By comparison, a national survey in 1989 found that about 91 percent of the people polled rated their health as excellent, very good, or good.[4]

Generally speaking, younger, better-educated, wealthier people living in *urban* areas of North Carolina see themselves as healthier than do older, less-educated poor residents living in *rural* sections of the state.[5] There was also a difference based on race. Eighty-three percent of the *white* people surveyed said their health was excellent or good, while only 71 percent of *non-whites* felt the same way.

Compared to ourselves, we are healthier than ever before. Compared to the United States, we are not as healthy as we should be.

— DR. RONALD H. LEVINE
STATE HEALTH DIRECTOR

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Table 1. Mortality Rates for U.S. and N.C., by Cause, 1979–88

Mortality Rates per 100,000	1979		1981		1984		1986		1988	
	U.S.	N.C.	U.S.	N.C.	U.S.	N.C.	U.S.	N.C.	U.S.	N.C.
All Causes	587.4	644.5	568.2	609.1	545.9	571.2	541.7	574.3	535.5	570.8
Specific Causes										
Diseases of the Heart	203.0	223.7	195.0	211.7	183.6	193.9	175.0	185.5	166.3	173.1
Cancer	133.4	132.0	131.6	129.6	133.5	126.8	133.2	130.6	132.7	134.7
Cerebrovascular Diseases (Stroke)	42.5	55.0	38.1	49.0	33.4	41.6	31.0	38.3	29.7	37.7
Motor Vehicle Accidents	23.9	26.9	21.8	25.2	19.1	23.3	19.4	26.2	19.7	23.9
Other Accidents and Adverse Effects	19.7	24.5	18.0	21.4	15.9	19.0	15.7	19.1	15.3	20.1
Chronic Obstructive PulmonaryDiseases (Lung Disease)	14.8	14.7	16.3	15.6	17.7	16.2	18.8	18.6	19.4	19.7
Pneumonia and Influenza	11.1	12.6	12.3	14.5	12.2	12.7	13.5	14.7	14.2	14.8
Diabetes Mellitus	9.9	11.3	9.8	10.0	9.5	10.0	9.6	10.0	10.1	13.0
Suicide	12.0	12.5	11.5	12.6	11.6	12.6	11.9	11.3	11.4	10.9
Chronic Liver Disease and Cirrhosis	12.3	12.7	11.4	10.5	10.0	8.7	9.2	8.8	9.0	9.2
Homicide/Legal Intervention	10.6	12.3	10.4	10.7	8.4	8.5	9.0	9.1	9.0	8.8
Nephritis/Nephrosis (Kidney Disease)	4.5	6.1	4.5	5.9	4.7	5.5	4.9	5.1	4.8	4.3
Atherosclerosis	5.6	5.9	5.2	5.0	4.2	4.2	3.7	4.0	3.4	2.8

Source: N.C. Center for Health and Environmental Statistics, Department of Environment, Health, and Natural Resources
Table prepared by Seth Blum, Center intern and Duke Univ. law student
Shaded areas indicate years when N.C. rates were lower than national average.

The overall breakdown in the Carolina Poll is about the same as the results from a survey conducted in 1981, 1983, and 1984 by the North Carolina Citizen Survey through the state's Office of State Budget and Management. In that poll, between 78 and 83 percent of the state's residents surveyed rated their health as good, very good, or excellent.[6]

Perceptions vs. Reality in Health Care

It's clear that most North Carolinians consider themselves to be in pretty good health—but do the facts give us a more accurate x-ray of the health status of North Carolina's population? How do you accurately and objectively measure health? In Northwestern National's ranking, the insurance company used a number of subjective categories, such as percent of high-school graduates in the adult population, and then boiled down the statistics to a single ranking.

In reality, the picture is much more complicated than that. The health status of the Tar Heel state isn't so much a uniform blanket as it is a patchwork quilt of black, white, and several shades of gray. That reflects the state's diversity. North

"For as a result of the pain, there are some who are born, others grow, others die . . ."

— CÉSAR VALLEJO
"THE NINE MONSTERS"

Carolina has grinding poverty tucked amid prosperous cities. It has nationally recognized medical schools and rural counties with no doctors. And the state has gleaming medical centers and as many as 1.2 million people who lack the health insurance they need to gain easy access to these facilities. [7]

The *mortality* rate is the most widely used indicator of health because it is among the simplest. That's because when people die, their death certificates state their cause of death, their age, their race, and address. At the end of the year, the numbers are collected and analyzed by the Division of Statistics and Information Services at the Department of Environment, Health, and Natural Resources.

The ease of data collection for deaths contrasts with the difficulty health officials have in compiling information on diseases, known in medical jargon as *morbidity*. At this point, good morbidity data—whether for diabetes or ulcers—just aren't available. The exceptions are for communicable diseases, such as tuberculosis, syphilis and, of course, Acquired Immunodeficiency Syndrome (AIDS).

The North Carolina Medical Database Commission, a branch of the Department of Insurance, collects information on hospital discharges, but its published statistics don't take note of a patient's age, sex, or race. And if patients never get admitted to a hospital, but rather find relief at the doctor's office, they're not recorded.

Even when considering death statistics, health officials urge caution in comparing counties on raw data. The reason is that while death might seem random in individuals, it follows a pattern for the population as a whole. *Generally speaking, the more non-whites, males, and elderly that live in a county, the higher the death rate.*[8]

The state's *unadjusted death rates* show these outcomes. In much of northeastern North Carolina, in the counties along the Virginia border, blacks make up a majority of the population and

Table 2. Comparative Rankings of Health Status in 1990 and 1991.

Rank 1990	Rank 1991	State
4	1	Hawaii
1	2	Minnesota
3	3	New Hampshire
1	3	Utah
7	5	Wisconsin
5	5	Nebraska
5	7	Connecticut
7	8	Iowa
10	8	Kansas
10	10	Colorado
7	11	Massachusetts
12	11	Maine
15	11	Virginia
12	14	Vermont
17	15	Rhode Island
16	15	New Jersey
12	17	North Dakota
20	18	Indiana
19	19	Ohio
20	19	Pennsylvania
18	19	Montana
22	22	California
30	23	Washington
23	23	Maryland
25	25	Wyoming
23	25	South Dakota
25	27	Oklahoma
25	28	Michigan
25	28	Delaware
32	**30**	**North Carolina**
30	30	Texas
25	32	Missouri
34	32	Illinois
34	32	New York
33	35	Idaho
34	36	Georgia
38	36	Kentucky
34	36	Tennessee
43	39	Oregon
39	40	Arizona
39	40	Arkansas
44	42	Florida
39	42	Alabama
39	44	South Carolina
47	44	Nevada
45	46	Louisiana
47	47	Mississippi
45	47	New Mexico
50	49	Alaska
49	50	West Virginia

Source: Northwestern National Life Insurance Co.

