CANCER AND BIRTH DEFECTS SURVEILLANCE SYSTEM
FOR COMMUNITIES AROUND THE SAVANNAH RIVER SITE
(ANNUAL PROGRESS/FINAL)

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SAVANNAH RIVER REGION HEALTH INFORMATION SYSTEM (SRRHIS)
TECHNICAL PROGRESS REPORT

TECHNICAL REPORT

The Savannah River Region Health Information System began on April 30, 1991, the start date of a three year grant from Department of Energy. The first half of the grant period was to be devoted to establishing a cancer registry for the 25 counties adjacent to or downstream from the nuclear production plant, Savannah River Site, in Aiken, South Carolina. To manage the Georgia side of the registry (12 counties) a subcontract was made with Emory University School of Public Health, already distinguished as a grantee within the SEER program of the National Cancer Institute. In the latter part of the grant period, the cancer registry was to be continued, while increased attention was to be devoted to designing a birth defects registry. From the beginning it was proposed to have a Steering Committee representing local residents and selected professional experts, and to keep the region’s communities informed of the process, and of results. The reference date for the cancer registry is January 1, 1991.

ACCOMPLISHMENTS IN FIRST TWO YEARS

YEAR 01

In year 01, April 30, 1991 through April 29, 1992, strong program foundations were laid to support a long term commitment by the Savannah River Region Health Information System (SRRHIS) to the residents of the Savannah River area:

- The Medical University of SC administration recognized the need for this public service/education program and provided the necessary support;
• The project was undertaken with the collaboration of the Emory University School of Public Health which directs a component of the NCI SEER program, the basis of the Nation's cancer profile;

• Approaches were made to agencies with considerable interest in the project, with the idea of complementing mutual programming. These included the SC Department of Health and Environmental Control (DHEC), Radiation Studies Branch of the Centers for Disease Control (CDC), the public education unit of the Agency for Toxic Substances and Disease Registry (ATSDR), the Health Protection unit of Westinghouse Savannah River Corporation (WSRC), and the SC Hospital Association, SC Association of Pathologists;

• A Steering Committee of twelve persons was chosen so as to assure strong citizen participation from the geographic area associated with the project;

• Pains were taken to provide openness of all processes, from Steering Committee meetings to community meetings to being available for the media, and especially to keeping environmentally active groups informed. Newspapers and the electronic media were informed about the effort;

• A mailing list was begun and it has been maintained and enlarged to accommodate persons interested in being kept informed about the project; a pamphlet was prepared and mailed broadly throughout the SRRHIS area;

• Highly skilled and dedicated staff persons were identified, and sufficient space was provided to foster developing close working relationships among them.

YEAR 02

These early policies and activities promoted continued success and timely progress in year 02 as well.

• The cancer registry made dramatic progress in accessing and abstracting records in the SRRHIS area. All hospitals signed the agreement to permit access to their
records. This process was eased considerably by a system of abstracting (developed by our programmer) which substitutes numbers for patient names, and from which no name could be reconstructed. Two hospitals in the SRRHIS area were reluctant to release personal names. However, the demonstration of the computer program, plus assurance from SRRHIS that the individual hospital personnel would be given a copy of our data file before taking it off site, convinced them to cooperate. The area records for 1991 are approximately 80 percent complete, and 1992 records abstracting was begun;

• A popular feature of the registry is the availability of consultation from SRRHIS to help improve existing hospital registries. This service also benefits the registry in a technical way, because it provides the perfect opportunity to make much needed improvements in the quality of the cancer identification and cancer record data. This is an important service to the region overall because, surprisingly, the data from many of the existing registries is based on deficient technique;

• The Charleston three-county area has continued to pose problems even though great progress has been made. Success has been evident in upgrading the quality of the existing private hospital registries and gaining access to one of the two federal hospitals; a problem continues to be with gaining full commitment and effort from the other federal hospital, and the reluctance of one large private hospital to give records access, even with the assurance that the use of personal names will be avoided. The latter hospital authorities indicate a desire to cooperate (they did when the tricounty registry first began in 1990), and they are expected to do so again “if” the State passes a cancer reporting law. Indeed, such a law will assure as well the cooperation of the noted federal hospital. This is not a problem for the primary SRRHIS area, and the Charleston area is included principally as a comparison region;
• Public meetings began in earnest in the second year. The first meeting was held in Beaufort on November 4, 1992. The next step taken was a planning meeting, namely a luncheon held on February 2 in cooperation with the hospital at Varnville, SC, at which guests were invited not only from Varnville but as well from Hampton, SC, Barnwell, SC, Waynesboro, GA, and Sylvania, GA. Plans were laid for future meetings at four different sites, and liaison persons from those sites were identified. Representatives of interested agencies also were invited to the luncheon, i.e., DHEC, CDC, ATSDR, and RAC (Radiation Assessment Corporation);

• The first newsletter was composed and mailed to approximately 2,500 persons. The second one was mailed to more than 3,000. It gave more detail about the community meetings and dealt more directly with public concerns as they were expressed at the public meetings, in letters, or via phone calls to SRRHIS;

• Further to understand the levels of awareness and knowledge, and the concerns of the SRRHIS community, a survey was taken to ascertain citizen perceptions of the effects of the SRS operations, past and present, on their health and that of their families. The survey was designed to be compatible with other professionally completed ones and was undertaken by the Survey Research Center of the Department of Biostatistics, Epidemiology, and Systems Science (DBESS) of MUSC. Funds for the survey were taken from a source other than this grant;

• The computer mortality-mapping program developed by NCI has been installed on our laptop computer for convenient demonstration to our interested publics, including the Steering Committee. The program is composed of cancer mortality statistics from 1953 to 1987 (all cancers), for the US overall (all states), SC overall (all counties), race, and gender. The figures are corrected to a standard US population and the mapping program ranks states and counties, using a color system, by whether their cancer rates are above or below that of the US. The software was given to us by the developer. William McKay, retired from NCI and
living in the Bethesda area. He is working with SRRHIS without compensation. He presently is planning the introduction of smaller geographic areas (census or zip code) into the program so as to display data and rates closer to the SRS operation;

- Using the mapping program and associated data, a technical paper was prepared showing cancer mortality for major sites in SC and the US. The paper will be expanded to include trends and modified as appropriate to be published in a medical journal, possibly the Journal of the South Carolina Medical Association;

- The planning process for the birth defects registry was accelerated by the Principal Investigator (PI) and the Steering Committee following the Beaufort meeting in November. The citizens attending the Beaufort meeting projected a strong desire for an active birth defects monitoring effort, a desire already expressed by members of the Steering Committee. A passive approach, based on a summary of birth certificate data and linkage to national data bases such as the medicaid one, was in effect in year 01. Soon after the Beaufort meeting, SRRHIS staff met with Dr. Roger Stevenson, Director of the Greenwood Genetic Center. Dr. Stevenson, a pediatrician-geneticist, is a salaried employee of the Center, which is a state-supported birth defects counseling and referral site. In this role he has won a CDC grant to form one part of a three-academic-site registry for spina bifida, a neural tube defect sometimes associated with high doses of radiation. He is interested in collaborating with SRRHIS in the construction of a birth defects registry. Further, Dr. L. Edmonds, of the CDC registry around metropolitan Atlanta, is interested in working with SRRHIS to assure compatibility with his effort. A presentation of the CDC Atlanta registry was made to the Steering Committee at its April 22, 1993 meeting by Dr. David Erickson, Chief, Birth Defects and Genetic Diseases Branch, CDC.
• South Carolina still has no law requiring the reporting of cancer. A DHEC effort to develop a state-wide cancer registry will include a request for the SC Legislature to pass such a law. Indeed, we are told that a model law is being drawn up. It is important to emphasize that this effort by DHEC is a direct result of the success of the SRRHIS program; past efforts by DHEC to have the Legislature pass a law have failed. In a related move by the Legislature, a law passed in late 1992 provides that physician records are not available to anyone else but the patient or the patient’s legal representative, without the written consent of the patient. We checked with our legal office (MUSC) and with that of the SC Hospital Association to ascertain the intent of the law. Our conclusion is that it does not apply to hospital records and was aimed primarily if not exclusively at preventing physicians from denying any medical records to patients owing them money;

• Relationships which have been cultivated from the beginning with interested agencies have matured and become very important in stimulating related activities as well as in strengthening the SRRHIS program within the region, and within the nation. RAC, WSRC, DHEC, ATSDR, and CDC are all much interested in both the registry results and in the community information side of the project. Care has been taken to coordinate our meetings with the liaison persons of these agencies. For example, we have invited CDC Radiation Studies Branch representatives to our Steering Committee and community meetings. In turn, they make sure that we have the opportunity to be present at their dose reconstruction meetings and be able to pass out our literature. This is extremely helpful in assuring the public and their environmentally-active representatives that duplication is being avoided, that is, that each of the efforts complements the others and does not wastefully overlap its aims with those of any of the others. Finally, at least two new useful projects have been stimulated as a result of these interactions, namely, the DHEC state-wide cancer registry noted earlier, and a public forum on low dose radiation to be
undertaken jointly by the Medical University of SC and the Medical College of
Georgia, possibly including collaboration as well with the American Association of
Physicists in Medicine.

STEERING COMMITTEE

The Steering Committee has been meeting quarterly in cities within the SRRHIS area,
since its first meeting in Aiken, SC on February 12, 1992. Five meetings have been held as of
the end of January 1993, and another was held April 22 just before the beginning of period
03. The early meetings were given to organizing the Committee, educating it about what a
registry is, and seeking to build trust. The Chairman was elected at the second meeting and
two subcommittees were named at the following one. Next we began talking of community
meetings. A risk communicator from Rutgers, Caron Chess, came to the October 1992
meeting to help both the Committee and the staff understand the benefits and the pitfalls of
public communication efforts. In preparation for the next two meetings, the staff has met in
Charleston with the Chairman and leaders of two subcommittees. There are three
subcommittees now: 1) on community meetings, 2) on the need and form of a state law in
SC, and 3) on the need to revise the by-laws. Starting with the meeting in January 1993 there
will be Subcommittee reports. This is felt to be an important marker of the maturing of the
Steering Committee and its acceptance of a long term presence in the region.

OPERATIONS

By utilizing both electronic data submission from SRRHIS hospitals with Tumor
Registries and case abstraction by a field staff representative, SRRHIS has attained an 80%
level of completion for participating facilities' 1991 data. In addition to the ongoing system
of casefinding and abstracting both prospective and retrospective quality assurance activities
are taking place. To maintain accurate abstracting, with correct application of coding rules and correct data entry, visual edits and computerized edit checks are being performed. To identify problem areas in the data collection phase at hospitals with and without tumor registries, "field" reabstracting audits and "field" quality control studies on reportability have begun. The SRRHIS registry also has the capability to register each case only once by a sophisticated computerized duplication removal system that assist the quality control editor to recognize cases similar in predetermined data items. If duplication has occurred, individual reports are combined to reflect only one incidence of cancer. To further assure complete case ascertainment, the SRRHIS database will be directly compared to registered deaths in Georgia and South Carolina.

The primary hindrance to timely data submission to the SRRHIS cancer registry is the lack of a cancer reporting law for the state of South Carolina. Without such a law in place, adherence to acceptable standards is difficult to enforce. The Steering Committee subcommittee is looking into the issue and the MUSC legislative representative and legal office are beginning to study the possible avenues to promote a law. Further, the state health department (DHEC) supports passage of such a law.

PERSONNEL

The only change made in staffing was in hiring a new secretary. Changes were made to percentage efforts of some of the faculty, reflecting small changes in program demands during the year. The PI for instance changed his effort to 20 percent from 40 percent during the year because the demands for hospital and other agency negotiations, and for developing community information resources diminished momentarily. With the opening of the third year, his percentage effort is expected to be needed at approximately 35 percent, to assist with the development of a low dose radiation forum, preparation of a renewal application by October 1993, and preparations for a birth defects application supplementary to the present
one. Dr. Yuko Palesch, our biostatistician, moved from 10 to 30 percent to support more time on the birth defects project and to complete the operations manual. The current staffing levels, both at MUSC and Emory University, appear to be adequate for the cancer registry part of the project.

**COMPUTER EQUIPMENT AND PROGRAMMING**

In year 02 the plans for our computerized database management and system progressed well. In September 1992, we closed a several months long recruitment effort for the Programmer/System Analyst position and Randall Scarberry was hired from a pool of about twenty plus applicants. He has solid training in large-scale programming tasks and is skilled in using the computer to solve complicated practical problems. Since then, he has played an active role in the daily operation of computer-related database management. He has developed the necessary software programs for transferring data from various area hospitals where many different computer hardware platforms and software systems are used for patient data management.

Our collection and management of registry data also is proceeding well. As we had originally planned, CanSur/Net, a database system developed by the American College of Surgeons for hospital cancer case data collection and management, has been used in year 01 and year 02 operation while we are developing a large scale cancer information system specifically for the SRRHIS operation. CanSur/Net is a PC-based system which makes it ideal for using laptop computers to collect data from hospitals in remote areas. Currently the master copy of the database is maintained on a Zenith 486SX. Regularly scheduled file backup and the storage of multiple physical copies ensure the security of data and continuous smooth operation. As mentioned above, file conversion programs have been developed so that for those hospitals with computerized patient data management systems, relevant data can
be directly extracted and then converted into CanSur/Net. This eliminates both the laborious work involved in manual abstracting and the possible sources of data entry error.

Our database system is receiving major attention. CanSur/Net, while it serves our current needs reasonably well, was designed primarily for the use of individual hospitals rather than a central registry for a large geographic region. Our two years of operation using CanSur/Net has revealed significant shortcomings in it and helped us gain valuable experience in terms of what are the "desired properties" in our new SRRHIS database system. Dr. Zhen Zhang is responsible for overseeing the developmental work of the database. We are currently in the process of defining the relation table and developing a prototype database system. This should be completed by the end of year 02. It is expected that in the beginning of year 03 we will be testing the new database system by having it operating in parallel with the CanSur/Net database. The 4GL database will be fully operational by the end of year 03.

EVALUATION OF YEAR 02 ACTIVITIES

SRRHIS achieved an overall evaluation score of nearly 100% for the activities associated with Year 02 in its goal of the establishment of a state-of-the-art health information system. The completion of the proposed activities as designated and planned contributed to the evaluation score. Several activities were completed in a noteworthy manner.

Under Objective 1, quality control measures were implemented and have been influential in hospitals modifying protocol to improve the quality of cancer case ascertainment.

Under Objective 2, SRRHIS newsletters were produced and distributed. The first was mailed to approximately 2,500 individuals; the second to over 3,500. Three community meetings were held. The first technical report on cancer mortality in South Carolina was produced. SRRHIS activities were presented at scientific sessions of the South Carolina Hazardous Waste Management Research Conference and MUSC Student Research Day, as
well as a presentation at the American Association of Central Cancer Registries meeting. Furthermore, SRRHIS has involved the NCI mapping program as an information mechanism. Modifications are being implemented to improve the use.

