Incidence of Cancer in United States Blacks

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Summary

Incidence rates for the black population of six Standard Metropolitan Statistical Areas in the United States are examined using data collected in the Third National Cancer Survey, 1969 to 1971. For all sites combined, black males had the highest rates among the four major race-sex groups; black females had the lowest rates. For fourteen common sites accounting for 80% of the cancers among blacks, black/white ratios, survival data, trends between 1935 and 1969, and geographic variation are presented. United States black data adjusted to an African Standard are compared with similar data from Nigeria, Rhodesia, and South Africa.

Introduction

Recent studies of United States cancer mortality data by several investigators (4, 10, 11, 13) reveal that cancer mortality rates have been increasing among blacks since 1949. Furthermore, there has been an increasing black/white ratio of age-adjusted death rates with black predominance, beginning in 1950 for females and in 1956 for males. Similar investigations using incidence data have not heretofore been carried out due to the lack of such data for large populations of blacks. Some incidence data have been available for Alameda County, Calif. (1), and Kovi and Heshmat (12) attempted to estimate cancer incidence in Washington, D. C., for 1950 to 1969. However, data from the TNCS3 show that these authors probably underestimated rates for Washington, D. C. The remainder of this report will be concerned with the incidence of cancer among United States blacks as reported by the TNCS.

Materials and Methods

The TNCS was a project of the Biometry Branch of the National Cancer Institute conducted to measure the incidence of cancer among all residents of 9 geographic areas of the United States during 1969 to 1971. These 9 areas, comprised of 7 SMSA's and 2 complete states, had a combined 1970 population of 21,003,451, which was slightly more than 10% of the population of the United States. However, 3 of these 9 areas, namely, Minneapolis-St. Paul, Minn., and the states of Iowa and Colorado, had very small black populations: 1.8, 1.2, and 3.1%, respectively. Therefore, this report is limited to incidence data from the remaining 6 SMSA's included in the survey: Atlanta, Ga.; Birmingham, Ala.; Dallas-Ft. Worth, Texas; Detroit, Mich.; Pittsburgh, Pa.; and San Francisco-Oakland, Calif. These 6 areas had a combined 1970 census population of 2,114,848 blacks or 9.4% of the black population of the United States in 1970.

A local, medically oriented, nonprofit organization, such as a Department of Health or School of Public Health, carried out the survey in each area. The staff of each field office identified cases and abstracted information from hospital charts, pathology reports, autopsy reports, radiotherapy records, outpatient clinic records, cancer registries, and medical record indices. Copies of all death certificates that mentioned cancer were obtained from State Offices of Vital Statistics. Almost all death certificates were traced back to hospital or other medical records to confirm the date and the accuracy of the diagnosis. Medical records provided the information in 97.9% of the cases. The remaining cases (2.1%) were identified from death certificates only. Case finding, including rechecking of all sources within each hospital, was periodically reviewed in each field office to ensure complete reporting.

The tumor type and site are coded according to the Manual of Tumor Nomenclature and Coding, 1968 Edition (14). Selected histologies, such as carcinoids, tumors not specified as benign or malignant, and carcinoma in situ, were reportable but were not included in routine tabulations. Over 90% of all cancers were microscopically confirmed.

The abstracts were reviewed for compatibility of such items as site-sex, site-histological type, and birth date-age. All documents for each individual were compared for consistency of birth date, age, race, sex, primary site, histological type, and date of diagnosis. Wherever possible, the comparison was done by computer. Duplicate cases were identified by manual operations in the field offices and by computer. All records for an individual were then consolidated. Details of the edit routines and the abstract forms used are available on request.

Results

There were 15,183 newly diagnosed invasive cancers (excluding nonmelanoma skin cancers) reported during 1969 to 1971 among black residents of the 6 survey areas discussed above. This yields an average annual crude rate of
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239.3/100,000 population. Age adjustment to the 1950 population of the United States gives an average annual age-adjusted incidence rate of 291.4. Unless otherwise specified, all rates presented will be age adjusted to the 1950 United States population to facilitate comparison with the large body of incidence data available from other sources. Rates adjusted to the African Standard will also be given in a later section to facilitate comparison with data that were presented for several African nations in Cancer in Five Continents (7).

Table 1 shows the average annual age-adjusted rates by primary site for blacks and for whites by sex. The rates presented in this table differ from those presented in the National Cancer Institute Monograph 41 (6), in that both black and white data are limited to only 6 of the areas participating in the TNCS. However, rates for the 6 individual areas agree exactly with those reported in that monograph.