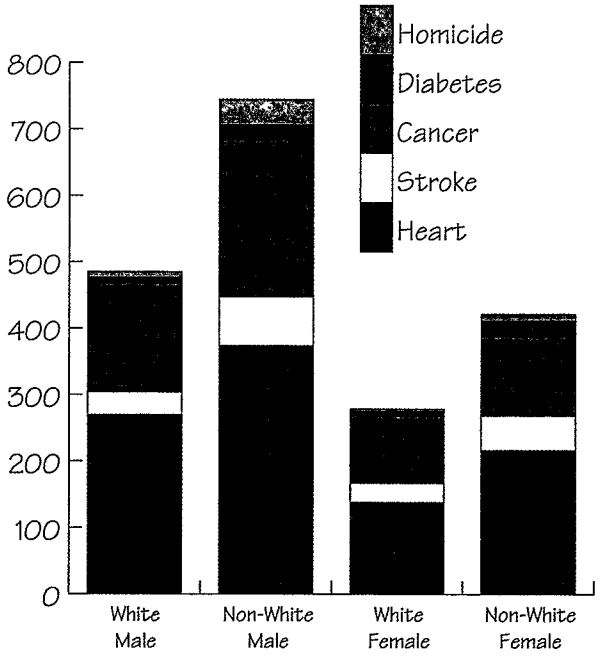
the death rates are higher than the state average (see Table 3, p. 6 for a comparison of white and non-white mortality rates for various causes.) By contrast, Onslow County is home to Camp LeJeune and has a disproportionate percentage of young people, especially healthy young U.S. Marines and their families. Its death rate is the lowest in the state.

But when statisticians account for these differences in demographics by adjusting for age, race, and sex, that pattern collapses. The county that ends up with the worst *adjusted death rate* is Avery County, a small mountain county. The reason: an unusually high rate of heart disease, despite a population that has few blacks.

So which batch of statistics is the right one to use? On national comparisons, health officials generally adjust death rates only for age. For in-state purposes, there's some debate. Dr. Thad Wester, the state's deputy health director, says, "If we want to compare North Carolina with other states, then adjustments should be made so that the populations compared appear similar. For example, you cannot compare North Carolina with Utah without adjusting for the marked differences in non-white populations. On the other hand, you must avoid the trap of allowing the non-white statistics—which are almost twice that of the white rate—from becoming an accepted norm within the state. This is because there is little reason to believe that the differences are racially determined. It is more likely that the higher rate is caused by being disadvantaged rather than by being non-white."

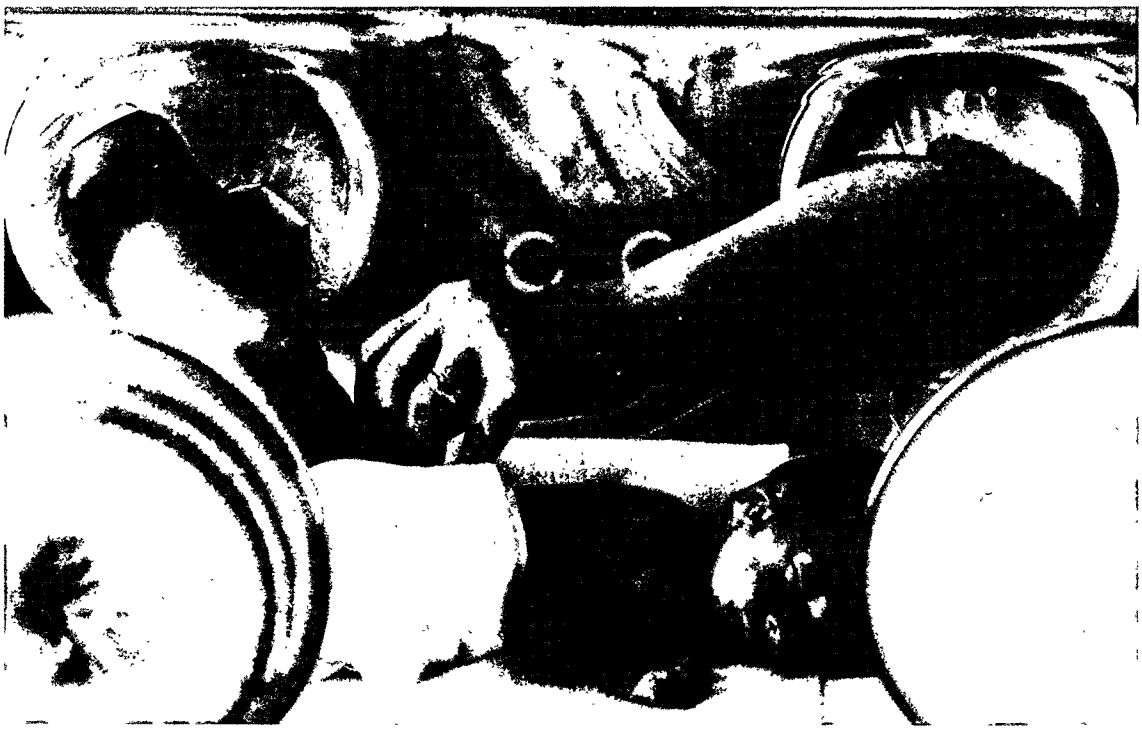
Wester, a former public health director in Robeson County, points out another reason Utah's citizens are healthier than North Carolina's: Utah, unlike North Carolina, has a large number of Mor-

Table 3. N.C. Average Mortality Rates per 100,000 for Race and Sex by Various Causes, 1986–1990



White Male	Non-White Male	White Female	Non-White Female
Homicide			
8.3	38.0	3.0	9.7
Diabetes			
9.8	24.0	8.3	25.3
Cancer			
163.5	235.7	100.8	118.7
Stroke			
35.0	73.2	28.2	51.6
Heart Disease			
270.0	374.0	138.5	216.6

Source: N.C. Center for Health and Environmental Statistics, Department of Environment, Health and Natural Resources



Wake Medical Center

Nurse cares for premature infant in isolette at intensive care nursery.

mons, whose religious teachings urge them to avoid tobacco, caffeine and alcohol.

In 1989, the last year for which state figures are available, 57,438 people died in North Carolina, about 870 people for each 100,000 residents. Nationally, the mortality rate is 880 per 100,000. When adjusted for age, the state's rate drops to 571 per 100,000. But the U.S. rate drops to 536 deaths per 100,000, even though the nation's population, on average, is slightly older than that of North Carolina (see Table 1, p. 4).

The state's top killer is heart disease, accounting for nearly a third of all deaths in North Carolina. Rounding out the top 10, in descending order, are cancer, stroke, unintentional injuries, lung disease, pneumonia, diabetes, suicide, liver disease, and homicide. Four-fifths of the state's deaths each year can be attributed to these 10 diseases.

Delton Atkinson is the director of DEHNR's statistics division. He says his job is to get beyond the numbers. "What do they mean?" he asks. "This information ought to be of use to policymakers."

Infant Mortality:

Take North Carolina's well-publicized battle against infant mortality. Any death of an infant less than one year old counts toward the state's infant mortality rate. Taken together, these deaths would rank eighth in number each year, just ahead of suicide.[9]

For the past decade, the state's infant death rate dropped steadily, but in 1987 and 1988 it took a turn for the worse. North Carolina ended the year with the highest infant mortality rate of any state and a black eye in the local and national press. The legislative and executive branches scrambled into action, convening task forces and targeting additional state dollars—nearly $40 million since 1989—towards various forms of prenatal care.[10] In mid-1991, Gov. James G. Martin was able to announce dramatic results—the infant death rate had dropped for 1989 and 1990. In trumpeting the decline, Martin praised several state and private-sector programs, as well as his Commission on Reduction of Infant Mortality, established in December 1989.

Yet despite the state's gains, one grim fact stands out: the infant mortality rate for non-whites is still nearly twice as high as the rate for whites. Along with race, the other key indicator for infant mortality is a baby's low birth weight. That, health officials assert, tends to "occur more fre-

quently among non-whites and persons of lower socio-economic status.... Infant mortality cannot be separated from its broader context of underdevelopment and poverty."[11]

But Atkinson and his staff still don't know either what caused the two-year hike in the rate in 1987 and '88 or what caused it to subside in 1989 and '90. "Do Medicaid and state dollars make a difference and under what conditions do they make a difference?" he wonders. "You can't say whether one thing did it or a combination of things did it."