Under Objective 3, SRRHIS contributed to two news media workshops by presenting SRRHIS activities.

Under Objective 4, a procedure manual and abstractor’s manual were produced.

Under Objective 5, computer activities associated with SRRHIS have begun with numerous modifications planned. In addition, SRRHIS completed the first assessment as a Beta Test Site for the American College of Surgeons.

Under Objective 6, the first SRRHIS technical report on cancer mortality was produced with a comprehensive distribution plan being implemented.

Under Objective 7, SRRHIS is included as a major contributor and model in a state-wide cancer plan.


Under Objective 9, SRRHIS continues to develop a birth defects surveillance protocol.

Under Objective 10, SRRHIS continues to collaborate with other registries. As stated previously, SRRHIS has been identified as an integral advisor to the S.C. Department of Health and Environmental Control in the role of cancer surveillance.

Under Objective 11, in addition, SRRHIS has contributed significantly to formal education at MUSC with the support of three graduate students and the sponsoring of two departmental seminars. SRRHIS also sponsored an education meeting for S.C. Tumor Registrars and SRRHIS hospital personnel.
SUMMARY

There were four major emphases in year two: consolidation of our relationships with the area hospitals so as to keep them carefully informed and pleased as far as possible with our work; formulating the public education/outreach side of the SRRHIS program and activating it; strengthening our networking with associated and interested agencies; moving our planning from a passive to an active birth defects registry.

Our tumor registrars visited every hospital in the SRRHIS area during the 02 year, continuing to abstract data for 1991, and providing assistance to the medical records personnel in improving the quality of their records keeping and computerization. Further, quality control checks have begun in three of the hospitals. The need for improvements becomes evident immediately as these checks are made. Care is taken to discuss our findings in a way which encourages improvement as a positive outcome ("what you might like to do" rather than "what you are doing wrong"). As a consequence, we believe our relations with the hospitals are good and improving as we work more and more with them. Articles in local papers and possible feedback from their patients who have heard of the registry also probably help in promoting their cooperation. These activities will be continued in year 03.

Year 02 was a banner year for public education/outreach. Not only did we begin holding public meetings, but we sent out our first and second newsletters, completed a survey of public perceptions of the health effects associated with living near the SRS, and set up a mapping program of cancer mortality from 1953-1987, in the US and the State of SC, for demonstrating geographic patterns of cancer mortality to interested persons, including those at public meetings, school classes, industrial and business leaders, workers, or other groups such as civic clubs. As was noted in the summary for year 02, the first public meeting was held in Beaufort, SC on November 4, 1992, and a community luncheon was held in Varnville, SC on February 2, 1993 for about 20 residents of the general area within 30 miles or so, persons came from Georgia (Waynesboro, Sylvania) and from SC (Varnville, Barnwell,
Hampton). We discussed the registry with them and received advice about future meetings to be held. A third community meeting was held on March 31, 1993 in Augusta, Georgia. Community relations and information dissemination will constitute a major activity in year 03, with more effective organization and experience permitting more frequent community programming.

Our first and second newsletters, sent in year 02, were well received. Our mailing list has grown from 2500 to approximately 3500 individuals. In year 03 more attention will be given to feedback from and to our constituents toward the end of reinforcing the notion that our relationship with them is to be a long term one.

A survey of the knowledge, awareness of SRS, and associated attitudes, is being undertaken in March 1993 (costs are being borne from another grant). A copy of the questions is included in the appendix to this technical report. Surveys will continue to be undertaken by the Survey Research Center of DBESS (Dr. Lackland, Director) periodically, perhaps even annually if necessary to ascertain on a continuing basis the effectiveness of regional public educational activities associated not only with SRRHIS outreach but with that of CDC (RAC), and WSRC.

The computer-based cancer mortality mapping program has been well received by the Steering Committee, the visitors at the first meeting in Beaufort, our Board of Trustees of MUSC, and the Scientific Advisory. It will be a constant part of our community meetings agenda, and we expect to respond often to requests to show it at sites within the region, and to different audiences therein.

Networking will continue to be a priority in year 03. Examples of successful networking and collaboration are the low dose radiation conference being planned jointly with the Medical College of Georgia and the American Association of Physicists in Medicine (earlier noted), and the multiple anticipated institutional collaborators in the birth defects registry planning and implementation processes.
The early part of year 03 will be taken with an intense planning effort for the birth defects registry, involving SRRHIS-MUSC, SRRHIS-Emory, the Greenwood Genetic Clinic (earlier noted), and the Medical School of the University of SC, in consultation with CDC and with selected national experts. The activity will be coordinated closely with the Steering Committee. This is especially important because the birth defects registry is of high priority to Committee members and to area residents (as expressed in community meetings).
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CANCER MORTALITY IN SOUTH CAROLINA 1953-1987
CANCER MORTALITY IN SOUTH CAROLINA
1953 - 1987

The Savannah River Region Health Information System

Medical University of South Carolina
Department of Biostatistics, Epidemiology
and Systems Science
Charleston, South Carolina 29425

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I. Introduction

This technical report presents the age-adjusted total, and race and sex specific geographic patterns of cancer mortality for South Carolina (SC) counties utilizing the 1953 - 1987 average annual age-adjusted mortality rates (AAMRs).

The mortality information was obtained from the State Cancer Control Map and Data Program produced by the National Cancer Institute (NCI), Centers for Disease Control (CDC) and the American Cancer Society (ACS).

The AAMRs for selected primary sites are classified as significantly different or not significantly different (at alpha = 0.05) from the corresponding United States (US) and SC mortality rates. Categories for classification of the rates are determined using 95% confidence intervals (CI). Geographic patterns of significantly high county AAMRs are identified and discussed. Individual county rates are not emphasized. The terminology, "mortality rates"* used throughout this report pertains to the 1953 - 1987 AAMRs.

* Number of deaths per 100,000 people, age-adjusted to the US 1970 standard.
II. Cancer Mortality in South Carolina

A. Population: The 1990 projected SC county population estimates are provided in Table 1. The estimates were obtained from the Division of Biostatistics, Research and Statistical Services State Data Center, SC Department of Health and Environmental Control. The counties and state health districts are delineated in Figure 1.

The population of SC is a biracial community. Approximately 32% of the total population is nonwhite and 97.3% of the nonwhite population is black. The race/sex population distribution can be found in the Table 2.

Approximately 55% of the total SC population is located in the following counties: Aiken, Anderson, Berkeley, Charleston, Florence, Greenville, Horry, Richland, Spartanburg and York. These counties will be emphasized in the discussion because the population concentration influences the overall AAMR. Health districts which combine smaller county populations will also be accented since district analysis provides a more stable AAMR estimate [1-5].

B. Cancer Deaths: Primary sites are grouped according to the World Health Organization's International Classification of Diseases, Ninth Revision (ICD-9). Cancer mortality data was obtained from the National Center for Health Statistics. The codes from ICD-6 through ICD-9 were converted to standardize the cause of death for comparability throughout the time period. See Table 3.
<table>
<thead>
<tr>
<th>COUNTY</th>
<th>WHITE MALES</th>
<th>WHITE FEMALES</th>
<th>NONWHITE MALES</th>
<th>NONWHITE FEMALES</th>
<th>WHITE</th>
<th>NONWHITE</th>
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<td>14,650</td>
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<td>16,130</td>
<td>15,800</td>
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<td>5,360</td>
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<td>19,880</td>
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<td>30,590</td>
</tr>
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<td>28,790</td>
<td>37,220</td>
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</tr>
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<td>RICHLAND</td>
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<td>69,270</td>
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<td>SALUDA</td>
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<td>2,990</td>
<td>11,090</td>
<td>8,720</td>
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<td>88,070</td>
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<td>172,990</td>
<td>105,680</td>
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</tr>
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<td>13,270</td>
<td>15,200</td>
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<td>20,680</td>
</tr>
</tbody>
</table>

SOURCE: STATE DATA CENTER, DIV. OF RES. & STAT. SERVICES.
NOTE: DETAIL MAY NOT SUM TO TOTALS DUE TO ROUNDING.
**Table 2:** Population Distribution Percentages for SC by Race and Sex

<table>
<thead>
<tr>
<th>Race/Sex Category</th>
<th>Number in Category</th>
<th>Percentage in Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population</td>
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<td>100.0</td>
</tr>
<tr>
<td>- White</td>
<td>2,431,800</td>
<td>68.2</td>
</tr>
<tr>
<td>- Nonwhite</td>
<td>1,136,700</td>
<td>31.9</td>
</tr>
<tr>
<td>Male</td>
<td>1,743,100</td>
<td>48.8</td>
</tr>
<tr>
<td>- White</td>
<td>1,201,400</td>
<td>33.7</td>
</tr>
<tr>
<td>- Nonwhite</td>
<td>541,700</td>
<td>15.2</td>
</tr>
<tr>
<td>Female</td>
<td>1,825,400</td>
<td>51.2</td>
</tr>
<tr>
<td>- White</td>
<td>1,230,400</td>
<td>34.5</td>
</tr>
<tr>
<td>- Nonwhite</td>
<td>595,000</td>
<td>16.7</td>
</tr>
</tbody>
</table>
C. **Cancer Mortality Rates:** Annual age-adjusted mortality rates were calculated using the direct method of age-adjustment, with the total US population for 1970 as the standard. The average annual age-adjusted mortality rate is calculated by averaging the annual age-adjusted mortality rates over the 15 year span from 1953 to 1987 [6]. The 95% confidence intervals of the age-adjusted rates were calculated using the standard error estimated by the method of Chiang [7]. County rate categories were defined by comparison to the US and SC AAMR 95% CI. Each county's mortality rate was then separately classified as significantly different (above or below the 95% CI) or not significantly different (within the 95% CI) [4]. Data is presented geographically with each county delineated by its classification. Maps for each primary cancer site begin with the total population figures followed by race/sex specific classifications. This format permits an overlay for the maps which aid in visualizing the cancer mortality patterns.

Certain primary site discussions contain SC AAMR rank comparisons in the US and/or various age categories. Rankings were obtained for each state in the US and ordered by magnitude utilizing the Map Program produced by the National Cancer Institute. Age categories were chosen so as to correspond to the most frequent US incident and mortality age ranges for the given primary site. Age categories are not presented separately. However, any special age effects are included in the primary site discussions.

D. **Limitations of the data:** Some counties have small populations which may cause unstable AAMR estimate. For this reason population data is included to help assess the impact of a significantly higher rate for a given county. Furthermore, special emphasis has been given to patterns in large population counties and health districts throughout the discussion to minimize spurious patterns.
County AAMRs were classified with respect to the US and SC 95% confidence intervals for each primary site. Standard errors for county estimated AAMRs were not utilized in the classification process because small population county estimates may result in large standard error estimates.

Calculation of AAMRs were performed to adhere to accepted methodologies. Nevertheless, a cohort effect may be present due to averaging the annual age-adjusted mortality rates for the 15 year span from 1953 to 1987. This would not be expected to seriously alter the major patterns.
### Table 3: ICD Codes Conversions for Primary Sites

<table>
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<tr>
<th>Primary Site</th>
<th>ICD-6 Revision</th>
<th>ICD-7 Revision</th>
<th>ICD-8 Revision</th>
<th>ICD-9 Revision</th>
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<tbody>
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<td>All Malignant Neoplasms</td>
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<td>140.0-205.9</td>
<td>140.0-207.9</td>
<td>140.0-208.9</td>
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<tr>
<td>Skin</td>
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<td>190.0-190.9</td>
<td>172.0-172.4</td>
<td>172.0-172.9</td>
</tr>
<tr>
<td></td>
<td>191.0-191.9</td>
<td>191.0-191.9</td>
<td>172.6-172.9</td>
<td>173.0-173.9</td>
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<td></td>
<td></td>
<td></td>
<td>173.6-173.9</td>
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</tr>
<tr>
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<td>190.0-190.9</td>
<td>172.0-172.4</td>
<td>172.0-172.9</td>
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<tr>
<td></td>
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<td></td>
<td>172.6-172.9</td>
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</tr>
<tr>
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<td>162.0-162.9</td>
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<td>171.0-171.9</td>
<td>180.0-180.9</td>
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<td>183.0-183.9</td>
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</table>
E. **Highlights:**

* Skin cancer AAMRs for SC white males and females are significantly higher than the corresponding US rates.

* Rates for SC white males are significantly above the US rates for lung cancer.

* Geographical patterns and significantly high AAMRs exist for nonwhite males and nonwhite females in SC for three of the four gastrointestinal primary sites.

* South Carolina prostate cancer AAMRs for both race categories are significantly higher than the corresponding US rates.

* South Carolina has significantly lower AAMRs for female breast cancer than the US.

* Cervical cancer AAMRs for SC exceed the US rate for both race categories.

* South Carolina nonwhite females have uterine AAMRs significantly higher than the US rates.
III Mortality Rates for Selected Primary Sites

A. All Malignant Neoplasms: The overall SC AAMR due to all malignant neoplasms is significantly lower than the US rate. All county rates with the exception of Charleston county rate, also remain below the US rate. This pattern persists for the State throughout the race categories. However, for sex and race specific AAMRs, 42.5% of the counties exceed the US rates for white males. Cancer mortality is higher among males than females in SC, a pattern which is consistent with the US rates for malignant neoplasms. Nonwhites have higher mortality rates than whites, although fewer SC counties have rates which exceed the US nonwhite AAMR. This phenomenon masks the excessive rates in white males within the total population map.

B. All Skin Cancer: South Carolina ranks 14th among all the states for overall skin cancer mortality. Seven of the ten large population counties exhibit significantly higher AAMRs than the overall US rate. A similar pattern exists for race-specific and sex-specific rates. Whites have a significantly higher mortality rate than nonwhites, while white male rates exceed those of the white female. The rates for white males and white females in SC ranks eighth and ninth respectively in comparison to the given US AAMR. Maps for all males and white males manifest a concentration of the excessive county rates in the Appalachian, Catawba, Pee Dee (northern border counties) and Lower Savannah health districts. The northern border and midland counties pattern is present for excessive white female AAMRs, but several of these counties contain small populations and associated rates may be unstable.

C. Melanoma: Results for SC melanoma AAMRs are similar to those found for all skin cancer mortality. White mortality rates exceed the nonwhite rates while white male rates surpass the white female rates. The SC white male and white female melanoma mortality
rates rank 13th and 9th in comparison to all other states, respectively. The Appalachian, Midlands Lower Savannah and Coastal regions appear to have excessive rates for both white males and females.

D. Lung: The SC lung cancer mortality rates for race/sex are comparable to those for the US. The SC male AAMRs exceed female rates for both race categories; however, only white males have an AAMR which exceeds the corresponding US rate. South Carolina ranks seventh among all of the states for white male lung cancer mortality, with six of the large population SC counties displaying an excessive AAMR. The Trident, Low Country, Lower Savannah and Midlands health districts (southwestern and midland counties) show a distinctive aggregate of significantly higher mortality rates. A similar, less extensive pattern exists for white females. The overall AAMR for SC shows a comparably higher rate, demonstrating the effects of the increased white male rates.