Examination of Table 1 reveals that among the 4 race-sex groups, black males had the highest incidence rate for all cancers combined, 353.1, and black females had the lowest, 241.7. Thus, the black/white incidence ratio is different among males than among females (1.13 and 0.94, respectively). As was pointed out earlier, blacks of each sex predominate with respect to mortality. The reversal of cancer predominance among white females compared with...
black females may be due to the poorer survival of black females. In fact, Axtell et al. (3) showed decreased survival among black females compared with whites during the 1st 2 years after diagnosis. They also showed that a higher proportion of cases in their series were diagnosed as localized among whites than among blacks: 38 versus 29% for males and 42 versus 32% for females.

Chart 1 shows the age-specific incidence curves for all cancers for the 4 race-sex groups. Up to age 30 and after age 85, white males have a slightly higher incidence of cancer, compared with blacks, while black males have higher rates in the age group 30 to 84. The incidence among black females exceeds that among white females only between the ages of 15 to 49, the child-bearing years.

Chart 2 shows the age-specific incidence curves for the 4 most frequent sites of cancer among blacks for each sex. These sites account for more than one-half of the cancers reported among black men and women. Common to both sexes were cancers of the colon and rectum, lung and bronchus. Males also had high incidence rates for prostate and stomach, whereas females had high rates for breast and cervix. Because of the organ sites involved, the age patterns among males and females were quite different. The incidence of breast and cervical cancer begins to increase relatively early in life and reaches substantial levels by age 40. In contrast, the leading cancer sites among males begin their increase at later ages but reach substantial levels very rapidly.

For each sex, over 75% of all cancers occur in only 10 sites, as shown in Chart 3. Among males, 9 of the same 10 sites were also the most frequently reported sites among whites, the esophagus being the exception. Among females, all 10 of the sites were also the 10 most common among white females. However, the rank ordering for each sex was very different in blacks compared with whites.

Each of the most frequently reported sites among black males and females will be discussed in more detail in the following section with respect to black/white predominance, trends in incidence over time, survival, and geographic variation.

Time trends have been ascertained by comparing trends between the Second National Cancer Survey (1947 to 1948)
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All Sites Combined. Since leukemia and Hodgkin’s disease were not included in the 1937 survey, data for these sites as well as for skin cancer and in situ tumors have been excluded from Chart 4. There has been a marked increase in both the incidence of and mortality from cancer among black males over time. Part of this increase may be due to an improvement in the delivery of medical care resulting in more complete diagnosis of the disease. However, it is likely that most of the reported increase is related to the impact of various environmental factors affecting black males, e.g., concentration in inner cities, changes in occupation, and changes in eating, drinking, and smoking practices.

Among black females, there has been a slight decline in the incidence of cancer since 1947, and mortality has remained essentially unchanged since 1950. Trends among whites have shown the same pattern, although the increase among black males has been greater than that among white males.

Chart 5 shows the incidence of cancer by geographic area for the 6 SMSA’s included in this discussion. The areas have
been arranged on the graph to suggest a regional grouping of North, Detroit and Pittsburgh; South, Atlanta, Birmingham, and Dallas-Ft. Worth; and West, San Francisco-Oakland. In general, Birmingham and Atlanta reported lower rates, while rates for Pittsburgh were generally high.

Cancers of the Digestive System. Esophagus. The black/white incidence ratio for esophageal cancer is 3.5 among males and 2.6 among females. While esophageal cancer has been declining among whites (5), the incidence among blacks has increased sharply (Chart 6). Mortality from esophageal cancer has also risen sharply, as would be expected, since the median survival time is 5 months (2). Axtell et al. (3) reported the 5-year relative survival rates for esophageal cancer as 1 and 4%, respectively, among black males and females, compared with 3 and 7% among whites.

The extent to which the marked rise in reported incidence of and mortality from esophageal cancer in the black population reflects more complete case-finding due to increased availability of medical care is not known. However, it is clear that esophageal cancer is now a substantial health problem among blacks, particularly in men.