Even Walter Shepherd, executive director of the commission, isn't sure what accounts for the drop. He said better medical technology might hold the answer. "It would be nice to say that the programs put in place would have an impact, but it's too early to say," he says.

Answers to those questions can be elusive, whatever the illness. Similar question arise about other causes of deaths and illnesses that prevail in North Carolina, and what policy makers are doing about them.

Heart disease:

Although it causes a third of all deaths, heart disease currently accounts for a smaller percentage of deaths in North Carolinians than in earlier years. In 1979, 223.7 people per 100,000 died from heart disease. In 1988, the last year for which comparable statistics are available, the rate was down to 173 per 100,000. The national rate—203 deaths per 100,000 in 1979—had fallen to 166 deaths per 100,000 by 1988.

Those statistics bear good news and bad. The state's death rate from this disease has dropped, but it still exceeds the national average.

Dr. Fredric Romm, an associate professor of family and community medicine at Wake Forest University's Bowman Gray School of Medicine in Winston-Salem, is coordinating North Carolina's participation in a national survey on heart disease. His suspicion is that heart disease's decline relative to other causes of death is caused partly by lifestyle changes but also by the rise of advanced medical care for heart disease.

Romm is one of four field coordinators for a heart-disease study called Atherosclerosis Risk in Communities, or ARIC. In four communities—Forsyth County, N.C.; suburban Minneapolis, Minn.; Hagerstown, Md.; and Jackson, Miss.—researchers hope to track about 16,000 middle-aged persons over several years and record changes in their heart conditions. From that information, they hope to gain insight into the onset and preven-

Technologists study film of cardiac catheterization at Wake Medical Center.

Wake Medical Center

tion of heart disease. "One of the reasons we're doing this study is there's been a decline in deaths in heart disease, and we don't know why," says Dr. Romm.

Cigarette smoking is the leading cause of heart disease and lung cancer, according to the U.S. Department of Health and Human Services.[12] But the public health crusade against smoking isn't quite as simple in North Carolina as it might be in other states. Tobacco is North Carolina's largest cash crop and a linchpin of the state's rural economy, despite efforts to shift the agricultural economy to other commodities. Cigarette making remains a leading high-wage industry in the urban Piedmont.

So not surprisingly, the state's policy makers on occasion have conflicting opinions about tobacco-related health issues. This shows at the state and local level in three recent instances. North Carolina applied in 1990 to take part in a nationwide program that aims to cut the adult smoking rate from 28 percent to 15 percent by the year 2000. The plan's name is the American Stop-Smoking Intervention Study, or ASSIST. The state's top health officials carefully weighed the grant application's merit, acknowledging that the tobacco industry's heft made the decision a touchy one, but in September 1991, North Carolina was approved for inclusion in the effort.

By contrast, consider what happened in mid-1991 when the Duplin County Board of Education tried to ban smoking in the county's schools. After the board's initial vote endorsing the ban, angry tobacco farmers threatened to derail a $30 million school bond referendum, and the board backed down. A brochure prepared that same summer publicizing recommendations of Lt. Gov. Jim Gardner's Drug Cabinet warned pregnant women not to drink or use drugs but made no mention of smoking.[13] The resulting brouhaha was publicized in newspapers across the state and wound up on the pages of the *Journal of the American Medical Association.*

Still, despite the widespread impact of tobacco and the state's traditional position as the largest cigarette manufacturer in the world, one ranking showed about 32 percent of North Carolina's adults smoke, compared to 28 percent for the nation. The highest rate: Nevada, with 35.7 percent. The lowest: Utah again, at 14.1 percent.[14]

While cigarette smoking is the leading cause of heart disease, it is by no means the only cause. Other contributors include: hypertension or high blood pressure, high cholesterol, obesity, and sedentary lifestyles.

Among the early findings of the ARIC research supervised by Romm is that nearly a fourth of the blacks and about a fifth of the whites participating in the Forsyth County study have high cholesterol levels. And half the blacks have high blood pressure, while slightly less than a third of whites also show hypertension.

Death from heart disease is highest in the rural southwest and rural northeast sections of the state (see Table 4, p. 10 for a county-by-county breakdown of death rates by cause). The clusters have mainly to do with age and race. Many of the eastern counties have large minority populations, and non-whites smoke more often than whites. Many of the western counties have a higher percentage of the elderly.

Cancer:

As heart disease has dropped as a cause of death, cancer has risen. It's the only major illness that causes more deaths now than 40 years ago. Part of the reason is modern medicine's success in treating *other* diseases relative to its ability to cure cancer. Another reason is that what the experts know about preventing and detecting cancer isn't always put into practice.

Overall, North Carolinians die of cancer at about the same rate as the nation as a whole, but certain segments of the population do not share in that status. In North Carolina, as elsewhere, blacks die of cancer at a greater rate than whites. In Chowan County, for example, the mortality rate from *prostate cancer* is three times the state average.

According to a state publication on mortality, "Blacks in certain regions of North Carolina have some of the highest prostate cancer mortality rates in the world. The high rate among blacks may be related to genetic or environmental factors as well as to health care access or quality issues."[15]

Cancer strikes at many organs. And the news is better for cancer in some parts of the body than for others. A bleak spot in the state's war on cancer is *lung cancer.* As a cause of death, it's increasing in both sexes and blacks and whites, with white females showing the greatest increase. With extremely low cure rates (less than 5 percent) for lung cancer, health officials say prevention is the most effective way to combat the disease. This is where the issue of access to health care enters the debate. In 1987, North Carolina had one doctor for every 565 residents. The national average