E. Oral Cavity and Pharynx: The SC AAMR significantly exceeds the US mortality rate for oral cavity and pharynx. County mortality rates essentially exhibit a dichotomous pattern when compared to the overall US and to SC rates, that is, they are either significantly above the SC rate or significantly below the US rate. The hour-glass geographical pattern of excessive mortality noted for the all race/sex map appears again in the white, male, and white male maps. South Carolina ranks seventh among all states for oral cavity and pharyngeal cancer mortality for white females. The counties with significantly higher mortality rates for white females and nonwhite females differ substantially. The white female mortality map shows a midland and northern concentration, while the nonwhite female map reveals a midland and southern coastal concentration. The Midlands health district is classified as significantly higher for all of the race/sex maps.
F. Esophagus: The SC AAMR significantly exceeds the US mortality rate for esophageal cancer. Examination of the race/sex rates show that most of this excess is due to cancer in nonwhites, with male AAMRs exceeding female rates for both race categories. Aggregation of the significantly high county AAMRs for nonwhites is observed primarily in the coastal and southwestern counties. The same geographic pattern is noted for the all race/sex map and for the oral cavity and pharynx map for nonwhite females. There is a dichotomous pattern of significantly higher AAMRs evident in the nonwhite male and nonwhite female maps. The mortality rate for nonwhite females ranks 14th in the US.

G. Stomach: The SC stomach cancer AAMRs for nonwhites, nonwhite males and nonwhite females are significantly higher than the US rate, with male rates significantly higher than female AAMRs. South Carolina ranks 11th and 14th among all US states for nonwhite male and nonwhite female stomach cancer mortality rates, respectively. The Midlands, Edisto, Low Country, Trident and Waccamaw health districts (central and southwestern coastal regions of SC) represent geographic concentrations of excessive AAMRs for both nonwhite males and nonwhite females. This general pattern also exists with the other gastrointestinal primary sites previously discussed.

H. Colorectal: The SC AAMR is significantly below the US rate for all race/sex categories. A geographic pattern is noted for nonwhite, nonwhite male and nonwhite female categories when examining the county AAMRs which are significantly higher than the overall SC colorectal mortality rate. A northwestern concentration appears in the Appalachian and Catawba health districts with Oconee and Pickens counties having significantly higher rates than the US. This pattern is unlike the previous geographic patterns shown for nonwhites in oral, esophageal, and stomach cancer mortality rate classifications. The coastal county of Beaufort (estimated population 92,560) however, is significantly higher than the US colorectal AAMR.
for nonwhite females which corresponds to the other gastrointestinal sites.

H. Bladder: The SC rates are significantly below the corresponding US mortality rates for bladder cancer in all race/sex classifications except for nonwhite females. The male AAMRs are significantly higher than female rates for both race classifications in SC. This pattern is consistent with that of the US [8]. Nonwhite males and nonwhite females have significantly higher AAMRs in 14 and 22 counties respectively, encompassing three to five of the SC counties with populations of 100,000 or greater. Significantly lower rates in the remaining counties cause the overall nonwhite mortality rate for bladder cancer to be diminished. No consistent geographical pattern was observed for the race/sex categories.

I. Prostate: South Carolina ranks 11th and 12th among all the states for nonwhite and white male prostate cancer AAMRs, respectively. Three-fourths of the counties exceed the nonwhite male rate and two-thirds of them exceed that of the white male rate of the US. Geographical patterns are different between whites and nonwhites. Significantly higher prostate mortality rates for white males are notable throughout the State, while nonwhite AAMRs are present in the northern and central counties.

J. Breast: The SC rates are significantly below the US rates for both white and nonwhite females. The nonwhite breast cancer mortality rate is significantly higher than the white female rate in SC, analogous to US race/sex comparisons in breast cancer mortality. A northwestern concentration of the excessive rates is evident for nonwhite females. Breast cancer mortality for nonwhite females ages 30 - 39 is significantly higher than the corresponding US rate. Small population sizes in this age category throughout the counties tend to decrease the importance of this finding.
K. Cervix Uteri: The SC AAMR for females is significantly higher than the US rate. South Carolina ranks fifth among all the states for cervix uteri cancer mortality rate. Ninety-one percent of the counties exceed the US AAMR for all females. Nonwhite females have a significantly higher mortality rate than white females. South Carolina ranks 14th among all the states for nonwhite female AAMRs. A concentration of the excessive AAMRs appears in the northwestern counties of the State for nonwhite females. Cervical cancer mortality for white females ages 40 and above is excessive in the northern counties.

L. Corpus Uteri and Unspecified Uteri: South Carolina ranks 14th among all the states for corpus uteri cancer mortality rates in females. Fifty-two percent of SC counties have significantly higher AAMRs than the US rate for females. The nonwhite female AAMR for SC ranks eighth among all the states and is significantly higher than the corresponding US rate. Geographical patterns are not evident for all of the race categories.

M. Ovary: South Carolina ranks significantly below the US AAMR for all, and for white and nonwhite female categories. Four of the SC counties with populations exceeding 100,000 have significantly higher rates for nonwhite females than the corresponding US rate. The four county average rate is significantly higher than the nonwhite US rate. No geographical pattern is evident for the all race categories.
Figure 2:

Cancer Mortality in SC
All Malignant Neoplasms
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: All
Ages: All
US rate: 164.13, 1.96 sd = 0.09
SC rate: 153.68, 1.96 sd = 0.87

Rates adjusted to 1970 US population.
Figure 3:

Cancer Mortality in SC
All Malignant Neoplasms
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: All
Ages: All
US rate: 161.74, 1.96 sd = 0.10
SC rate: 149.78, 1.96 sd = 1.01

Rates adjusted to 1970 US population.
Figure 4:

Cancer Mortality in SC
All Malignant Neoplasms
Average Annual Age-Adjusted Rate for 1953 - 1987

Race: NonWhite
Gender: All
Ages: All
US rate: 184.62, 1.96 sd = 0.32
SC rate: 165.22, 1.96 sd = 1.71

Rates adjusted to 1970 US population.
Figure 5:

Cancer Mortality in SC
All Malignant Neoplasms
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Male
Ages: All

US rate: 202.76, 1.96 sd = 0.16
SC rate: 199.11, 1.96 sd = 1.56

Rates adjusted to 1970 US population.
Figure 6:

Cancer Mortality in SC
All Malignant Neoplasms
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Male
Ages: All

US rate: 199.23, 1.96 sd = 0.16
SC rate: 195.89, 1.96 sd = 1.84

Rates adjusted to 1970 US population.
Figure 7: Cancer Mortality in SC
All Malignant Neoplasms
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Male
Ages: All
US rate: 235.26, 1.96 sd = 0.55
SC rate: 212.10, 1.96 sd = 3.00

Rates adjusted to 1970 US population.
Figure 8:

Cancer Mortality in SC
All Malignant Neoplasms
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Female
Ages: All
US rate: 136.04, 1.96 sd = 0.11
SC rate: 122.77, 1.96 sd = 1.02

Rates adjusted to 1970 US population.
Figure 9:

Cancer Mortality in SC
All Malignant Neoplasms
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Female
Ages: All
US rate: 134.77, 1.96 sd = 0.12
SC rate: 119.04, 1.96 sd = 1.18

Rates adjusted to 1970 US population.
* (134.65, 134.88) US 95% CI
Figure 10:

Cancer Mortality in SC
All Malignant Neoplasms
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Female
Ages: All
US rate: 144.90, 1.96 sd = 0.38
SC rate: 132.07, 1.96 sd = 2.01

Rates adjusted to 1970 US population.
Figure 11:
Cancer Mortality in SC
All Skin Cancer
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: All
Ages: All
US rate: 2.47, 1.96 sd = 0.01
SC rate: 2.60, 1.96 sd = 0.11

Rates adjusted to 1970 US population.
Figure 12:

Cancer Mortality in SC
All Skin Cancer
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: All
Ages: All

US rate: 2.64, 1.96 sd = 0.01
SC rate: 3.20, 1.96 sd = 0.15

Rates adjusted to 1970 US population.
Figure 13:

Cancer Mortality in SC
All Skin Cancer
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: Nonwhite
Gender: All
Ages: All
US rate: 1.00, 1.96 sd = 0.02
SC rate: 1.05, 1.96 sd = 0.14

Rates adjusted to 1970 US population.
* (0.91, 1.19) SC 95% CI
Figure 14:

Cancer Mortality in SC
All Skin Cancer
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Male
Ages: All

US rate: 3.33, 1.96 sd = 0.02
SC rate: 3.50, 1.96 sd = 0.21

Rates adjusted to 1970 US population.
* (3.29, 3.71) SC 95% CI
Figure 15:

Cancer Mortality in SC
All Skin Cancer
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Male
Ages: All
US rate: 3.55, 1.96 sd = 0.02
SC rate: 4.36, 1.96 sd = 0.27

Rates adjusted to 1970 US population.
Figure 16:

Cancer Mortality in SC
All Skin Cancer
Average Annual Age-Adjusted Rates for 1953 -1987

Race: NonWhite
Gender: Male
Ages: All
US rate: 1.27, 1.96 sd = 0.04
SC rate: 1.27, 1.96 sd = 0.23

Rates adjusted to 1970 US population.
(1.04, 1.50) SC 95% CI
Figure 17:

Cancer Mortality in SC
All Skin Cancer
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Female
Ages: All
US rate: 1.80, 1.96 sd = 0.01
SC rate: 1.96, 1.96 sd = 0.13

Rates adjusted to 1970 US population
Figure 18:

Cancer Mortality in SC
All Skin Cancer
Average Annual Age-Adjusted Rates for 1953-1987

Race: White
Gender: Female
Ages: All

US rate: 1.92, 1.96 sd = 0.01
SC rate: 2.37, 1.96 sd = 0.17

Rates adjusted to 1970 US population.
Figure 19:

Cancer Mortality in SC
All Skin Cancer
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Female
Ages: All
US rate: 0.79, 1.96 sd = 0.03
SC rate: 0.90, 1.96 sd = 0.17

Rates adjusted to 1970 US population.
* (0.73, 1.07) SC 95% CI
Figure 20:

Cancer Mortality in SC Melanoma
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: All
Ages: All

US rate: 1.65, 1.96 sd = 0.01
SC rate: 1.62, 1.96 sd = 0.09

Rates adjusted to 1970 US population.
* (1.53, 1.71) SC 95% CI
Figure 21:

Cancer Mortality in SC
All Malignant Neoplasms
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: All
Ages: All
US rate: 161.74, 1.96 sd = 0.10
SC rate: 149.78, 1.96 sd = 1.01

Rates adjusted to 1970 US population.
Figure 22:

Cancer Mortality in SC Melanoma
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: All
Ages: All

US rate: 0.39, 1.96 sd = 0.01
SC rate: 0.40, 1.96 sd = 0.08

Rates adjusted to 1970 US population.
*(0.32, 0.48) SC 95% CI
Figure 23:

Cancer Mortality in SC
Melanoma
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Male
Ages: All
US rate: 2.08, 1.96 sd = 0.02
SC rate: 2.01, 1.96 sd = 0.15

Rates adjusted to 1970 US population.
(1.86, 2.15) SC 95% CI
Figure 24:

Cancer Mortality in SC Melanoma
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Male
Ages: All
US rate: 2.26, 1.96 sd = 0.02
SC rate: 2.57, 1.96 sd = 0.20

Rates adjusted to 1970 US population.
Figure 25:

Cancer Mortality in SC Melanoma
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Male
Ages: All
US rate: 0.46, 1.96 sd = 0.02
SC rate: 0.50, 1.96 sd = 0.15

Rates adjusted to 1970 US population.
* (0.35, 0.65) SC 95% CI
Figure 26:

Cancer Mortality in SC Melanoma
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Female
Ages: All
US rate: 1.29, 1.96 sd = 0.01
SC rate: 1.30, 1.96 sd = 0.10

Rates adjusted to 1970 US population.
* (1.20, 1.40) SC 95% CI
Figure 27:

Cancer Mortality in SC Melanoma
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Female
Ages: All

US rate: 1.40, 1.96 sd = 0.01
SC rate: 1.67, 1.96 sd = 0.14

Rates adjusted to 1970 US population.
Figure 28:

Cancer Mortality in SC
Melanoma
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Female
Ages: All
US rate: 0.34, 1.96 sd = 0.02
SC rate: 0.32, 1.96 sd = 0.10

Rates adjusted to 1970 US population.
* (0.22, 0.42) SC 95% CI
Figure 29:

Cancer Mortality in SC
Lung, Trachea and Pleura
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: All
Ages: All

US rate: 33.75, 1.96 sd = 0.04
SC rate: 33.50, 1.96 sd = 0.40

Rates adjusted to 1970 US population
* (33.10, 33.90) SC 95% CI
Figure 30:

Cancer Mortality in SC
Lung, Trachea and Pleura
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: All
Ages: All

US rate: 33.34, 1.96 sd = 0.04
SC rate: 35.55, 1.96 sd = 0.49

Rates adjusted to 1970 US population
**Figure 31:**

Cancer Mortality in SC Lung, Trachea and Pleura
Average Annual Age-Adjusted Rates for 1953 - 1987

<table>
<thead>
<tr>
<th>Age-Adjusted Rate Categories</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00 - 27.46</td>
<td></td>
</tr>
<tr>
<td>24.47 - 28.87 (SC 95% CI)</td>
<td></td>
</tr>
<tr>
<td>28.88 - 35.60</td>
<td></td>
</tr>
</tbody>
</table>

Race: NonWhite  
Gender: All  
Ages: All

US rate: 37.07, 1.96 sd = 0.14  
SC rate: 28.17, 1.96 sd = 0.70

Rates adjusted to 1970 US population.  
* (36.93, 37.21) US 95% CI
Figure 32:

Cancer Mortality in SC Lung, Trachea and Pleura
Average Annual Age Adjusted Rates for 1953 - 1987

Race: All
Gender: Male
Ages: All
US rate: 57.42, 1.96 sd = 0.08
SC rate: 61.42, 1.96 sd = 0.84

Rates adjusted to 1970 US population.
Figure 3.3:

Cancer Mortality in SC
Lung, Trachea and Pleura
Average Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Male
Ages: All

US rate: 56.90, 1.96 sd = 0.09
SC rate: 65.07, 1.96 sd = 1.03

Rates adjusted to 1970 US population.
Figure 34:

Cancer Mortality in SC Lung, Trachea and Pleura
Average Annual Age Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Male
Ages: All

US rate: 64.76, 1.96 sd = 0.29
SC rate: 52.64, 1.96 sd = 1.47

Rates adjusted to 1970 US population.
Figure 35:

Cancer Mortality in SC Lung, Trachea and Pleura
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Female
Ages: All

US rate: 14.57, 1.96 sd = 0.04
SC rate: 12.49, 1.96 sd = 0.33

Rates adjusted to 1970 US population.
Cancer Mortality in SC
Lung, Trachea and Pleura
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Female
Ages: All