—continued on page 12

Table 4. 1990 North Carolina Deaths by Cause and by County

County	* County Rank	Population	Cancer	Diabetes	Heart Disease	Stroke	Pneumonia/ Influenza	Chronic Obstructive Pulmonary Disease	Chronic Liver Disease/ Cirrhosis	Unintentional Injuries & Adverse Effects	Suicide	Homicide	** Total Deaths
Alamance	37	108,427	257	41	362	87	32	50	8	41	17	17	1104
Alexander	83	27,608	49	3	69	17	14	7	2	12	1	2	221
Alleghany	10	9,590	22	1	37	7	7	5	2	8	3	1	113
Anson	35	23,421	58	5	83	19	14	12	3	7	2	6	242
Ashe	20	22,206	59	5	75	26	7	11	1	4	4	2	245
Avery	51	14,878	23	3	56	4	10	11	4	10	3	0	141
Beaufort	18	42,331	112	21	154	42	22	19	3	15	3	4	473
Bertie	6	20,372	60	10	76	24	9	5	2	20	4	1	257
Bladen	22	28,616	61	6	105	31	10	5	3	24	4	5	311
Brunswick	62	51,365	132	4	146	26	22	21	5	35	5	4	467
Buncombe	31	175,173	466	30	529	129	89	77	27	79	22	11	1821
Burke	78	75,815	149	19	224	39	19	22	9	33	12	10	648
Cabarrus	73	99,256	222	25	306	45	43	20	11	28	14	9	868
Caldwell	82	70,789	149	16	166	53	16	21	3	30	13	15	572
Camden	80	5,906	10	1	12	9	2	4	0	3	2	0	49
Carteret	58	52,854	122	5	144	35	13	21	11	28	11	3	487
Caswell	51	20,695	45	7	64	14	7	7	4	9	5	0	196
Catawba	70	118,742	237	20	332	70	45	42	9	67	17	11	1049
Chatham	66	38,893	75	6	124	32	11	9	3	18	7	4	345
Cherokee	31	20,200	47	5	83	18	11	4	2	3	3	1	211
Chowan	8	13,530	32	4	46	16	15	5	6	3	0	1	162
Clay	28	7,168	17	0	38	5	3	1	0	2	2	0	75
Cleveland	43	84,748	173	31	311	68	23	28	12	39	10	16	838
Columbus	24	49,549	111	10	190	45	18	12	5	29	5	9	536
Craven	92	81,715	136	7	206	40	16	23	9	32	12	10	616
Cumberland	97	276,791	370	45	541	98	36	66	28	100	28	39	1624
Currituck	51	13,800	24	3	39	10	12	6	0	9	2	0	131
Dare	94	22,980	43	2	53	8	7	2	2	9	3	2	166
Davidson	91	127,038	224	22	344	61	28	33	13	69	16	9	968
Davie	78	27,941	57	6	90	14	10	7	2	15	7	3	238
Duplin	28	39,976	98	6	129	50	19	18	4	17	6	6	420
Durham	92	182,585	310	32	415	97	42	37	13	59	15	22	1376
Edgecombe	20	56,602	157	12	178	64	21	15	6	40	7	11	620
Forsyth	73	266,443	527	58	695	199	84	86	28	91	47	33	2331
Franklin	41	36,675	80	9	122	30	8	12	6	31	3	4	369
Gaston	62	175,410	358	24	631	94	45	62	17	76	23	17	1594
Gates	27	9,317	17	0	35	9	1	3	0	11	4	0	100
Graham	64	7,195	16	3	16	5	3	1	2	5	1	0	65
Granville	43	38,510	83	9	131	23	25	14	4	16	8	7	382
Greene	87	15,397	18	1	44	6	4	7	0	12	2	1	118
Guilford	76	348,187	724	63	923	267	97	104	51	110	48	33	2998
Halifax	7	55,572	143	17	235	61	15	28	10	35	4	10	670
Harnett	66	68,033	140	26	194	39	12	19	2	44	12	12	603
Haywood	22	46,950	113	8	202	28	21	25	4	16	7	8	512
Henderson	10	69,551	192	7	298	59	33	39	14	33	10	6	821
Hertford	4	22,504	59	5	96	21	9	10	5	8	2	4	290
Hoke	87	22,857	47	1	51	15	7	7	5	9	1	5	175
Hyde	2	5,399	12	2	29	6	4	6	0	4	1	1	75
Iredell	70	93,193	177	17	262	69	26	28	13	54	17	10	818

County	* County Rank	Population	Cancer	Diabetes	Heart Disease	Stroke	Pneumonia/ Influenza	Chronic Obstructive Pulmonary Disease	Chronic Liver Disease/ Cirrhosis	Unintentional Injuries & Adverse Effects	Suicide	Homicide	** Total Deaths
Jackson	66	26,884	40	8	83	15	15	8	1	18	3	0	239
Johnston	58	81,580	156	11	296	51	25	23	11	44	11	8	747
Jones	58	9,407	18	2	33	3	4	4	0	4	0	1	87
Lee	55	41,490	97	10	120	20	15	17	7	29	6	9	388
Lenoir	18	57,206	134	13	227	52	16	22	9	25	11	10	643
Lincoln	87	50,517	105	6	148	31	8	6	6	28	4	2	389
McDowell	48	35,696	79	8	134	24	13	16	4	20	4	4	349
Macon	24	23,545	79	6	77	17	6	13	6	8	4	0	255
Madison	43	16,966	28	7	46	18	13	8	2	10	3	1	168
Martin	13	25,056	70	12	73	23	8	12	4	16	5	5	292
Mecklenburg	95	514,056	869	87	1023	267	97	114	58	168	69	98	3599
Mitchell	28	14,433	40	2	50	12	10	5	2	11	1	1	152
Montgomery	56	23,342	57	3	64	23	3	4	1	12	3	3	217
Moore	35	59,228	159	9	194	60	31	18	7	34	10	6	608
Nash	49	76,916	142	15	240	62	27	31	15	37	16	13	746
New Hanover	73	120,691	303	26	296	97	19	44	16	42	20	4	1052
Northampton	10	20,758	56	8	81	19	11	10	2	15	3	1	245
Onslow	100	150,744	136	11	158	27	15	28	10	43	22	11	579
Orange	98	94,283	137	14	140	42	15	20	3	24	17	11	539
Pamlico	8	11,396	29	0	49	12	5	3	0	6	3	0	137
Pasquotank	41	31,368	81	5	118	21	9	11	5	8	5	3	318
Pender	66	29,022	56	7	76	29	8	11	4	12	5	3	258
Perquimans	13	10,471	28	0	34	14	5	4	1	5	4	1	122
Person	31	30,206	77	4	99	30	9	11	2	22	2	5	314
Pitt	83	108,380	204	28	237	69	29	18	16	55	12	9	865
Polk	1	14,452	50	7	73	22	8	7	4	7	1	2	227
Randolph	80	106,928	214	18	286	71	22	38	12	50	12	6	891
Richmond	37	44,502	96	11	152	42	10	16	6	25	9	10	454
Robeson	70	105,280	163	37	308	72	32	32	7	69	15	16	924
Rockingham	43	86,131	202	23	273	77	29	33	13	47	8	10	852
Rowan	43	110,886	260	20	383	97	44	34	8	49	18	9	1103
Rutherford	37	57,018	130	11	229	47	16	27	3	18	6	6	579
Sampson	17	47,242	100	12	182	55	14	21	5	30	10	4	535
Scotland	86	33,790	55	12	85	22	4	7	3	21	4	3	263
Stanly	64	51,851	92	16	184	41	16	11	5	25	7	2	467
Stokes	83	37,321	65	4	98	32	12	11	5	22	5	0	297
Surry	49	61,760	128	12	215	51	17	30	11	27	14	7	601
Swain	3	11,287	30	3	48	9	10	5	1	8	1	1	149
Transylvania	56	25,562	75	4	82	11	11	10	6	7	1	3	239
Tyrrell	5	3,853	15	0	15	0	2	3	1	4	0	0	49
Union	87	84,562	138	17	226	45	27	12	5	32	8	10	647
Vance	16	38,950	94	9	162	40	24	13	3	22	8	6	451
Wake	99	426,212	603	57	694	201	60	68	22	116	53	30	2419
Warren	13	17,291	46	2	71	18	6	9	0	14	3	3	202
Washington	37	13,973	31	3	53	6	9	1	1	6	2	2	143
Watauga	96	37,074	48	1	73	13	13	12	3	22	9	2	239
Wayne	76	104,836	222	28	289	61	14	42	9	37	8	18	903
Wilkes	58	59,414	106	8	173	44	30	26	7	34	9	3	546
Wilson	24	66,145	153	26	219	64	24	18	11	33	13	15	712
Yadkin	31	30,543	57	6	110	19	17	12	2	16	3	0	317
Yancey	51	15,432	32	3	50	14	3	6	1	7	2	0	147
Total		**6,648,6891**	**13198**	**1315**	**18520**	**4446**	**1937**	**2042**	**719**	**2896**	**927**	**762**	**57175**

* *1 = highest death rate after adjusting for population size*

** *Includes all causes, not just causes included in this table, so row total does not equal total deaths.*

was one doctor for every 467 people. But within the state, there are vast disparities in the availability of *primary care* physicians, a vital first rung on the health care ladder.

In Orange County, home to the University of North Carolina's medical center, there was one such doctor for every 316 people in 1990—the lowest ratio of population to primary care physicians in the state.[16] In Stokes County in the northwest, each primary care physician serves, on average, 6,204 people, the highest ratio in the state. Other counties with high ratios are: Camden, 5,904; Montgomery, 5,837; and Greene, 5,128.

Other indicators also point to the inability of many North Carolinians to gain access to health care. Most critical is the lack of health insurance. Nearly one in every eight persons in North Carolina lacks health insurance on any given day, and as many as 1.2 million citizens are uninsured at some point over the course of a year.[17]

There's a large segment of North Carolina's population that likes its buttered grits and red-eye gravy and bacon.

— Dr. Joseph Konen
Director of Community Medicine
Bowman Gray School of Medicine

In the treatment of cancer, ready access to health care can be the difference between life and death. Take *cervical cancer,* which is often successfully treated if detected early. While the mortality rate for this form of cancer is dropping, nonwhites still die at three times the rate of white females. "This wide differential probably involves late access to health care and perhaps socioeconomic and sexual activity factors often associated with the disease," according to a 1988 state publication on mortality.[18]

"I don't think there's rank discrimination here," state health director Levine told *The News & Observer* of Raleigh. "I think it's inadvertent discrimination. The lack of access to resources is an indirect form of discrimination that needs to be addressed."

How do you give more people access to health care? In the 1991 session, the General Assembly approved two pieces of legislation that address parts of the problem through the existing health insurance structure. The first law requires health insurers to pay for annual mammograms and pap smears for women.[19] Mammograms are a screening procedure to detect *breast cancer,* while pap smears detect cervical cancer. The idea behind the legislation is to remove virtually all financial disincentives to women using these diagnostic tests.

But there's a catch. The law only covers women who have health insurance. Dr. Wester applauds the spirit of the law, but says there's something not quite right with a law that gives wealthier women access to a potentially life-saving procedure while denying it to poor women. Wester attributes the law's limited scope to the budget difficulties that confronted the General Assembly when it convened for the 1991 session. Lawmakers eventually closed a gap of about $1.2 billion using equal parts budget cuts and tax increases, but revenues are projected to be tight for the foreseeable future.[20] "Eventually, I'm sure, these services will be picked up for all," Wester says, "but it's hard to do that when you have a $1 billion shortfall."

The second piece of legislation important to providing access requires health insurers and health maintenance organizations (HMOs) to offer a bare bones insurance policy for small businesses.[21] The law would also limit the annual rate increases insurers could charge. Sponsors and industry lobbyists who pushed for the bill estimate there are about 600,000 uninsured residents who work for or are dependent on someone who works for a small business. While N.C. Department of Insurance officials say it's too early to tell about the success or failure of this program, an optimistic estimate is that 10 percent of these uninsured individuals might gain access to health care coverage.

Diabetes:

Diabetes is both a leading cause of death and a leading disease in North Carolina. An estimated 350,000 residents have the ailment, but about half don't know it.[22] Although the disease can be controlled through diet, exercise, and insulin and other drugs, about 1,372 persons died from diabetes in 1989. Another 3,000 death certificates listed diabetes as an associated condition. Non-whites are more than twice as likely to die from diabetes as whites.

The public and private sector's efforts against diabetes provide a glimpse of a substantial population that is considered unhealthy but still is reluc-

tant to make changes in their lifestyle. Dr. Joseph Konen, director of community medicine at the Bowman Gray School of Medicine, said adult diabetes often appears in a two-step pattern. Certain people are genetically predisposed to the disease, but the ailment's onset is triggered by an inappropriate diet.

The key to preventing diabetes, he said, is identifying high-risk individuals and then helping them make lifestyle changes. And that is often a difficult task. "There's a large segment of North Carolina's population that likes its buttered grits and red-eye gravy and bacon," he says. The people who readily come forward for help, he adds, are not the disadvantaged, but "are the ones who've already bought into changing to a healthy lifestyle."

The Centers for Disease Control have begun a project in the Triad and the Triangle to combat diabetes. The Triad will be the control group, while the Triangle communities of Raleigh and Durham will receive intervention in the form of heavy doses of public education. The goal is to reduce body weight by an average of 5 to 10 percent during the next decade or so, which would reduce the risk of diabetes. One target for these efforts is the black church, where researchers plan to push for dietary changes. "If the community buys into it, there will be a change in the culture," says Dr. Konen, one of the study's coordinators.

These types of early steps are crucial for narrowing the black-white health gap, says Dr. John Hatch, a professor of health behavior and health education at UNC–Chapel Hill. "Intervening at the symptoms is not a long-run solution," he says.

Dr. Stoodt of the Division of Adult Health Services agrees. "Preventing the incidence of diabetes is a pretty new question," she says. The public health emphasis traditionally has turned on keeping the disease in check and preventing its side effects, such as blindness and kidney failure.

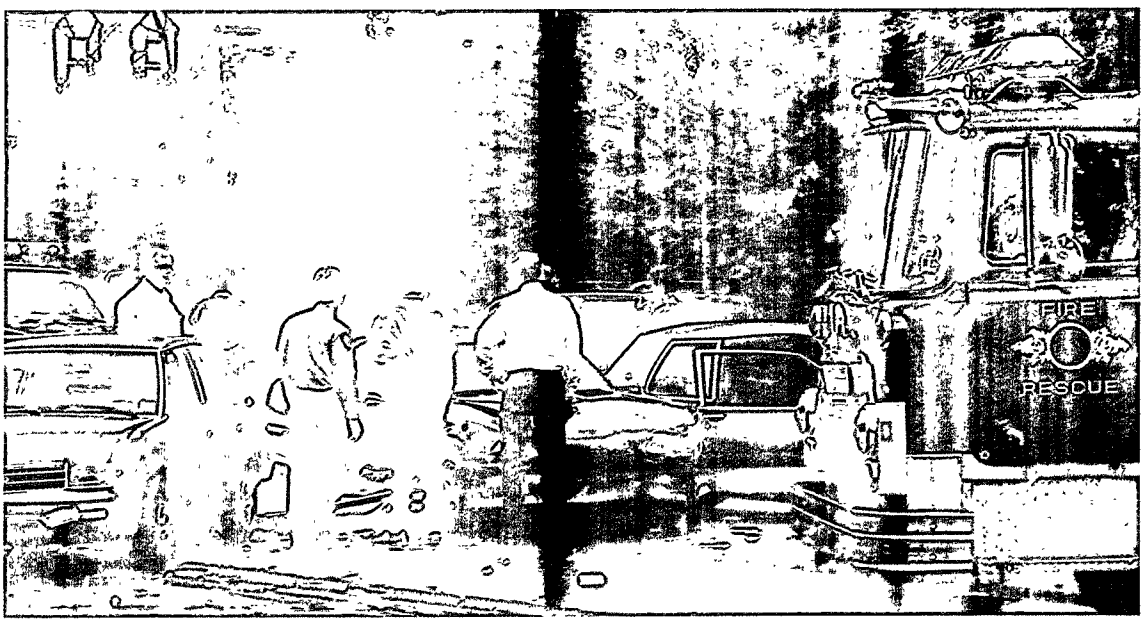
That view still predominates in state policy decisions. Using federal money, North Carolina spends nearly $220,000 to staff diabetes control programs at three local health departments in rural eastern North Carolina. The goal is to reduce the complications, disabilities and premature deaths caused by diabetes. According to the grant application for the Triad and Triangle project, "The emphasis is on increasing self-care in the management of the disease and in controlling complications."[23] Dr. Stoodt adds, "Managing diabetes on a daily basis is largely the individual's responsibility."