US rate: 14.57, 1.96 sd = 0.04
SC rate: 13.58, 1.96 sd = 0.40

Rates adjusted to 1970 US population.
Figure 37: Cancer Mortality in SC Lung, Trachea and Pleura
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Female
Ages: All
US rate: 14.36, 1.96 sd = 0.12
SC rate: 9.64, 1.96 sd = 0.55

Rates adjusted to 1970 US population.
Figure 38:

Cancer Mortality in SC Oral Cavity and Pharynx
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: All
Ages: All

US rate: 3.52, 1.96 sd = 0.01
SC rate: 3.69, 1.96 sd = 0.13

Rates adjusted to 1970 US population.
Figure 39:

Cancer Mortality in SC Oral Cavity and Pharynx
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: All
Ages: All

US rate: 3.40, 1.96 sd = 0.01
SC rate: 3.61, 1.96 sd = 0.16

Rates adjusted to 1970 US population.
Figure 40:

Cancer Mortality in SC Oral Cavity and Pharynx
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: Nonwhite
Gender: All
Ages: All

US rate: 4.47, 1.96 sd = 0.05
SC rate: 3.95, 1.96 sd = 0.26

Rates adjusted to 1970 US population.
Figure 41:

Cancer Mortality in SC
Oral Cavity and Pharynx
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Male
Ages: All

US rate: 5.72, 1.96 sd = 0.03
SC rate: 5.79, 1.96 sd = 0.26

Rates adjusted to 1970 US population.
* (5.60, 6.05) SC 95% CI
Figure 42:

Cancer Mortality in SC Oral Cavity and Pharynx
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Male
Ages: All

US rate: 5.52, 1.96 sd = 0.03
SC rate: 5.76, 1.96 sd = 0.31

Rates adjusted to 1970 US population.
* (5.45, 6.07) SC 95% CI
Figure 43:

Cancer Mortality in SC
Oral Cavity and Pharynx
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Male
Ages: All

US rate: 7.40, 1.96 sd = 0.10
SC rate: 6.11, 1.96 sd = 0.49

Rates adjusted to 1970 US population.
Figure 44:

Cancer Mortality in SC
Oral Cavity and Pharynx
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Female
Ages: All

US rate: 1.76, 1.96 sd = 0.01
SC rate: 2.09, 1.96 sd = 0.13

Rates adjusted to 1970 US population.
Figure 45:

Cancer Mortality in SC Oral Cavity and Pharynx
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Female
Ages: All
US rate: 1.71, 1.96 sd = 0.01
SC rate: 2.03, 1.96 sd = 0.15
Rates adjusted to 1970 US population.
Figure 46:

Cancer Mortality in SC Oral Cavity and Pharynx
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Female
Ages: All

US rate: 2.02, 1.96 sd = 0.05
SC rate: 2.25, 1.96 sd = 0.26

Rates adjusted to 1970 US population.
* (1.97, 2.07) US 95% CI
* (1.90, 2.51) SC 95% CI
Figure 47:

Cancer Mortality in SC
Esophagus
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gener: All
Ages: All

US rate: 3.06, 1.96 sd = 0.01
SC rate: 3.68, 1.96 sd = 0.13

Rates adjusted to 1970 US population.
Figure 48:

Cancer Mortality in SC
Esophagus
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gener: All
Ages: All

US rate: 2.62, 1.96 sd = 0.01
SC rate: 2.27, 1.96 sd = 0.12

Rates adjusted to 1970 US population.
Figure 49:

Cancer Mortality in SC
Esophagus
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: Nonwhite
Gener: All
Ages: All

US rate: 7.06, 1.96 sd = 0.06
SC rate: 7.51, 1.96 sd = 0.36

Rates adjusted to 1970 US population.
Figure 50:

Cancer Mortality in SC
Esophagus
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Male
Ages: All

US rate: 5.18, 1.96 sd = 0.03
SC rate: 6.03, 1.96 sd = 0.26

Rates adjusted to 1970 US population.
Figure 51:

Cancer Mortality in SC Esophagus
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Male
Ages: All

US rate: 4.43, 1.96 sd = 0.02
SC rate: 3.73, 1.96 sd = 0.25

Rates adjusted to 1970 US population.
Figure 52:

Cancer Mortality in SC
Esophagus
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gener: Male
Ages: All

US rate: 12.07, 1.96 sd = 0.12
SC rate: 12.72, 1.96 sd = 0.72

Rates adjusted to 1970 US population.
(11.95, 12.19) US 95% CI
(12.00, 13.44) SC 95% CI

Age-Adjusted Rate Categories

- 0.00 - 11.94
- 11.95 - 13.44
- > 13.44
Figure 53:

Cancer Mortality in SC Esophagus
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Female
Ages: All

US rate: 1.36, 1.96 sd = 0.01
SC rate: 1.80, 1.96 sd = 0.12

Rates adjusted to 1970 US population.
Figure 54:

Cancer Mortality in SC Esophagus
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Female
Ages: All

US rate: 1.18, 1.96 sd = 0.01
SC rate: 1.16, 1.96 sd = 0.12

Rates adjusted to 1970 US population.
* (1.04, 1.28) SC 95% CI
Figure 55:

Cancer Mortality in SC Esophagus
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gener: Female
Ages: All

US rate: 2.97, 1.96 sd = 0.06
SC rate: 3.49, 1.96 sd = 0.33

Rates adjusted to 1970 US population.
Figure 56:

Cancer Mortality in SC Stomach
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: All
Ages: All

US rate: 8.29, 1.96 sd = 0.02
SC rate: 7.52, 1.96 sd = 0.19

Rates adjusted to 1970 US population.
Figure 57:

Cancer Mortality in SC
Stomach
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: All
Ages: All

US rate: 7.79, 1.96 sd = 0.02
SC rate: 5.21, 1.96 sd = 0.19

Rates adjusted to 1970 US population.
Figure 58:

Cancer Mortality in SC
Stomach
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: All
Ages: All

US rate: 12.91, 1.96 sd = 0.09
SC rate: 13.73, 1.96 sd = 0.49

Rates adjusted to 1970 US population.
Figure 59:

Cancer Mortality in SC Stomach
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Male
Ages: All

US rate: 11.82, 1.96 sd = 0.04
SC rate: 10.87, 1.96 sd = 0.36

Rates adjusted to 1970 US population.
Figure 60:

Cancer Mortality in SC Stomach
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Male
Ages: All

US rate: 11.08, 1.96 sd = 0.04
SC rate: 7.50, 1.96 sd = 0.36

Rates adjusted to 1970 US population.
Figure 61:

Cancer Mortality in SC Stomach
Average Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Male
Ages: All

US rate: 18.82, 1.96 sd = 0.16
SC rate: 20.23, 1.96 sd = 0.92

Rates adjusted to 1970 US population.
Figure 62:

Cancer Mortality in SC
Stomach
Average Annual Age-adjusted Rates for 1953 - 1987

Race: All
Gender: Female
Ages: All

US rate: 5.60, 1.96 sd = 0.02
SC rate: 5.06, 1.96 sd = 0.21

Rates adjusted to 1970 US population.
Figure 6.3:

Cancer Mortality in SC Stomach
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Female
Ages: All

US rate: 5.31, 1.96 sd = 0.02
SC rate: 3.59, 1.96 sd = 0.21

Rates adjusted to 1970 US population.
Figure 64:

Cancer Mortality in SC Stomach
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Female
Ages: All

US rate: 8.19, 1.96 sd = 0.09
SC rate: 8.88, 1.96 sd = 0.52

Rates adjusted to 1970 US population.
Figure 67:

Cancer Mortality in SC Colorectal
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: Nonwhite
Gender: All
Ages: All

US rate: 20.09, 1.96 sd = 0.11
SC rate: 14.38, 1.96 sd = 0.51

Rates adjusted to 1970 US population.
Figure 68:

Cancer Mortality in SC
Colorectal
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Male
Ages: All

US rate: 25.22, 1.96 sd = 0.06
SC rate: 17.58, 1.96 sd = 0.47

Rates adjusted to 1970 US population.
Figure 69:

Cancer Mortality in SC Colorectal
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Male
Ages: All

US rate: 25.55, 1.96 sd ± 0.06
SC rate: 18.68, 1.96 sd ± 0.58

Rates adjusted to 1970 US population.
Figure 70:

Cancer Mortality in SC
Colorectal
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Male
Ages: All

US rate: 21.74, 1.96 sd = 0.17
SC rate: 15.07, 1.96 sd = 0.80

Rates adjusted to 1970 US population.
Figure 71:

Cancer Mortality in SC Colorectal
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Female
Ages: All

US rate: 19.96, 1.96 sd = 0.04
SC rate: 14.77, 1.90 sd = 0.35

Rates adjusted to 1970 US population.
* (19.94, 20.02) US 95% CI

Age-Adjusted Rate Categories
- 0.00 - 14.41
- 14.42 - 15.12 (SC 95% CI)
- 15.13 - 17.85 •
Figure 72:

Cancer Mortality in SC Colorectal
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Female
Ages: All
US rate: 20.04, 1.96 sd = 0.05
SC rate: 15.06, 1.96 sd = 0.42

Rates adjusted to 1970 US population.
* (19.00, 20.00) US 95% CI
Figure 73:

Cancer Mortality in SC Colorectal
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Female
Ages: All

US rate: 18.82, 1.96 sd = 0.14
SC rate: 13.88, 1.96 sd = 0.66

Rates adjusted to 1970 US population.
Figure 74:

Cancer Mortality in SC Bladder
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: All
Ages: All
US rate: 4.23, 1.96 sd = 0.01
SC rate: 3.40, 1.96 sd = 0.13

Rates adjusted to 1970 US population.
Figure 75:

Cancer Mortality in SC Bladder
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: All
Ages: All

US rate: 4.25, 1.96 sd = 0.02
SC rate: 3.39, 1.96 sd = 0.16

Rates adjusted to 1970 US population.
Figure 76:

Cancer Mortality in SC Bladder
Average Annual Age-Adjusted Rates for 1953 -1987

Race: Nonwhite
Gender: All
Ages: All

US rate: 3.91, 1.96 sd = 0.05
SC rate: 3.43, 1.96 sd = 0.25

Rates adjusted to 1970 US population.
Figure 77:

Cancer Mortality in SC Bladder
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Male
Ages: All
US rate: 6.96, 1.96 sd = 0.03
SC rate: 5.17, 1.96 sd = 0.26

Rates adjusted to 1970 US population.
Figure 78:

Cancer Mortality in SC Bladder
Average Annual Age-Adjusted Rates for 1953 -1987

Race: White
Gender: Male
Ages: All

US rate: 7.12, 1.96 sd = 0.03
SC rate: 5.47, 1.96 sd = 0.32

Rates adjusted to 1970 US population.
Figure 79:

Cancer Mortality in SC Bladder
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Male
Ages: All

US rate: 5.26, 1.96 sd = 0.08
SC rate: 4.54, 1.96 sd = 0.45

Rates adjusted to 1970 US population.
Figure 80:

Cancer Mortality in SC Bladder
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Female
Ages: All

US rate: 2.27, 1.96 \( \text{sd} = 0.01 \)
SC rate: 2.20, 1.96 \( \text{sd} = 0.14 \)

Rates adjusted to 1970 US population.
* (2.06, 2.34) SC 95% CI
Figure 81:

Cancer Mortality in SC Bladder
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Female
Ages: All

US rate: 2.20, 1.96 sd = 0.01
SC rate: 2.03, 1.96 sd = 0.15

Rates adjusted to 1970 US population
Figure 82:

Cancer Mortality in SC Bladder
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Female
Ages: All

US rate: 2.86, 1.96 sd = 0.05
SC rate: 2.64, 1.96 sd = 0.29

Rates adjusted to 1970 US population.
* (2.35, 2.93) SC 95% CI
Figure 83:

Cancer Mortality in SC Prostate
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Male
Ages: All

US rate: 22.01, 1.96 sd = 0.05
SC rate: 27.16, 1.96 sd = 0.62

Rates adjusted to 1970 US population.
Figure 84:

Cancer Mortality in SC Prostate
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Male
Ages: All

US rate: 20.66, 1.96 sd = 0.05
SC rate: 22.35, 1.96 sd = 0.69

Rates adjusted to 1970 US population.
Figure 85:

Cancer Mortality in SC
Prostate
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Male
Ages: All

US rate: 35.64, 1.96 sd = 0.23
SC rate: 40.11, 1.96 sd = 1.37

Rates adjusted to 1970 US population.
Figure 86:

Cancer Mortality in SC Breast
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Female
Ages: All

US rate: 26.59, 1.96 sd = 0.05
SC rate: 22.32, 1.96 sd = 0.44

Rates adjusted to 1970 US population.
* (26.54, 26.64) US 95% CI
Figure 87:

Cancer Mortality in SC Breast
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Female
Ages: All

US rate: 26.79, 1.96 sd = 0.05
SC rate: 22.60, 1.96 sd = 0.52

Rates adjusted to 1970 US population.
Figure 88:

Cancer Mortality in SC
Breast
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Female
Ages: All

US rate: 24.13, 1.96 sd ± 0.16
SC rate: 21.50, 1.96 sd ± 0.81

Rates adjusted to 1970 US population.
Figure 89:

Cancer Mortality in SC Cervix Uteri
Average Annual Age-Adjusted Rates for 1953-1987

Race: All
Gender: Female
Ages: All
US rate: 6.02, 1.96 sd = 0.02
SC rate: 8.44, 1.96 sd = 0.27

Rates adjusted to 1970 US population.
**Figure 90:**

Cancer Mortality in SC  
Cervix Uteri  
Average Annual Age Adjusted Rates for 1953 - 1987

Race: White  
Gender: Female  
Ages: All  
US rate: 5.26, 1.96 sd = 0.02  
SC rate: 6.14, 1.96 sd = 0.27

Rates adjusted to 1970 US population
Figure 91:

Cancer Mortality in SC Cervix Uteri
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Female
Ages: All
US rate: 12.53, 1.96 sd = 0.11
SC rate: 14.37, 1.96 sd = 0.66

Rates adjusted to 1970 US population.
Figure 92:

Cancer Mortality in SC Corpus Uteri
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Female
Ages: All
US rate: 5.11, 1.96 sd = 0.02
SC rate: 5.34, 1.96 sd = 0.21

Rates adjusted to 1970 US population.
Figure 93:

Cancer Mortality in SC
Corpus Uteri
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: White
Gender: Female
Ages: All
US rate: 4.81, 1.96 sd = 0.02
SC rate: 3.89, 1.96 sd = 0.21

Rates adjusted to 1970 US population
Figure 94:

Cancer Mortality in SC Corpus Uteri
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Female
Ages: All
US rate: 7.89, 1.96 sd = 0.09
SC rate: 9.10, 1.96 sd = 0.53

Rates adjusted to 1970 US population
Figure 95:

Cancer Mortality in SC Ovary
Average Annual Age-Adjusted Rates for 1953 - 1987

Race: All
Gender: Female
Ages: All
US rate: 8.51, 1.96 sd = 0.03
SC rate: 6.58, 1.96 sd = 0.24

Rates adjusted to 1970 US population.
Figure 96:

Cancer Mortality in SC Ovary
age-adjusted rates, 1987

Race: White
Gender: Female
Ages: All

US rate: 8.71, 1.96 sd = 0.03
SC rate: 7.02, 1.96 sd = 0.29

Rates adjusted to 1970 US population.
**Figure 97:**

Cancer Mortality in SC 
**Ovary**

Average Annual Age-Adjusted Rates for 1953 - 1987

Race: NonWhite
Gender: Female
Ages: All

US rate: 6.56, 1.96 sd = 0.08
SC rate: 5.39, 1.96 sd = 0.41

Rates adjusted to 1970 US population.
V. References


V. References


HELLO. I'm (NAME OF INTERVIEWER) Calling for the Survey Research Center. We're doing a study of the health opinions and concerns of residents of the Southeastern United States.