Injuries:

Not so long ago, fatalities from car wrecks, drownings, and fires were called "accidents." Now they're called "injuries." This isn't an Orwellian attempt at double-talk or news-speak. Instead it reflects the growing recognition that many accidents aren't as accidental as they seem.

When North Carolina abandoned the term "accident" in 1990, health officials wrote, "The connotation of accidents as random events beyond

Traffic accidents are a leading cause of death and injury in North Carolina.



Karen Tam

Wake Medical Center

reasonable human control is considered an impediment to the prevention of injuries in North Carolina."[24]

In 1989, the last year statistics are available, 4,752 people died from injuries. A third of those deaths are considered "intentional" injuries, such as *suicide* and *homicide*. The rest are called "unintentional."

Compared to the nation, North Carolina's rates of murder and suicide are slightly lower. (In past years, they've been slightly higher.) And the state considers "accidents" from drowning, falls, poisoning, and fire enough of a problem to have a Governor's Task Force on Injury Prevention.[25]

But overall, the incidence of death from unintentional injuries is higher than the national average. This is particularly true in *motor-vehicle accidents*. Generally, residents in the state's rural areas die more often in car wrecks than in other types of injuries.[26]

"I attribute it to a lack of manpower for traffic law enforcement in rural areas of the state versus urban areas," says Alfred C. Warlick III, deputy director of the Governor's Highway Safety Program. Warlick says young people who like to drive fast tend to seek out rural areas where they are "less likely to be caught."

But the biggest cause of the state's 1,384 traffic deaths in 1990 had little to do with city streets or country roads. It was abuse of alcohol. According to reports from the state's medical examiners, more than half the drivers in single-vehicle crashes were legally intoxicated. Overall, 44 percent of all fatal accidents were alcohol-related.

The Safe Roads Act is the cornerstone of the state's attack on drunk-driving. Enacted in 1983, it imposed stiffer penalties for convictions of driving-while intoxicated.[27] But it's not easy to trace the act's direct or indirect impact on the number of traffic fatalities. The state's rate of vehicle deaths actually increased in the years immediately after the legislation was passed, but then began dropping again in 1986. "I attribute the declining fatality, injury, and accident picture in the years following the Safe Roads Act to a combination of stiffer penalties, increased adjudication, and more concentrated enforcement," says Warlick. "These factors, combined with a higher percentage of larger cars and a 60 percent-plus safety belt use rate account for a large portion of our improved collision picture."

North Carolina's child seat belt laws were enacted in 1982 and 1985.[28] The adult version took effect in 1987.[29] Now drivers and front-seat passengers of any age must wear a seat belt and children up to age 6 must be restrained whether they are riding in the front or back. But according to the UNC Highway Safety Research Center, which monitors seat belt use statewide, compliance has dropped since the early days, from 78 percent in the first year to just over 60 percent in 1991.[30]

States measure traffic fatality rates two ways: the number of deaths per 100,000 population and the number of deaths for each 100 million miles driven. With either method, North Carolina, along with other South Atlantic states, is above the national average, although its rate for each measure is lower than it was a decade ago.[31]

"How literary . . . streets thick with the details of impulsive life as the hero ponders the latest phase in his dying."

— Don DeLillo
White Noise

On the job, North Carolinians appear to be relatively healthy, despite the tragic poultry processing plant fire that claimed 25 lives in Hamlet, N.C., in September 1991. A total of 182,103 private sector *work-related injuries* were reported in 1988, according to the N.C. Department of Labor.[32] While a greater share of the state's workers draw their paychecks from manufacturing jobs than in any other state,[33] North Carolina's private-sector injury rate is still lower than the nation's. There were 8.2 injuries for every 100 full-time Tar Heel workers in 1988, the last year figures are available. Nationally, 8.6 injuries were reported for every 100 workers.

Injuries are the leading cause of death for Americans aged 1–44.[34] Health statisticians use a measurement called "years of potential life lost" to gauge the impact of these accidental deaths. The calculation multiplies each death by the number of years before the victim turned 65. A 25-year-old who drowned would be given 40 years of life lost, while a 63-year-old who died from stroke would only receive two years. The years lost from injuries in North Carolina exceed the years lost from

cancer or heart disease. In 1988, health officials estimated the economic cost of death by injury in the state at $1.5 billion a year.

Sexually Transmitted Diseases:

One of the fastest-growing health problems in North Carolina is STD, the acronym for Sexually Transmitted Diseases. Once known euphemistically as "social diseases," STDs include gonorrhea, syphilis, chlamydia, and AIDS (Acquired Immunodeficiency Syndrome). "A relentless increase in gonorrhea and syphilis cases in North Carolina is worrying public health experts who fear that the trend foreshadows a surge in AIDS," *The News & Observer* of Raleigh reported in November 1991.[35] Health officials are worried that the dramatic increases in syphilis and gonorrhea mean that increases in HIV infection—the virus linked to AIDS—won't be far behind (See Table 5 for a 10-year look at trends in sexually transmitted diseases).

As late as 1986, there were no reported cases of congenital syphilis, an STD passed from mother to child at birth. In 1990, there were 30 cases of the disease, spread from infected mothers to their babies. "That means syphilis is rampant," says Dr. Rebecca A. Meriwether, the director of the communicable disease division of the Department of Environment, Health, and Natural Resources.

Indeed, in 1990, reported cases of syphilis jumped by nearly 40 percent in North Carolina, according to preliminary figures compiled by the American Social Health Association. Based on the 1990 figures, the state's infection rate now tops the national rate. For gonorrhea, the other major reported sexually transmitted disease, the infection rate is already well above the national average, although not increasing, according to state-produced statistics.

Dr. Meriwether blames drug use and budget cuts for the increase in syphilis. "Whenever resources for partner notification go down, rates go up," she said. This past year, the General Assembly approved hiring 10 additional people to conduct partner notification for people infected with syphilis or AIDS.

North Carolina's AIDS infection rate, now at 9.0 per 100,000, is increasing steadily, although it's still about half the national average and below most other states in the South Atlantic region. "We're catching up," warns Dr. Meriwether. Of particular concern to public-health officials is the disease's steady tilt toward non-whites and poor people. That would follow a pattern of other sexually transmitted diseases. Syphilis and gonorrhea, the state's most common STDs, are both most prevalent in counties with large minority populations.

Mental Health:

Although perhaps not as obvious as heart disease or diabetes, mental illness is a serious and widespread problem in North Carolina. Estimates vary on the number of mentally ill, but including substance abuse, as many as 900,000 North Carolina citizens may suffer some form of mental illness at any one time, according to the state Mental Health Study Commission.[36] A report issued in July 1988 by the Division of Mental Health, Mental Retardation, and Substance Abuse Services in the N.C. Department of Human Resources estimated more than 1.2 million North Carolinians had suffered

Table 5. Cases of Sexually Transmitted Diseases in N.C., 1980–90

	AIDS	Syphilis	Gonorrhea	Chlamydia
1980	0	908	41,707	
1981	0	1,165	41,825	
1982	4	1,311	43,835	
1983	17	1,532	39,441	
1984	28	1,516	37,447	
1985	91	1,289	39,162	
1986	142	1,094	38,031	
1987	282	1,416	31,958	2,210
1988	346	1,655	29,418	
1989	474	2,057	30,922	8,740
1990	474	2,867	33,377	10,500

Source: N.C. Communicable Disease Information Office, HIV/STD Branch

some mental disorder in the previous year.[37] That included everything from major depression to a simple fear of wide-open spaces.