Your number has been chosen randomly to be included in the study, and we would like to ask some questions about your ideas of things which may affect health.

1. Is this a private residence?

   YES -> GO TO QUESTION 2

   NO -> Thank you very much, but I seem to have dialed the wrong number. It is possible that your number may be called at a later time. STOP.

   NO -> Thank you very much, but we are only interviewing in private residences. STOP.

Refusal Information

FINAL DISPOSITION OF TELEPHONE CALL

01- Completed Interview
02- Refused Interview
03- Non-working Number
04- No Answer (multiple tries)
05- Business Phone
06- No Eligible Respondent at this number
07- No Eligible Respondent could be reached during time period
08- Language barrier prevented completion of interview
09- Interview terminated within questionnaire
10- Line busy (multiple tries)
11- Selected respondent unable to respond because of physical or mental impairment

Edited by: ___________________________ Date: ___________________________
Our study requires that we interview only one person who lives in your household.

1. How many members of your household, including yourself, are 18 years of age or older? [ ]

   IF ONE PERSON HOUSEHOLD
   GO TO "ALL RESPONDENTS"

2. How many are men and how many are women?
   Men [ ]
   Women [ ]

3. Who is the oldest man/woman presently lives in this household?
4. Who is the next oldest man/woman presently lives in this household?

INTERVIEWER ORDER OF LISTING IS ALL MEN FIRST, OLDEST TO YOUNGEST, THEN ALL WOMEN, OLDEST TO YOUNGEST.

<table>
<thead>
<tr>
<th>Resident Number</th>
<th>Name/Relationship</th>
<th>LAST DIGIT OF TELEPHONE #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>3 1 2 3 1 2 3 1 2 3 1 2 X</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>1 2 3 4 1 2 3 4 X X</td>
</tr>
</tbody>
</table>
| 5               |                   | 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 | 5
| 6               |                   | 6 5 1 2 3 4 X X X X         |
| 7               |                   | 2 3 4 5 6 7 1 X X X         |
| 8               |                   | 8 1 2 3 4 5 6 7 X X X       |

The person in your household that I need to speak with is ________________

INTERVIEWER: IF RESPONDENT IS NOT HOME, TRY TO ARRANGE TIME FOR CALLBACK

Date: __________
Time: __________

IF SCREENING WAS NOT DONE WITH RESPONDENT

Hello. I'm (NAME OF INTERVIEWER) calling for the Survey Research Center. I'm a member of a special research team. We're doing a study of residents in the Southeastern United States regarding their health concerns. You have been randomly chosen to be included in the study from among the adult members of your household.

ALL RESPONDENTS

The interview will take about 10 minutes or perhaps a little less and all the information obtained in this study will be confidential.

Your name will not be used, but your responses will be grouped together with information from others participating in the study.

Of course, your part is voluntary and you can refuse to answer any questions or even end this interview anytime you like. ....
KNOWLEDGE

1. What is the leading cause of death in your area? (DON'T READ)
   - Cardiovascular Disease ............. 1
   - Cancer ................................ 2
   - Stroke .............................. 3
   - Diabetes ............................ 4
   - Other ................................ 5
   - Don't Know ......................... 7
   - Refused ............................. 9

2. Are the cancer death rates in your county, higher, lower, or the same as the rest of the state?
   - Higher ............................. 1
   - Lower ............................... 2
   - Same ............................... 3
   - Don't Know ......................... 7
   - Refused ............................. 9

3. What is the major type of cancer responsible for death in your area?
   - Lung ................................ 1
   - Breast .............................. 2
   - Leukemia ............................ 3
   - Prostate ............................ 4
   - Colon/Rectum ....................... 5
   - Other ................................ 6
   - Don't Know ......................... 7
   - Refused ............................. 9

AWARENESS

4. Are you aware of any environmental health hazards in your county?
   - Yes ................................ 1
   - No .................................. 2
   - Don't Know ......................... 7
   - Refused ............................. 9

5. What type(s) of health hazards?
   (READ)
   - Yes  No
     - Chemical ..................... 1 ............. 2
     - Radioactive ................. 1 ............. 2
     - Biological .................. 1 ............. 2
6. Do you feel that you are exposed to the hazards?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Don’t Know</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Refused</td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

7. From what source(s) do you get health information regarding environmental hazards?

(READ) Yes No

<table>
<thead>
<tr>
<th>Source</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Television</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Newspaper</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Physician’s Office</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

ATTITUDES/OPINIONS

8. Do you feel you are receiving adequate information regarding environmental health hazards?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Don’t Know</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Refused</td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

9. Do you feel adequate health investigations are being conducted on environmental hazards?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Don’t Know</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Refused</td>
<td></td>
<td>9</td>
</tr>
</tbody>
</table>

10. Please rate between 1 and 4 your concern regarding the following events and the level of risk you feel is present. A rating of 1 indicates you feel very likely the event will occur, while 4 indicates the event is not likely to occur.

<table>
<thead>
<tr>
<th>Event</th>
<th>Very Likely</th>
<th>Likely</th>
<th>Unlikely</th>
<th>Very Unlikely</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop lung cancer from smoking</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Radon exposure in your home</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Fall and breaking hip</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Being struck by lightning</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Home catching on fire</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Being in an aircraft accident</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Having a heart attack</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Being in a traffic accident</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>
11. Dose - Use Relationships

A. If you are exposed to a toxic chemical substance, then you are likely to suffer adverse health effects.

B. If you are exposed to a carcinogen then you are likely to get cancer.

C. For pesticides, it's not how much of the chemical you are exposed to that you should worry about, but whether or not you are exposed to it at all.

D. There is no safe level of exposure to a cancer-causing agent.

12. Animal Studies

A. The way that an animal reacts to a chemical is a reliable predictor of how a human would react to the same chemical.

B. If a scientific study produces evidence that a chemical causes cancer in animals, then we can be reasonably sure that the chemical will cause cancer in humans.

13. Attitudes

A. Our society has perceived only the tip of the iceberg with regard to the risks associated with chemicals.

B. The land, air and water around us are, in general, more contaminated now than ever before.

C. Use of chemicals has improved our health more than it has harmed.

D. People are unnecessarily frightened about very small amounts of pesticides found in ground water and on fresh food.

E. People worry unnecessarily about what chemicals can do to their health.
### F. Chemicals are a major force behind technological advancement.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>No Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

### G. Chemical risks are too many. I don't even like to think about them.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>No Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
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<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

### H. I do everything I can to avoid contact with chemicals and chemical products in my daily life.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>No Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

### 14. Risk Reduction Attitudes

#### A. It can never be too expensive to reduce the risks associated with chemicals.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>No Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>5</td>
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</tbody>
</table>

#### B. All use of chemicals must be riskful.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>No Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

#### C. I think that I should know as much as I can about the chemicals around me.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>No Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

#### D. Residents of a small community (30,000 people) observed that several malformed children had been born there during each of the past years. The town is in a region where agricultural pesticides have been used during the past decade. It is very likely that these pesticides were the cause of the malformation.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>No Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>4</td>
<td>5</td>
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</table>

### 15. The next questions involve word association. For example, when I mention the word baseball, you might think of the World Series, summertime, hot dogs, or the Atlanta Braves. We are interested in the first three thoughts that come to your mind when you hear Savannah River Site.

What is your first thought or image that comes to mind?

________________________________________________________________________

What is your second thought or image?

________________________________________________________________________

What is your third thought or image?

________________________________________________________________________
PART VI: DEMOGRAPHICS

And, finally, these next few questions ask for a little more information about you.

16. How old were you on your last birthday? (162-163)
   a. CODE AGE IN YEARS
      Don't know/not sure .................. 0 7
      Refused ................................ 0 9

17. What is your race?

   Would you say: (164)
   (PLEASE READ)

   a. White ....................................... 1
   b. Black ....................................... 2
   c. Other - specify ... (_________________). ...... 3
      Don't know/not sure .................. 7
      Refused ................................ 9

18. What is the highest grade or year of school you completed? (165)

   (READ ONLY IF NECESSARY)

   a. Eighth Grade or Less ..................... 1
   b. Some High School ......................... 2
   c. High School Grad or GED Certificate .... 3
   d. Some Technical School .................... 4
   e. Technical School Graduate ............... 5
   f. Some College ................................ 6
   g. College Graduate ......................... 7
   h. Post Grad or Professional Degree ........ 8
      Refused ................................ 9
19. Are you currently: (PLEASE READ)
   a. Employed for wages .................................. 1
   b. Self employed ...................................... 2
   c. Out of work for more than 1 year .................... 3
   d. Out of work for less than 1 year ..................... 4
   e. Homemaker ........................................ 5
   f. Student ............................................. 6
   OR
   g. Retired ............................................ 7
   Refused .................................................. 9

20. And are you: (PLEASE READ)
   a. Married ............................................. 1
   b. Divorced ............................................ 2
   c. Widowed ............................................. 3
   d. Separated .......................................... 4
   e. Never been married .................................. 5
   OR
   f. A member of an unmarried couple ....................... 6
   Refused .................................................. 9

21. Which of the following categories best describes your annual household income from all sources? (PLEASE READ)
   a. Less than 10,000 ..................................... 1
   b. 10 to 15,000 ......................................... 2
   c. 15 to 20,000 ......................................... 3
   d. 20 to 25,000 ......................................... 4
   e. 25 to 35,000 ......................................... 5
   f. 35 to 50,000 ......................................... 6
   OR
   g. Over 50,000 .......................................... 8
   Don't know/Not sure ..................................... 7
   Refused .................................................. 9
22. How many years altogether have you lived in South Carolina?
   a. CODE YEARS ........................................... ______ ______ ______
      Don't know/Not sure ........................................ 7 7 7
      Refused ...................................................... 9 9 9

23. INTERVIEWER: INDICATE SEX OF RESPONDENT ASK IF NECESSARY
   a. Male, (GO TO Q 102) ...................................... 1
   b. Female ...................................................... 2

24. How many telephone numbers will reach this household, including the number I used today?

   DIFFERENTIATE BETWEEN TELEPHONE NUMBERS AND TELEPHONE SETS IF NECESSARY.
   INCLUDE ALL TELEPHONE NUMBERS THAT CAN REACH HOUSEHOLD

   A. Total Telephone Numbers ................................. ______

CLOSING STATEMENT

That's my last question. Everyone's answers will be combined to give us information about the health practices of the people in this community. Thank you very much for your time and cooperation. You will be contacted in the near future about participation in the next phase of the study.
FROM THE EDITOR:

We appreciate the positive and encouraging response we received regarding our first newsletter. Hopefully you will continue to find this and future issues as informative and interesting.

In our quest to get the newsletter into the SRRHIS communities, our mailing list has increased to over 4,000 names. To ensure the accuracy of the list, we would appreciate it if you would complete and mail back the enclosed postcard. Also, please add any names and addresses of others you think might be interested in receiving our newsletter.

As always, your comments and questions are welcome.

Editor: Janis S. Koenig
Assistant Editor: Margery Swanson

SRRHIS REPORT

by John B. Dunbar, D.M.D., Dr.P.H.

Seeking to Become an Information Source

As I suggested in the first Newsletter, a major long-term goal of SRRHIS is to become a source of environment/health-related information for the residents of the SRS region. Although the task is formidable and likely to take a number of years to accomplish, we have made a few beginnings. I want to share with you some of these beginnings, and to emphasize that we are making a strong effort to keep the area residents informed about our meetings, and to move broadly throughout the region speaking to them in various settings:

- We have a Steering Committee of 12 persons made up principally of residents of the SRS region. The Committee meets quarterly, rotating its meeting place among the South Carolina and Georgia cities of Aiken, Augusta, Beaufort, and Savannah. We have begun mailing out letters and placing notices in local newspapers so as to inform the residents that they are always welcome at these meetings. At our first two meetings in Aiken and Augusta, we had only three to four residents; later meetings have shown great improvement. At the last meeting in Aiken on January 28, 1993, we had about 15 residents. Also the Steering Committee changed the meeting time to 7:00 to 9:00 pm in the evening (was held from 10:00 am to 2:00 pm) so as to make it more convenient for the public.

- We are holding community meetings in the SRS region to explain the aims and limitations of our activities, and to hear suggestions, advice, and criticism from area residents. We had about 35 participants at our first community meeting in Beaufort on November 4, 1992. On February 2, 1993 we invited selected residents from the Hampton County area to have lunch with us to discuss the registry and to indicate their interests and concerns. Twenty-five persons were there, one of whom came from Sylvania, Georgia at our invitation. We have plans underway to hold more community meetings in Sylvania, Augusta, Orangeburg, Walterboro, and Statesboro over the ensuing six months. To try to assure the maximum public participation, we hold the meetings at night and toward the middle of the week; we send out written invitations to those on our mailing list; and we notify the media which we ask to publish announcements.

- We have just completed our first technical report showing South Carolina counties and mortality from the different types of cancer over the 24 year period, 1953-1987. We have a limited number but will make copies available as long as they last.

- With the assistance of a colleague and consultant, formerly of the National Cancer Institute (Federal Government agency), we have developed a computer mapping program which shows by county (SC and GA) the mortality rate from the specific types of cancer, and how they compare to the US rate overall. It is a user-friendly program suitable for classroom or other group demonstrations and self study. Upon request, we are available to demonstrate the program in a classroom or other appropriate setting. (Continued on page 2)

THE DEVELOPMENT OF THE CANCER REGISTRY IN SOUTH CAROLINA

by Catherine D. Harvey, Dr.P.H., R.N.

During the last several years, there has been increasing interest in developing a cancer registry for the state. As early as 1987 a group met at the Department of Health and Environmental Control (DHEC) and recommended that a cancer registry be a top priority of the department. This recommendation went forward in 1990, but was not funded.

In 1990 and 1991 the South Carolina Department of Health and Environmental Control began working with the Centers for Disease Control to set up a breast and cervical cancer screening program for income eligible women. At that time, a commitment was made to develop a surveillance system for breast and cervical cancer. To that end, DHEC developed a program that will be implemented this year. Last summer, the Cancer Control Advisory Committee of DHEC recommended that this activity be expanded to include all cancer cases in the state. (Continued on page 2)
In cooperation with the American College of Surgeons (agency responsible for the accreditation of hospital cancer registries) and the SC Association of Tumor Registrars, we have completed workshops for active cancer registrars in the region.

Through these efforts and others, we are trying to become a source of credible information/referral for residents of the Savannah River region.

**When Will Relevant Information Be Available?**

Beginning with this issue, and extending to future issues, I will identify a question which has been asked at a community meeting, and which would seem to hold interest for the residents generally. One question I have heard over and over is, "When will we have the health-related information relevant to the Savannah River region?" The registry has just begun and we won't have its data until three to four years down the line. Because we intend to have access to a number of data sources over time, a word about each of them is needed.

The cancer registry is the first active data-collecting component of the program. We began abstracting information on new cancer cases in the SRRHS region of South Carolina and Georgia as of January 1, 1991. Emory University School of Public Health is responsible for identifying cases on the Georgia side and the Medical University of S.C. is responsible for the South Carolina side. Because we are looking only at cases occurring since January 1, 1991, we will not have a significant set of data to report until three to four full years of data are in the files. Recalling that it takes six to nine months to assemble data from the close of a given year, you can appreciate that it will be 1995 to 1996 before a good data base will be developed. We will publish several draft reports prior to that time showing what data we have collected; but the first solid base of information is not expected until the mid-nineties.

A birth defects registry proposal is under discussion. Residents of the region have expressed interest in supplementing the cancer effort with one about birth defects. To help us in the planning process, contact has been made with the Centers for Disease Control and Prevention (CDC), which operates such a registry in the Atlanta area, and with professional personnel in states having successful programs. If funding can be identified, the birth defects registry could begin no later than the summer of 1994.

We have information from the National Center for Health Statistics (part of CDC) and from state health departments on the causes of death in the region. The information is available for the years 1953-1987, and for both sexes, race, and county of residence, and for other causes of death such as cardiovascular disease. Furthermore, we have the information available in a user-friendly mapping program which fits on an ordinary computer (with large hard drive) and presents comparative data by counties, color-coded by whether they are below or above the US average. The program, which is available for demonstration to classes and groups, has been well received by past citizen groups.

In April 1993 we will be using our Survey Research Center to take our first poll of area residents concerning their knowledge and awareness of selected environmental issues, and associated perceptions of health risk. Results of the survey will be discussed at our community meetings and in subsequent newsletters.

In addition to these monitoring type activities we will have special follow-up studies. For instance, if a pattern of unusual cancer occurrence is observed, special epidemiological kinds of studies may be undertaken to ascertain whether there is a public health problem. Typically, such studies would be undertaken by state health departments either alone or in collaboration with university-based experts.

So you see there are elements associated with monitoring health outcomes (having a cancer, having a birth defect, dying of certain causes, and citizen concerns), and activities associated with following up on any suspect outcomes. While this is not a set of information sources to answer all concerns, it is a practical beginning.

Your comments and letters are most welcome. We can start a "letters to the editor" section if your interest dictates.

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**CALENDAR OF EVENTS**

**SRRHS STEERING COMMITTEE**

Augusta, GA Radisson 4/22 Riverfront 7-9PM

**COMMUNITY MEETINGS**

Planned for:
- Statesboro, GA Orangeburg, SC
- Savannah, GA Walterboro, SC
- Waynesboro, GA Edgefield, SC

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(A Harvey continued from Page 1)

A Steering Committee was appointed by the Cancer Control Advisory Committee and met in January of this year. The Steering Committee has representatives from many interested health care groups and professional organizations. Among those represented are the South Carolina Medical Association, the South Carolina Hospital Association, the South Carolina Association of Tumor Registrars, the university based cancer centers, the South Carolina Division of the American Cancer Society, the Department of Health and Environmental Control, and the South Carolina Budget and Control Board. The charge of that Steering Committee was to develop a mechanism and the enabling legislation for the implementation of a cancer registry in South Carolina.

The group is working actively in subcommittees to accomplish three tasks: 1) to develop legislation, 2) to develop an operational plan for a DHEC-based cancer registry, and 3) to address the issues of data usage, dissemination, and access. The time table for introducing the legislation is January 1994. Some early conversations with individual legislators indicate interest in the project as well as support. We hope to utilize existing resources including the 18 hospital based cancer registries, the Savannah River Region Health Information System and the Appalachian State Initiative to facilitate and contribute data to this endeavor. This approach minimizes redundancy, capitalizes on existing resources, and assures collaboration of other cancer researchers in the state.

During the next six months, the group will also identify sources of funding to defray many startup costs and assure early implementation. The registry may potentially be funded from other federal and foundation grant sources besides the state. Also, during this time the Steering Committee will address concerns of special interest groups and organizations in the state. It is believed that these activities must occur prior to the initiating legislation in order to assure passage.

In summary, we are hopeful that a cancer registry will be developed in South Carolina.

Catherine D. Harvey, Dr.P.H., R.N. is Chairperson, Cancer Registry Steering Committee, S.C. Department of Health and Environmental Control and Associate Director for Administration, Hollings Oncology Center, Medical University of South Carolina.
HAMPTON GENERAL HOSPITAL
VARNVILLE, SC

by Alva M. Driggers
Public Relations/Health Education

In the central portion of South Carolina’s Lowcountry along a sixteen mile stretch of the Savannah River, sits Hampton County-rich in heritage and hospitality. The county is known for its gracious antebellum plantation homes, abundant wildlife, making it a Sportsman’s Paradise and the annual Watermelon Festival, South Carolina’s oldest continuing festival.

Located in the center of Hampton County is Hampton General Hospital, a non-profit, county owned facility. Opening in 1950 with just twenty-six beds, this small rural hospital has expanded into a sixty-eight bed facility.

Serving a population area of approximately 25,000, Hampton General Hospital works continuously to provide the best medical services available to the community.

Recently, the hospital has added a heliport, a mammography unit, mobile CAT Scan services, and rehabilitation services which include physical therapy, occupational therapy and speech therapy.

The Hampton General Hospital Dialysis Center, the county’s first and presently the state’s only hospital-based outpatient dialysis center, opened February 24 of this year. Patients now can enjoy the convenience of driving just a few minutes for dialysis treatments instead of driving long, tiresome distances outside the county.

The emergency room is staffed with an ER physician twenty-four hours a day, seven days a week. Patients needing additional medical care can be transported quickly by helicopter to medical centers 50 to 75 miles away.

The hospital has consulting physicians, specializing in cardiology, podiatry, gastroenterology, and urology, who provide these services regularly to the community.

Hampton Healthstyles, the hospital’s Wellness Program, is very active in providing health education and exercise programs to the community and hospital employees. Radio show, “Health Happenings,” gives weekly reports on health and hospital news. Low Impact Aerobic classes, CPR courses, “Cut Fat Not Taste,” “Diet Puzzle,” and the annual “Hampton County Fitness Festival” co-sponsored by Clemson University Extension Services and Low Country Health District are just a few of the programs offered regularly.

EDITOR’S NOTE: Beginning with this issue we are showcasing the individual hospitals participating in the SRRHIS program. Because Hampton General Hospital of Varnville, South Carolina was so important in the initiation of the program, it is fitting that it be the first hospital featured. Hampton General had the following “firsts” with us:

- The Hospital Administrator, Ms. Athalene Mole, was the first to answer our early 1990 original letter of inquiry about interest in a potential cancer registry;
- It was the first hospital to agree to the cancer abstracting format and the related hospital-based abstracting procedure;
- We began our first abstracting of records at Hampton General, and we completed our 1991 data collection there first.

The remaining hospitals will be featured in future issues of the Newsletter.

RESPONDING TO CANCER CLUSTERS

by Robert F. Marino, M.D., M.P.H.

Nearly one out of three Americans will develop a cancer in their lifetime. Cancers are the second leading cause of death in the nation and in South Carolina. Even if these events occur totally at random, some clustering is bound to occur by chance alone. Yet, such “clusters” cause much anxiety and concern in communities because of the belief that somehow they are causally related. Responding to these situations requires not only an understanding of cancer epidemiology but an appreciation for the public’s concern about the occurrence of such dread diseases in their communities.

Evaluating clusters in communities have not been particularly productive in identifying causal agents. Of all the studies performed nationally and internationally, only one study was able to link a cluster of cancers to the presence of an environmental carcinogen (a cluster of mesotheliomas in a Turkish village was causally linked to the natural abundance of the mineral, Erionite, in the village’s soil). Causal associations have been drawn from cluster studies in the occupational sector where exposures to toxins were invariably higher and exposure periods longer than what may occur in communities. Some examples include lung cancer and mesothelioma among asbestos workers, aplastic anemia and leukemia among benzene workers, angiosarcoma of the liver among vinyl chloride workers. Although most of the human data have arisen from studies in the occupational sector, some causal agents have also been identified through the health surveillance of populations unusually exposed to a toxic agent (for example, the occurrence of leukemia, thyroid and breast cancers among the Hiroshima survivors).

Considering the unlikely possibility of identifying a causal agent, why do we investigate cancer clusters? Certainly, the relative lack of positive findings would argue against undertaking these studies at all. However, public
health agencies are obligated to respond for the following reasons: 1) to educate the public about risk factors (particularly lifestyle factors) that may contribute to the occurrence of these diseases; 2) to help them become informed about and focus on the environmental problems in their communities which may underlie their concern about the occurrence of these diseases, and 3) in the event that through their study, some previously unknown association may be discovered or at least, to further substantiate our understanding of the etiologies of cancers.

Clusters are evaluated using a step-wise process beginning with the identification and confirmation of cases. This can be an arduous task given that South Carolina does not yet have a statewide, population-based cancer registry. Although hospitals may have a tumor registry, they are often inadequate for case ascertainment as many of our residents travel to out-of-state hospitals for care. We must rely primarily on the concerned resident for information about the identities of the cancer cases, the time of occurrence of their diseases, and the geographic area of concern in which the cases occurred. Once we have this information, we determine if a "true" or a "perceived" cluster exists. A "true" cluster is one in which the observed cases statistically exceed the cases that would be expected to occur in a similar population of the same age, race, and sex. A "perceived" cluster is one in which the observed cases do not statistically exceed the expected number of cases for the population of concern. The following factors are likely to be present in a "true" cluster: all cases are of the same tumor type; the tumor is a particularly rare type; all cases are in one age group, particularly within a sensitive subgroup, such as children; the tumor type is known to be causally-associated with a particular toxic agent; morbidity and/or mortality is greater than expected; cases are localized to a particular geographic area and occurred within a specific period of time.

"Perceived" clusters do not warrant further study; however, they do provide us with an opportunity to educate those who report the cluster about the risk factors that may have contributed to the occurrence of the cancers. It also allows us to help the community understand any environmental problems that may underlie their concern. Once a "true" cluster is identified, a hypothesis-generating study, such as a case study, may be undertaken to identify any commonalities within the medical or exposure histories of the cases. Should a hypothesis be developed from this study, further analytical investigation may be pursued.

Robert F. Marino, M.D., M.P.H. is Director, Division of Health Hazard Evaluation, S.C. Dept. of Health and Environmental Control.

PATHOLOGISTS AND TUMOR REGISTRIES:
A PERSPECTIVE FROM PRIVATE PRACTICE

by R. Marshall Austin, M.D., Ph.D. and G. Frederick Worsham, M.D.

Cancer registration is one of the initial steps in the control of cancer. A cancer registry has been defined as an organization for collection, storage, analysis, and interpretation of data on persons with cancer. Approximately 75% of the hospitals in South Carolina currently have such a registry. South Carolina is one of only eight states which does not have a statewide cancer registry.

In 1935, Connecticut began the first statewide cancer registry using data accumulated from hospitals. Later the American College of Surgeons became involved in giving assistance to hospital registries throughout the United States, and their Commission on Cancer has for many years supported a National Cancer Database using computerized information from hospitals. The American Cancer Society, for obvious reasons, has also been active in the establishment of cancer registries, usually at the state level.

With this brief background information, a natural question is what is special about the relationship between pathologists and tumor registries? Since the initial definitive or tissue diagnosis of any cancer is done by a pathologist, as a group, we have always been active in the management of cancer. Pathologists are an essential part of the team in the hospital tumor board or cancer registry. At many facilities, the pathology department is responsible for initiating the registry of a cancer patient by sending a copy of the report of the tumor registrar for identification. Pathologists are usually intimately involved in the hospital's cancer committee or a committee with similar responsibility so that coordination of which cancers are reported, how the registry is maintained, and other details have oversight by the medical staff. The pathologist is frequently a resource person for the tumor registrar in determining whether a particular patient with a rare and obscure tumor deserves registration. Some tumors of the ovary, although named "border-line" require registration since they may recur and require treatment similar to tumors classified as cancer. Similarly some uncommon "benign" soft tissue tumors, such as fibromatoses, may frequently recur and require modalities such as radiation therapy for their control.

Pathologists have also developed a role in some hospitals as information specialists. Because the laboratory is an enormous storehouse for medical data, most laboratories have computerized ahead of their parent hospitals. Most pathology departments will have computer literate personnel to assist in planning a cancer database, including choosing software and hardware to fit a particular application. Data presentation, including report formatting, is an area pathologists are sensitive to because of their long working relationships with the medical staff and its requirement for user-friendly reports.

The pathology department is also frequently the initial point of contact for agencies asking for incidence data regarding cancer. One author's early experience in this practice was a request from a state agency to our hospital to provide the types of cancers from a particular zip code. There was concern that an old industrial site was associated with an increased cancer risk in a small neighborhood adjacent to the plant. Without a relatively sophisticated computerized database, this information was simply not available. Furthermore, since patients in metropolitan areas frequently seek care at multiple institutions, incidence information from a single institution may not be useful.

Although the pathology community has been a willing participant at the hospital level, the role of pathologists at the state and national level has not been as visible. Fortunately, there are growing initiatives at both the state and national levels to improve the population-based reporting of cancer. It is estimated that 14,500 new cases of cancer will be diagnosed in South Carolina in 1992, and 6,800 existing cancer patients will die based on American Cancer Society statistics. The Department of Health and Environmental Control has been aware of the dependency on estimates for this information and is aware that surveillance of actual cases is not possible. This lack of data has been a major concern to the Cancer Control Advisory Committee to DHHC, and in 1987 a sub-committee began meeting to address the issues surrounding cancer reporting. In 1989, this
group recommended as the number one priority the development of a population-based cancer registry to track the incidence of cancer in South Carolina. In December, 1992, two separate planning and steering committees were established to achieve the following objectives: 1) to define the role, mission, scope, and goals of this South Carolina Cancer Surveillance System; 2) to author legislation requiring cancer to become a reportable disease throughout the state; 3) to develop a public awareness program that supports both public hearings and consumer education throughout the state; 4) to develop an operational model for the implementation and dissemination of data from the State Cancer Surveillance System; 5) to assure that the Surveillance System include appropriate data elements, reporting capabilities, and confidentiality guidelines; 6) to identify and secure sources of non-governmental funding to assist with the development of the Cancer Surveillance System; 7) to develop a model for professional education for those required to report as well as new data collectors throughout the state. Sub-committees have been established to achieve these objectives and include legislation, public awareness, advocacy, management and operations, data collection and dissemination. All of these committees are active at this time and have representation from appropriate groups, including the South Carolina Pathology Society.