For severe and persistent mental illness, a narrow definition of serious cases, the study estimated that about 85,000 residents, or 1.76 percent of the adult population, were afflicted. Another 1.15 percent have schizophrenia. Leaders of the study commission suggested earlier this year that the state needed to add $600 million during the next decade to the existing $645 million budget to fight mental illness and substance abuse and expand existing programs. They received only $15.3 million in new money, and only $6 million of that had been part of the study commission package. Sen. Marvin Ward (D-Forsyth), a member of the study commission, said, "For a year like this past one [when tax revenues were short], we're glad to have anything."[38]

The Challenge

If North Carolina is to improve its health, the challenge is to make the next generation healthier than the previous one. The experts say the solution lies in fostering better eating habits, a regular exercise program, and avoidance of alcohol and drugs, including tobacco.

The most recent survey of North Carolina lifestyles revealed that 11 percent of residents between the ages of 18–24 are *obese*. More than half do little or no *exercise*. A fifth *smoke*. More than a fifth *drink* heavily (See Table 6, p. 18 for more).

What to do? Much of the energy and money for this task will be directed through the state's public schools. "My whole spiel is pay now or pay later," says John P. Bennett, chief consultant for the Healthful Living Section in the Department of Public Instruction. "You always have to remember that kids think they are immortal, but as elementary kids their eating patterns are set for life."

Health education is being slowly broadened to emphasize lifetime health habits instead just of hammering home hygiene and the four food groups. This includes studying nutritional weight management and learning lifelong sport and fitness skills.

North Carolina's students must complete a one-unit health and physical education course to graduate from high school. Bennett wants more but understands the school day is already stretched thin. "My best guess is that expansion in this area won't occur," he notes.

Less than half of North Carolina's 133 school systems have a health education coordinator or director. Shellie Pfohl is the director of the Governor's Council on Physical Fitness, an agency designed to promote fitness and help communities develop local fitness councils, which teach and encourage lifetime health skills. She says the nation as a whole is basically unfit. "We're definitely not at the rear end, but we're not at the forefront either," she adds.

To date, five counties—Buncombe, Davidson, Forsyth, Mecklenburg, and Wake—are establishing these local fitness councils. Pfohl said another 20 counties have expressed serious interest in forming a council. For the most part, the counties moving forward in this area are larger and more urbanized. It's not that rural counties don't care, says Pfohl. But their dispersed population makes it more difficult to galvanize community support.

At least one area of health education has produced modest success: the humble school lunch, which is undergoing a subtle transformation at cafeterias across the state. In the Mooresville City Schools in Iredell County, for example, the old cafeteria was ripped up and replaced with a layout that resembled a fast-food restaurant more than a cafeteria. Pat Currin, the system's child nutrition director, says, "The average junior high school and high school diet is very poor. They want French fries, pizzas, hot dogs, and hamburgers."

At Mooresville, however, the pizza has low-fat cheese. The French fries are processed in canola oil and fried in soybean oil. And school administrators say about a fifth of the kids chow down at the salad, potato, and taco bar. More kids want fresh fruit with lunch, says Currin, but whole-grain breads still go over like extra homework. "Many of those Southern kids won't eat that," says Currin. Still, there are signs that even this last bastion of Southern culture—the bad diet—may be crumbling. Witness Woody Durham, the venerable voice of UNC athletics. Durham, long an endorser of down-to-earth products, now tells listeners along the Tar Heel Sports Network he has dispensed with white bread and has his bologna on whole wheat smeared with Grey Poupon.

Levine, the state health director, says the statistics compiled over the years show that North Carolinians generally "are enjoying better health than ever before. Compared to a decade ago or longer, we are living longer; are experiencing declines in overall mortality as well as some of the leading causes of mortality such as heart disease,

Table 6. Percentage of North Carolinians with *Reported* Risks by Race and Sex, Age, Income, and Education Level

	Current Smokers	Current Hypertensives	Sedentary Lifestyles	Obesity	High Cholesterol	Chronic Drinkers	Acute Drinkers	Drinking & Driving	Lack of Seat Belt Use
Total N.C. Population	28.0	18.0	60.5	28.8	11.7	2.5	9.1	1.5	15.8
Race and Sex									
White Male	32.4	15.0	58.8	27.5	11.2	5.1	15.8	3.3	21.4
White Female	27.4	18.1	56.4	23.7	15.8	0.3	3.5	0.4	12.5
Nonwhite Male	23.4	16.5	67.8	32.3	1.6	4.1	15.1	1.0	15.4
Nonwhite Female	21.0	27.8	71.8	45.6	9.0	0.8	3.5	0.5	9.9
Age									
18–24	20.9	1.5	57.3	11.1	3.1	5.6	16.9	3.6	21.1
25–34	39.6	6.1	55.3	23.9	5.8	3.2	16.0	3.2	17.4
35–44	29.4	10.2	60.1	34.5	12.1	1.9	8.9	1.0	16.0
45–54	31.0	24.3	62.2	39.6	18.3	1.5	4.5	0.5	18.8
55–64	27.9	39.4	63.7	37.5	18.7	1.6	2.4	—	10.8
65+	13.4	39.2	68.9	30.0	17.1	1.2	1.2	—	9.1
Income									
Less than $10,000	22.4	33.5	74.9	38.4	11.2	2.5	6.2	0.4	17.1
$10,000–14,999	29.1	17.0	65.3	35.0	10.1	3.4	10.3	2.0	19.3
$15,000–19,999	34.8	20.3	58.2	25.6	11.0	3.4	10.4	2.3	19.2
$20,000–24,999	32.1	16.7	55.6	26.2	12.2	3.0	7.6	1.8	14.6
$25,000–34,999	30.6	10.3	55.0	21.6	11.4	2.3	8.8	0.9	15.5
$35,000–50,000	28.1	13.2	56.5	30.8	15.1	3.5	14.0	2.7	12.0
$50,000+	20.3	9.1	43.7	23.1	16.2	0.9	11.2	1.3	13.6
Education Level									
<9th Grade	23.2	40.4	79.4	43.1	8.8	1.4	1.8	0.8	16.0
Some High School	33.2	23.7	78.1	34.4	8.2	1.5	6.9	1.2	18.2
High School Grad.	31.2	16.4	62.0	27.2	11.7	2.5	10.3	1.4	19.0
Any Tech. School	38.7	7.4	58.4	24.2	10.2	3.2	10.4	—	13.0
Some College	28.9	10.6	48.8	27.8	13.5	3.7	12.2	2.4	14.7
College Graduate	17.4	15.4	44.8	23.0	13.8	3.2	9.4	2.1	9.5
Post Graduate	20.2	12.3	48.1	19.4	17.5	1.2	9.9	—	8.7

Definition of Risk Factors

Current Smokers—Have smoked 100 cigarettes in life and smoke now.

Current Hypertensives—Persons told blood pressure was high more than once, or who are on medication, or report their blood pressure is still high.

Sedentary Lifestyles—Persons who do not get at least 20 minutes of aerobic exercise at least three times a week.

Obesity—Persons at or above 120 percent of ideal weight—as defined by the 1959 Metropolitan Height-Weight Tables.

High Cholesterol—Blood reading greater than 200 milligrams per deciliter.

Chronic Drinkers—Persons who have an average of 60 or more alcoholic drinks in a month.

Acute Drinkers—Persons who had five or more drinks on one occasion in a month.

Drinking and Driving—Persons who drive after having too much to drink.

Lack of Seatbelt Use—Any reported seat belt use that is less than always.