Furthermore, at the federal level, in the last session of Congress in 1992, in a relatively complex series of legislative maneuvers, a national tumor registry was authorized. Funding for the registry has not been settled at this time, but for the first time there appears to be both a state and national agenda to have cancer statistics developed on the basis of more precise registation of actual cases rather than projections from sampled populations. However, crucial issues remain in implementation and include access to information without breaching confidentiality and funding during one of the most cost sensitive periods for American medicine.


R. Marshall Austin, M.D., Ph.D. currently practices at Roper Hospital in Charleston and has a clinical faculty appointment at the Medical University of South Carolina. Dr. Austin is Pathology Consultant to the Savannah River Region Health Information System.

G. Frederick Worsham, M.D. currently practices at Roper Hospital in Charleston and has a clinical faculty appointment at the Medical University of South Carolina. Dr. Worsham is South Carolina Society of Pathologists’ Representative to the Legislative, Public Awareness, and Advisory Sub-Committee of the Cancer Registry Planning Committee to the DHIEC Cancer Control Advisory Committee.

**SRRHIS TECHNICAL REPORT:**

"Cancer Mortality in South Carolina, 1953 to 1987"

**EDITOR’S NOTE:** The following is a press release written by Ellen Bank, MUSC Public Relations announcing the publication of the first SRRHIS technical report.

South Carolina leads the nation in cancer mortality for some major types of cancer, according to a report just published by the Medical University of South Carolina.

That’s the bad news.

But the good news is that many of these types of cancer are preventable through lifestyle changes or highly curable when detected early.

The report was published by the Medical University’s Savannah River Region Health Information System. Data were obtained from the National Cancer Institute, Centers for Disease Control and the American Cancer Society.

"People want accurate information concerning cancer mortality in their areas," said Dr. John Dunbar, Director of the Savannah River Region Health Information System. "They want facts, not hearsay." This report provides information comparing death rates not only between South Carolina and the rest of the country, but among the counties in South Carolina. The report also shows significant differences in cancer rates between whites and non-whites and between males and females for some cancers.

Persons in any county of South Carolina can look at their county and see immediately where that county ranks in death rates from specific cancers and what subgroups of the county’s population have higher rates than others.

Among the highlights of the report are:

- Skin cancer rates for South Carolina white males and females are significantly higher than the corresponding U.S. rates, with the state ranking 14th among all states for overall skin cancer mortality.
- Lung cancer mortality rates are comparable to those in the United States, but the state rate for white males exceeds the U.S. rate. Indeed, South Carolina ranks seventh among all states for lung cancer mortality in white males.
- S.C. significantly exceeds the U.S. mortality rate for oral cavity and pharynx cancer. Among the regions of the state, the Midlands has a significantly higher death rate for all races and both sexes.
- South Carolina ranks 11th and 12th respectively among all states in non-white and white male prostate cancer death rates.
- South Carolina ranks significantly higher than the U.S. in the mortality rate for esophageal cancer. Most of this excess is due to high rates in non-whites, with male rates exceeding female rates for both race categories.
- The S.C. stomach cancer rates for non-whites are significantly higher than the U.S. rates, with male rates significantly higher than female ones. The central and southwestern coastal regions of the state show concentrations of excessive stomach cancer rates for non-whites.
- The S.C. rates for colorectal cancer are significantly below the U.S. rate for all races and sex categories. However, there appear to be specific pockets in the state that have rates significantly higher than the U.S. rate.
- The S.C. rates for breast cancer are significantly below the U.S. rates for both white and non-white females. However, the non-white breast cancer mortality rate is significantly higher than the white rate, and there appears to be a concentration of high mortality rates in the northwestern section of the state for non-white females.
- S.C. ranks significantly below the U.S. rate for ovarian cancer, but four of the S.C. counties with populations exceeding 100,000 have higher rates for non-white females than the corresponding U.S. rate.

"The causes for these differences in frequency are not known," said Dunbar. "However, some of these cancers, such as lung and colon, can be prevented to a large extent by the individual person; not smoking reduces lung cancer, and a low-fat, high-fiber diet favors a healthy colon. Others, such as breast, cervix and prostate cancers can be treated successfully if they are detected early."
January Steering Committee Meeting Report
by Janis S. Koenig, M.Ed.

The fifth meeting of the Savannah River Region Health Information System (SRRHIS) Steering Committee was held in Aiken, South Carolina on January 28, 1993. This was the first evening meeting. The Committee voted at the prior meeting to change the time of the meetings so as to encourage more community attendance and participation. As noted in Dr. Dunbar's report, it proved to be a successful decision.

The meeting began with old Committee business which was followed by progress reports from the South Carolina and Georgia sides of the River. Other business conducted is summarized in the following paragraphs.

Mr. Brian Costner, Director, Energy Research Foundation, gave a brief update of the activities related to the Savannah River Site. He discussed them from the aspect of three categories: production, clean-up, and health studies such as SRRHIS, Centers for Disease Control dose reconstruction project, and studies being planned by the National Institute of Occupational Safety & Health and the Agency for Toxic Substances and Disease Registry.

Dr. Dan Lackland, Director of the Medical University of South Carolina Survey Research Center, briefed the Committee on a survey planned for a sample of residents in the SRRHIS area, with the aim of determining public awareness and knowledge of activities relating to environmental health in their regions. This survey will serve as a baseline for future evaluation of how well we and others have done in the job of making the public aware of our project and of others, such as the dose reconstruction project spearheaded by CDC.

Dr. Tom Hulse, Medical University of South Carolina (SRRHIS-Birth Defects) gave a brief explanation of the passive birth defects registry data he has been tabulating. A set of summary data was distributed to the Committee. Dr. Yuko Palesch, Medical University of South Carolina (SRRHIS Biostatistician) presented an outline of a planned active birth defects registry noting the complexity and additional expense compared to a passive registry. Meetings are being planned with Mr. Larry Edmonds of CDC to discuss an active registry in greater detail.

The next SRRHIS Steering Committee meeting will be held at the Augusta Radisson, Two Tenth Street, in Augusta, GA, April 22, 1993, 7:00 to 9:00 pm.

The Savannah River Region Health Information System (SRRHIS) Steering Committee Members

Mr. Andrew Rea
Chairman
Savannah, GA

Ms. Alva Driggers Dr. Denise Parrell
Varnville, SC Aiken, SC

Ms. Mildred Ford Dr. Bonnie Richter
Blackville, SC Washington, DC

Dr. Curtis Hanes Dr. Jon Trueblood
Claxton, GA Augusta, GA

Mr. Tom Hendrix Dr. Lisa Wagner
North Augusta, SC Statesboro, GA

Ms. Hulda Mingleford Mr. Fred Washington
Sylvania, GA Beaufort, SC

Ms. Brenda Nickerson
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FROM THE EDITOR

We are pleased to present the first edition of the Savannah River Region Health Information System (SRRHIS) Newsletter. It will feature updated articles about SRRHIS, cancer prevention and control and general health information written by health professionals and para-professionals. The newsletter will report upcoming events and other information of interest. We hope you find it interesting and informative and enjoy reading it. Please let us know if there are any topics you would like to see in future issues.

HAPPY HOLIDAYS!

Editor: Janis S. Koenig
Assistant Editor: Margery Swanson

SRRHIS REPORT

by John B. Dunbar, D.M.D., Dr.P.H.

This first Newsletter to the residents of South Carolina and Georgia, particularly those of the Savannah River area is the perfect medium for me to convey three important points about the Savannah River Region Health Information System (SRRHIS):

1) It is meant to be of service to ALL OF YOU;
2) We want you to know this (#1 above) so you will contact us when you want information about health statistics for the area;
3) We want you to know how to contact us.

The cancer registry:

The first component of SRRHIS is the cancer registry. As of January 1, 1991 we began counting all new cases of cancer in the 22 counties within 50 miles of SRS and those downstream to Beaufort and Savannah, in addition to those in a comparison set, the Tri-county area of Charleston. In three to four years we expect to have a good picture of the frequency of occurrence of the major types of cancer in the region, and we will be able to tabulate our results on a county by county basis. Further, we will be able to compare the pattern of cancer occurrence in the region with that of areas more distant, such as Charleston, Atlanta, and even the US overall.

The cancer registry will serve three general purposes:

1) Information dissemination: Information from the registry will be made available to the public, practicing physicians, hospitals, and health-related scientists by way of newsletters, brochures, community meetings, and technical reports.

2) Evaluation of cancer prevention and control efforts: Cancer registry data can be used to evaluate programs aimed at improving detection, treatment, and/or prevention of cancers in a given community or region. Most hospitals and all university medical centers and health departments have active programs seeking to reduce the impact of cancer in their communities. By monitoring the incidence of site specific cancers by age, sex, residence and other demographic factors over time, the level of success of these collective programs can be assessed.

3) Research, planning support, and timely identification of problem areas: Registry data will be available to scientists and health planners, subject to clearance through a registry review committee, and maintenance of confidentiality.

Hospital and physician assistance:

We would be unable to do this project except for the fact that your area hospitals have been forward-looking in recognizing that this kind of cancer occurrence infor-
Cancer mortality is a prominent issue, especially in the United States, where factors such as smoking, drinking, and diet can lead to deadly diseases. The Savannah River Site (SRRHIS) cancer registry is a critical source of information for understanding the causes and trends of cancer in the region. The registry is supported by a grant from the U.S. Department of Energy, which funds the Medical University of South Carolina. The grant has supported the registry for over 20 years, providing a significant amount of funding for cancer research and prevention.

The registry has been instrumental in tracking cancer trends, particularly for certain populations. For instance, black women have higher mortality rates from breast cancer compared to white women. Similarly, prostate cancer rates are higher in men, especially among those with a history of smoking. These trends are important for public health officials to address, as preventative measures can help reduce the burden of cancer in these groups.

While the registry has produced valuable data, there are still limitations to its methodology. For example, some data may be missing or incomplete, which can affect the accuracy of the findings. Despite these limitations, the registry remains an essential tool for understanding cancer trends and developing effective prevention strategies.

The future of cancer research is promising, with advances in technology and data analysis leading to new insights into the causes and treatment of cancer. Researchers continue to study the relationship between environmental factors, such as exposure to nuclear power plants, and cancer incidence. This research is crucial for developing targeted prevention strategies and improving public health outcomes.

Overall, the SRRHIS cancer registry is a critical resource for understanding cancer trends in the United States, providing valuable data for researchers and public health officials.
GEORGIA UPDATE

by Jonathan M. Liff, Ph.D.

The development of the SRRHIS cancer registry is one of the most important events to impact cancer information collection in Georgia since 1978. On the Georgia side of the Savannah River this system is operated by the Georgia Center for Cancer Statistics (GCCS), a component of the Division of Epidemiology in the School of Public Health at Emory University.

Although the Emory School of Public Health is only two years old, the GCCS has functioned continuously in various forms at Emory University since 1976. Our activities include the operation of population-based cancer registries and the conduct of epidemiologic studies of cancer. Funding for various research projects has come from the National Institutes of Health, the Centers for Disease Control, the Georgia Department of Human Resources and various other governmental and private organizations. We are very excited to be joining with investigators from MUSC in this very important project, funded by the Department of Energy.

Our Roles in SRRHIS

The GCCS plays several roles in SRRHIS. First, we provide experience and expertise in cancer registration to the SRRHIS project. Second, we are responsible for collecting cancer data from Georgia institutions, and ensuring that the Georgia data is complete and of high quality. Third, staff are available to offer advice, consultation, and quality assurance support to tumor registrars and cancer programs in participating Georgia hospitals. Fourth, we will provide follow-up information on Georgia patients to hospital tumor registrars needing such information. Lastly, once data have been collected and processed for several years, we will be responsible for generating and providing appropriate cancer incidence statistics to the public.

Cancer Registration in Georgia

Several population-based cancer registries are currently operated by the GCCS. They include the Georgia Cancer Registry, the Metropolitan Atlanta SEER Registry, the Rural Georgia SEER Registry, and most recently, the SRRHIS.

The Georgia Cancer Registry (GCR)

Although the Georgia Department of Human Resources has contracted out the operation of a statewide cancer registry for about two decades, it is only since 1987 that the GCR has been the contractor. Although the coverage area for the GCR is the entire state of Georgia, it is not a comprehensive cancer registry; that is, it does not have information about all Georgia residents diagnosed with cancer. Because of the relatively low level of funds provided for this registry, information is only received from hospitals with active tumor registries. We estimate that because of this, we register only about half of all cancers diagnosed in the State. Thus, no reasonable estimates of cancer incidence by area (or for the state overall) are available from this registry.

The Metropolitan Atlanta and Rural Georgia SEER Registries

The GCCS is one of nine participants in the National Cancer Institute’s Surveillance, Epidemiology and End Results (SEER) cancer registry program. This program, which encompasses about 10% of all new cancer diagnoses in the United States, is used to generate most of the information about cancer incidence and survival in the United States. In Georgia, this comprehensive, population-based registry has been operational in five counties of metropolitan Atlanta since 1975, and in ten additional counties east of Atlanta since 1978. The accompanying map shows the location of the covered counties. To date, these fifteen counties are the only ones of the 159 Georgia counties for which accurate, population-based information about cancer incidence, stage and survival is available.

The Georgia SRRHIS Cancer Registry

The start of SRRHIS, which includes twelve additional Georgia counties adjacent to the Rural Georgia SEER Registry area, is an important development in population-based cancer information collection in Georgia. At last, accurate information will be available in this area, so that we can evaluate the cancer related needs and resources of the population and assess whether there is justification for devoting resources to begin analytical studies of cancer causes. Through the SRRHIS, health care providers, health officials, epidemiologists and the public will finally have a necessary key to permit us to begin to work together to address concerns about cancer in this region. Hopefully, in the future, resources can be provided so that the 133 counties in Georgia that are still not part of a comprehensive cancer registry will be able to participate as well.

Jonathan M. Liff, Ph.D., is Associate Professor of Epidemiology at Emory University School of Public Health, and is Director of the Georgia Center for Cancer Statistics.

NEW COMPUTER SYSTEMS AT SRRHIS

by Zhen Zhang, Ph.D.

Currently the SRRHIS master database resides on a Zenith 386 computer using Cansur/Net, a product developed and distributed by the American College of Surgeons. Development work is under way to establish a state-of-the-art large-scale 4GL relational database on a new computer system recently purchased from Digital Equipment Corporation.

The system consists of a DecStation 5000/240 (highest end of DEC's RISC-based workstation) with 32 Mbyte core memory and a graphics accelerator board, two 1.3 Gbyte hard drives, a tape backup unit, and a CD-ROM drive. The principal use of the computer system is for the development and eventual operation of a 4GL-based relational database system for the Savannah River Region Health Information System. The system is the file server and electronic mail center for SRRHIS staff members. Currently, the system with the address "srrhis.musc.edu", has been connected through DBESS/MUSC Ethernet to Internet and has formally registered its name with DNS.

The system has an X Window/Motif user interface which makes routine operations such as account management, E-mail handling, calendar service as easy as clicking a button. The X Window System has quickly become the standard among hardware-independent
graphical user interfaces. With the addition of some X Window hardware and/or software to their IBM/AT's and Macintoshes, SRRHIS staff members will be able to use them to access database information on the DecStation with exactly the same geographical interface.

The 4GL relational database system will be developed using INGRES. In addition to its excellent reputation as a major database development environment, INGRES also offers the environment for quick development of X Window-based graphical user interface to the database system. For example, when fully developed the graphical interface of the new information system will enable the novice user to click on a regional map covering the SRRHIS area and, using a few buttons and menu items, obtain the necessary information for his or her research.

COMMUNITY MEETINGS

On November 4, 1992, the first SRRHIS community meeting was held in Beaufort, South Carolina on the USC-Beaufort campus.

Dr. John Dunbar spoke to an audience of approximately 35 persons, on the benefits and limitations of registry information. The attendees sparked a 45-minute question and answer period following Dr. Dunbar's presentation. While the audience indicated the desire for a more comprehensive effort to answer their concerns, they recognized the registry constitutes a critical component of any health surveillance program. They also recognized that useful information about cancer rates in the area will not be forthcoming for three to four years. (The registry began data collection as of January 1, 1991.)

Future community meetings are being planned. Further details will be forthcoming. If you have received this newsletter, you are on our mailing list and will be informed of all future meetings. If you know of anyone who would be interested in receiving SRRHIS information and materials, please let us know and we will add their name to our mailing list.

OCTOBER STEERING COMMITTEE MEETING REPORT

by Janis S. Koenig

The fourth meeting of the Savannah River Region Health Information System (SRRHIS) Steering Committee took place in Savannah, Georgia on October 23, 1992. The meeting began with committee business, South Carolina and Georgia Progress Reports and presentations by Centers for Disease Control (CDC) personnel and the director of the Environmental Communication Research Program, Rutgers University.

Mr. Paul Renard, Project Director for the CDC Dose Reconstruction Project and Dr. Charles Miller, Health Physicist with the CDC Radiation Studies branch gave a brief presentation about CDC's Dose Reconstruction Project at the Savannah River Site. Mr. Renard discussed the history, authority and purposes of the project and Dr. Miller explained the process and rationale for the dose reconstruction. They stated that Dr. John Till, Radiation Assessment Corporation, Neeses, SC, is the contractor for this project.

The guest speaker, Ms. Caron Chess, Director of the Environmental Communication Research Program of Cook College (Rutgers University) presented information about the process of communicating with the public.

The next meeting will be held at the Holiday Inn (Exit 18, I-20) in Aiken, SC on January 28, 1993.

(Editor's Note: Previous meetings of the SRRHIS Steering Committee have been held in Aiken, SC; Augusta, GA; and Hilton Head Island, SC).
For further information regarding the Savannah River Region Health Information System (SRRHIS) registry, please write or call:

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Savannah River Regional Health Information System
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Medical University of South Carolina
171 Ashley Ave., Charleston, SC 29425-2503
Telephone: (803) 792-4081  Fax: (803) 792-0539
INTRODUCTION

In recent years, the nation's and South Carolina's health care industry has been particularly responsive to public concern about cancer. To a significant extent, this public concern translates into public support because it is related to the recognition that research findings have made prevention and early detection of some cancers into realizable goals. Further, modern state-of-the-art treatment can extend lives of those with cancer. One has only to read the papers, turn on the television, or visit local hospitals and academic medical centers to recognize the pace at which the health care institutions and professions are responding to cancer control.

To guide this growing effort, and to evaluate its success in future years, a way was needed to measure the amount and kinds of cancer in a given geographic area, and to determine the associated risks of these cancers for the area's residents. The use of mortality records was considered. However, mortality records, while they indicate the general impact of cancer on a community, they provide information that is only supplementary to the more direct and reliable method, namely, that of cancer incidence. This is so because death records underestimate those cancers which are associated with long patient survival times. With improving cancer treatment, more and more cancer patients are benefiting with longer, useful lives. A cancer incidence registry, therefore, is the most efficient and precise way to measure cancer occurrence, and the magnitude of the cancer problem in a given population.

An incidence registry collects all newly diagnosed cancer cases from hospitals and pathology laboratories pertaining to residents of a defined geographic area within a specified period of time. With such a registry, one can record accurately the numbers and kinds of cancers occurring in residents by sex, age, race, and other demographic and health characteristics. Over time, the rate of rise or fall in incidence of specific cancers can be observed, permitting evaluation of the success of cancer detection and follow-up efforts by the hospitals and clinics in the area, and of the public's response to healthy living styles (such as non-smoking and healthy diet).

HISTORY

In response to this need, the Epidemiology unit of the Department of Biostatistics, Epidemiology, and Systems Science (DBESS) of the Medical University of South Carolina (MUSC), decided to assess the feasibility of developing a cancer registry in the Tricounty area (Charleston, Berkeley, and Dorchester). It was recognized that the success of the effort would depend on the collaboration of individual hospitals and laboratories, because the state does not require the reporting of cancer diagnosis. The nine Charleston area acute care hospitals, including the two Federal hospitals (Veterans Administration and U.S. Navy) were contacted early in 1989 about their willingness to participate.

The cancer registry was named the Tricounty Central Cancer Registry of South Carolina (TCCRC) and began collecting information from the area hospitals in the summer and fall of 1990. The reference date was January 1, 1990, i.e. all cancers newly diagnosed on and after that date in area residents are included in the Registry. The Registry was accepted into membership of the American Association of Central Cancer Registries in 1990.

Also in 1990, the Epidemiology faculty, in collaboration with the faculty of Emory University School of Public Health, submitted a grant application to the U.S. Department of Energy (DOE) proposing to develop a similar registry incorporating counties within 50 miles of the Savannah River Site (SRS) and those downstream to Beaufort and Savannah. The Emory University faculty already has a state-of-the-art cancer registry supported by the National Cancer Institute. The Department of Energy approved the proposal and has funded it for three years, beginning April 29, 1991. The project is titled, "The Savannah River Region Health Information System (SRRHIS)."

The DOE grant application also included a proposal to assess birth defects in the SRS region. The proposal called for assessment and planning during the early years of the effort, not for immediate collection of birth defects information. To this end, a small group of faculty and outside experts are discussing the issues with the aim of recommending the size and nature of any future birth defects component of SRRHIS.

GOALS OF SAVANNAH RIVER REGION HEALTH INFORMATION SYSTEM

- Assembling and reporting cancer incidence (new cases) in the 25 contiguous counties (13 in South Carolina and 12 in Georgia), with separate reports being available for South Carolina and Georgia sides.

- Broad dissemination of the assembled information to hospitals, physicians, and the public.

- Monitoring cancer incidence in the SRRHIS region to identify unusual changes in specific cancers occurring in population subgroups defined by geographic, demographic, and social characteristics.

- Evaluating the effects of overall cancer control efforts by examining information on changes over time in the amount of cancers of specific types, and in the extent of disease at the time of diagnosis.

- Passive follow-up of patients through mortality surveillance to determine survival by type of cancer.

- Promoting research to identify factors related to cancer control such as:
  a) environmental, social, dietary, occupational effects;
  b) early detection and treatment needs;
  c) determinants of length of patient survival and quality of life.

OPERATIONS

The registry collects incidence data and cancer staging codes at diagnosis. Currently, no treatment or follow-up information is collected. However, the abstracting form used includes treatment codes for any hospitals wishing to have such data summarized for themselves.

The SRRHIS leadership and staff wish to establish a first class registry and to make its resources available to cooperating hospitals many of which will wish to establish or improve their own registries. To this end, SRRHIS staff are available to answer any questions about the registry, including coding, software, or
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This reporting area will provide population-based information for all counties within 50 miles of the Savannah River site as well as those downstream to Beaufort and Savannah. In addition, selected more distant counties will serve as comparison areas.
STAFF INFORMATION

The Savannah River Region Health Information System staff brings together expertise in the areas of academics, administration, research, and computer technology.

John B. Dunbar, D.M.D., Dr.P.H., is Professor of Epidemiology at the Medical University of South Carolina (MUSC) and Principal Investigator of the Savannah River Region Health Information System (SRHRIS). Dr. Dunbar has an extensive background in health-related research administration, having served as Coordinator of Research Grants and Vice President for Administration at the University of Alabama in Birmingham. Further, for more than a decade, he worked as a federal Health Scientist Administrator, assembling expert national scientific panels to address critical health research directions. He also has been active in community-related research programs and in community service more generally. Dr. Dunbar graduated from the University of Alabama at Birmingham School of Dentistry, and later studied epidemiology and public health at Tulane University School of Public Health, where he received a doctorate in public health (Dr.P.H.). His research interests include community outreach and health promotion.

Jonathan M. Liff, Ph.D., is Associate Professor of Epidemiology at the Emory University School of Public Health, and serves as Principal Investigator of the Georgia component of the Savannah River Region Health Information System (SRHRIS). He is also Principal Investigator and Director of the Metropolitan Atlanta and Rural Georgia SEER Cancer Registry, and of the Georgia Cancer Registry, and currently serves on the Executive Board of the American Association of Cancer Registry. In addition to cancer surveillance, his research activities have included population-based studies of various cancers, focusing on non-genetic exposures including dietary, sexual, socioeconomic, and reproductive risk factors. Currently, he is conducting studies of breast cancer in young women, and HIV prevalence among patients with lymphoma. Dr. Liff also serves in an advisory capacity to the Cancer Control Program of the Georgia Department of Human Resources in the analysis of data and the evaluation of the effectiveness of statewide cancer control programs. He received an MSPH degree in epidemiology and biostatistics from the University of Illinois (Chicago), and a doctoral degree in epidemiology from the University of Washington (Seattle).

Daniel T. Lackland, Dr.P.H., is Assistant Professor of Epidemiology at the Medical University of South Carolina (MUSC) and Co-Investigator (Cancer) of the Savannah River Region Health Information System (SRHRIS). Dr. Lackland served as an epidemiologist with the Division of Chronic Disease at the South Carolina Department of Health and Environmental Control prior to joining the faculty at the Medical University of South Carolina. He received his Dr.P.H. from the University of Pittsburgh. His research interests include cancer epidemiology and the assessment of cancer risk factors in the community.

Thomas C. Hulse, Sc.D., is Assistant Professor of Pediatrics and Epidemiology at the Medical University of South Carolina (MUSC); Director, Regionalized Perinatal Program (MUSC) and Co-Investigator (Birth Defects) of the Savannah River Region Health Information System (SRHRIS). Dr. Hulse served as Coordinator of Special Health Programs, Maryland Department of Health and Mental Hygiene prior to joining the Medical University faculty. He received his Sc.D. from the School of Hygiene and Public Health, Johns Hopkins University. Dr. Hulse’s research interests include perinatal epidemiology surveillance systems.

Zhen Zhang, Ph.D., is Assistant Professor of Systems Science at the Medical University of South Carolina (MUSC), and computer analyst/consultant for the Savannah River Region Health Information System (SRHRIS). Prior to joining the faculty, he was a teaching fellow in the Department of Electrical Engineering and a Research Assistant in the Learning Research and Development Center, University of Pittsburgh. Dr. Zhang received his Ph.D. in electrical engineering from the University of Pittsburgh. His research interests include image processing, pattern recognition, and artificial intelligence.

Yuko Y. Palesch, Ph.D., is Assistant Professor of Biostatistics at the Medical University of South Carolina (MUSC) and biostatistician on the Savannah River Region Health Information System (SRHRIS). Dr. Palesch joined the faculty after several years at the National Institutes of Health. She received her Ph.D. in statistics from George Washington University. Her research interests include survival analysis methods and their application to cancer and to epidemiology of senile dementia and scleroderma.

Kenneth A. Gerlach, M.P.H., is Project Administrator of the Georgia component of the Savannah River Region Health Information System (SRHRIS) at the Emory University School of Public Health. He serves in a similar capacity for the Metropolitan Atlanta and Rural Georgia SEER cancer registry (since 1984) and the Georgia Cancer Registry (since 1986). Since 1990, Mr. Gerlach has been President of the Georgia Tumor Registrars’ Association. He received a BS degree from Virginia Commonwealth University, and an MPH degree from the University of Tennessee.

Janis S. Koenig, M.Ed., is Administrative Director of the Savannah River Region Health Information System (SRHRIS). Ms. Koenig joined the SRHRIS staff after several years in public education and a decade in Psychiatry Administration at the Medical University of South Carolina (MUSC). She received her B.A. from Florida Atlantic University and M.Ed. from the Citadel.

Nancy D. Ferrelle, CTR, is the Field Staff Quality Control Coordinator of the Georgia component of the Savannah River Registry. Ms. Ferrelle has worked for the Atlanta "SEER" program since January 1977. She has been a certified tumor registrant since 1986 and has been a member of the National Tumor Registrars Association since 1979. She is a founding member of the Georgia Tumor Registrars Association.

Donna Mister is the Quality Control Editor of the Georgia component of the Savannah River Registry. Ms. Mister has worked for the Atlanta "SEER" Registry since 1978. During that time, she has served as the Atlanta SEER Quality Control Editor for over ten years. As such, she has edited over 50,000 cancer cases for consistency with SEER coding and staging rules. Ms. Mister’s knowledge of Cobol programming has been instrumental in the installation and analysis of the cancer data edit computer programs received periodically from the National Cancer Institute.

Beverly Richards, CTR, is the Project Coordinator of the Georgia component of the Savannah River Registry. For the past three years, she has served as Coordinator for the Oncology Data Center in addition to performing the duties of Acting Director for Jemmiah Cancer Center at University Hospital. Ms. Richards is an active member of the National Tumor Registrars Association and the Georgia Tumor Registrars Association.

Charlene Seltz, CTR, is the Quality Control Editor of the Savannah River Region Health Information System. Ms. Seltz received her certification in Tumor Registry from the National Tumor Registrars Association in March, 1984. Specialized training was completed at Allegheny General Hospital, Pittsburgh, PA, with formalized training at the Fox Chase Cancer Center in Philadelphia, PA. Ms. Seltz also has an extensive background in many phases of medical record functions. She is currently a member of both the National Tumor Registrars Association and the South Carolina Association of Tumor Registrars and has actively participated in cancer awareness projects sponsored by the American Cancer Society in northern California.

The Savannah River Region Health Information System staff will include a Program Analyst, a Field Cancer Abstractor, and a Data Entry personnel.
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