Source: N.C. Department of Environment, Health, and Natural Resources, Division of Adult Health. These data are based on annual telephone interviews with more than 1,700 persons and adjusted for age, race, and sex to reflect the demographic makeup of the North Carolina population. The results are published in a brochure titled, "Risky Business—A Fact Sheet on the Behavioral Risk Factors of North Carolinians."

cerebrovascular disease, and injuries; and are experiencing declines in infant mortality." The median age at death has increased from 28.1 years in 1914 to 72.9 years in 1989, Levine says.

But he adds, "While the past century has been marked by outstanding progress toward saving lives and promoting health, we are still challenged. North Carolina continues to be far below the comparable U.S. rates for a number of the health indicators. Minorities and low-income persons in this state have rates far exceeding those for whites and the moderate-to-high-income groups. Our citizens continue to die from causes too early or needlessly. Problems such as lack of health care access, poor health habits [and] behavior, and inadequate health education requiring extraordinary efforts by health officials must be resolved before the relative health of North Carolinians can improve."

FOOTNOTES

[1] The Northwestern National Life State Health Rankings: Results, Methodology and Discussion, 1990 Edition and 1991 Edition, Minneapolis, Northwestern National Life, pp. 1–8.

[2] Robert A. Hahn, *et al.*, "Excess Deaths from Nine Chronic Diseases in the United States, 1986," *The Journal of the American Medical Association,* Vol. 264, No. 20, Nov. 28, 1990, pp. 2654–2659. See also "The Stroke Belt: Stroke Mortality by Race and Sex," National Heart, Lung and Blood Institute, October 1989, pp. 1–4.

[3] See Thad Beyle, "North Carolinians and Health: It Is a State of Mind," Department of Political Science, UNC–Chapel Hill, June 1990, pp. 1–4. See also The Carolina Poll, March 1991, School of Journalism and Mass Communication and the Institute for Research in the Social Sciences, UNC–Chapel Hill. The poll's margin of error, based on sample size, is plus or minus 4 percent. Respondents were asked, "Would you say your own health, in general, is excellent, good, fair, or poor?"

[4] *Health United States 1990,* National Center for Health Statistics, U.S. Public Health Service, March 1991, p. 123.

[5] For more on health care in rural areas, see Jeanne M. Lambrew and Jack Betts, "Rural Health Care in North Carolina: Unmet Needs, Unanswered Questions," *North Carolina Insight,* Vol. 13, No. 3–4 (November 1991), pp. 66–92.

[6] "North Carolina Citizen Survey: A review of survey data from 1976 to 1984," Management and Information Services, Office of State Budget and Management, Raleigh, N.C., December 1985. The poll is no longer being conducted, although the North Carolina Center for Public Policy Research has recommended that it be revived.

[7] For a full discussion of inadequate health insurance as an access barrier, see Chris Conover and Mike McLaughlin, "Spreading the Risk and Beating the Spread: The Role of Insurance in Assuring Adequate Health Care," *North Carolina Insight,* Vol. 13, No. 3–4, November 1991, p. 21.

[8] *Leading Causes of Mortality: North Carolina Vital Statistics, 1989, Vol. 2,* N.C. Center for Health and Environmental Statistics, February 1991, Chap. 1, p. 1 through Chap. 7, p. 1.

[9] See Pam Silberman, "State's Infant Mortality Rate Among the Nation's Worst," *North Carolina Insight,* Vol. 11, No. 2–3 (April 1989), pp. 131–133 for more on this topic.

[10] The legislature appropriated a total of $10.3 million in new money for the fight against infant mortality in the 1991–93 biennium. In the 1989–91 biennium, $28.5 million in additional funds were appropriated to battle infant mortality, according to the legislature's Fiscal Research Division.

[11] *Leading Causes of Mortality: North Carolina Vital Statistics, 1988, Vol. 2,* N.C. Center for Health and Environmental Statistics, June 1990, Chap. 8, p. 4.

[12] "Reducing the Health Consequences of Smoking: 25 Years of Progress," a report by the U.S. Surgeon General, U.S. Department of Health and Human Services, 1989.

[13] A spokesperson for the Department of Environment, Health, and Natural Resources says smoking was omitted because the brochure focused on illegal drugs and tobacco is legal.

[14] Northwestern National Life State Health Rankings (See footnote 1).

[15] *Leading Causes of Mortality,* Center for Health and Environmental Statistics, Department of Environment, Health, and Natural Resources, Volume 2, 1988, Chap. 5, p. 31.

[16] "North Carolina Health Manpower Databook," Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, October 1990, pp. 7–13. Primary care physicians are defined as those concentrating on family practice, general practice, internal medicine, pediatrics, or obstetrics and gynecology.

[17] Conover and McLaughlin, p. 22. See also Pam Silberman, "Health Care for the Poor: Adequacy, Availability, Affordability," *North Carolina Insight,* Vol. 11, No. 2–3 (April 1989), pp. 122–137 for more on gaps in health care coverage.

[18] *Leading Causes of Mortality: North Carolina Vital Statistics 1988, Vol. 2,* Chap. 5, p. 11.

[19] Chapter 490 (HB 347) of the 1991 Session Laws.

[20] For more on the budget shortfall and its implications for the future, see Mike McLaughlin, "North Carolina's Biennial Budget: Oil Change or Overhaul?" *N.C. Insight* Vol. 13, No. 2 (June 1991), pp. 2–19.

[21] Chapter 630 (HB 1037) of the 1991 Session Laws.

[22] Estimates are from the Diabetes Control Program, Division of Adult Health Services, Department of Environment, Health, and Natural Resources.

[23] See "Diabetes Control Program Proposal FY 1991–1992," Division of Adult Health Services, N.C. Department of Environment, Health, and Natural Resources, undated, p. 1.

[24] *Leading Causes of Mortality, 1988, Vol. 2,* Chap. 7, p. 3.

[25] Established by Executive Order No. 78, issued by Gov. James G. Martin, Nov. 1, 1988.

[26] "N.C. Traffic Accident Facts 1990," Division of Motor Vehicles, N.C. Department of Transportation, 1991, pp. 4–6.

[27] Chapter 435 of the 1983 Session Laws, codified as G.S. 20-179.

[28] G.S. 20-137.1.

[29] G.S. 20-135.2A.

[30] See "Increased Seat Belt Use Through Police Action," N.C. Highway Safety Research Center, Publication No. A-144, 1990–90 and 1990–91, forthcoming.

[31] "1990 State Statistics," National Highway Safety Transport Association, Washington, D.C., 1991, pp. 11–12.

[32] "Occupational Injuries and Illnesses in North Carolina, 1988," N.C. Department of Labor, undated, p. 31.

[33] As of December 1991, 26.7 percent of the state's nonagricultural work force held jobs in manufacturing, according to the Employment Security Commission of North Carolina.

[34] Draft, 1989 Edition, Behavioral Risk Factor Surveillance System, Division of Adult Health, Department of Environment, Health, and Natural Resources, dated 1989, unnumbered sheet provided by department.

[35] Rachele Kanigel, "Gonorrhea, syphilis on rise in N.C.," *The News & Observer* of Raleigh, Nov. 6, 1991, p. 1B.

[36] See Remarks by Sen. Kenneth C. Royall Jr., co-chair, Mental Health Study Commission, Jan. 29, 1991, p. 1.

[37] Prevalence of Mental Disorders in North Carolina, N.C. Division of Mental Health, Mental Retardation and Substance Abuse Services, N.C. Department of Human Resources, July 18, 1988, p. 14.

[38] See Comments For Sen. Marvin Ward, member, Mental Health Study Commission, Jan. 29, 1991, pp. 1–2.