There was noticeable geographic variation in incidence of esophageal cancer among males but not among females (Chart 7). Birmingham reported an incidence rate of only 7.4/100,000 among males, while the next lowest rate was 15.0 in Dallas-Ft. Worth, and Pittsburgh and Atlanta both reported rates in excess of 20/100,000. The low rate among Birmingham black males is intriguing since their occupational exposures should be quite similar to those of black

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*The 95% confidence interval is shown for each rate.*
males in Pittsburgh and their dietary habits should be similar to those of black males in Atlanta.

Stomach. The black/white incidence ratio for stomach cancer is 1.6 and 1.4 for males and females, respectively. However, while blacks still predominate, there has been a continuous and consistent downward trend in incidence among all 4 race-sex groups over a period of more than 30 years. Similar trends have been seen in mortality as well (Chart 8), which again is expected since the median survival for stomach cancer is 5 months (2). Blacks have a slightly lower 5-year relative survival due to stomach cancer: 8% for males and 13% for females among blacks versus 11 and 14%, respectively, among whites.

There were no significant differences noted among the incidence rates for blacks reported by the 6 areas in the United States (Chart 9).

Colon. The incidence rates for colon cancer were similar among males and females for both blacks and whites. The black/white ratio was 0.8 for males and 1.0 for females. While there has been some increase over time in the incidence of colon cancer among whites, there has been a sharp increase among the blacks, particularly among the black females. In fact, Chart 10 shows that since 1947, there has been a 90% increase in the incidence rate among black males and an increase of 129% among black females. The slower increase in mortality due to colon cancer among blacks is due to improved survival since the 1940's. The 5-year relative survival rates during the 1960's was 29% for black males and 32% for black females (3); corresponding figures for whites were 38 and 41%, respectively.


Birmingham reported the lowest incidence of colon cancer among both black males and females (Chart 11). Rates for Atlanta were also low.

Rectum and Rectosigmoid. For each sex the incidence of rectal cancer is lower in blacks than in whites, the black/white ratio being 0.8. Between 1937 and 1947 (Chart 12) there was a marked net increase in the occurrence of rectal cancer among blacks, followed by a decrease between 1947 and 1969 among black females and a very small net increase among black males. The pattern among whites also showed an increase followed by a decrease during the same time periods. As with colon cancer, there has been an improvement in patient survival among blacks since the 1940's, with relative 5-year survival rates in the 1960's of 29% for black males and 32% for black females. Corresponding figures for whites were 39 and 41%, respectively (3).

There was marked variation between the 6 areas with respect to the incidence of rectal cancer (Chart 13). For both males and females, Pittsburgh reported high rates while those in Atlanta and Birmingham were low. The same patterns were noted among whites. For both races and sexes the rates of rectal cancer for Birmingham were significantly lower than those for Pittsburgh.

The low rates of both colon and rectal cancer reported for Birmingham and Atlanta lead one to wonder what effects are in operation in the southern corridor of the United States which results in these lower rates.

Analysis by socioeconomic status may yield some evidence. Unfortunately, rates by socioeconomic status are not
yet available. However, it is interesting to note that, while blacks in the Birmingham SMSA in 1970 had the lowest median family income of any of the 6 areas, $5,220, the median family income among blacks in the Atlanta SMSA was higher than that among blacks in the Pittsburgh SMSA $6,462 versus $6,342, respectively (17).

Pancreas. The black/white ratio for pancreatic cancer was 1.4 for males and 1.3 for females. Chart 14 shows a marked increase in incidence of pancreatic cancer among blacks over time for both sexes. It seems likely that at least part of this large reported increase among blacks is due to more frequent identification of the disease as a result of increased availability of medical care. Since extremely few patients with pancreatic cancer survive for 1 year, the median survival being less than 3 months, the ratio of incidence to mortality should be close to 1. The divergence between the mortality and incidence curves for blacks therefore probably represents an underreporting of mortality rather than an overreporting of incidence. The 5-year relative survival rates for blacks is 1% for males and 3% for females (3).

Chart 15 reveals that there was very little geographic variation with respect to the incidence of pancreatic cancer among blacks, although rates for Birmingham and Atlanta again were somewhat low.

Lung, Bronchus, and Trachea. As was pointed out earlier, cancers of the lung, bronchus, and trachea were the most frequently reported cancers among black males and the 4th most frequent among black females. Chart 16 shows a large and continuous increase in incidence among both sexes, although the increase among males was greater
than among females. Similar trends were also observed among whites of both sexes. Since the median survival time for lung cancer is 5 months, the incidence to mortality ratio should be close to 1. The large discrepancy between lung cancer incidence and mortality seen in blacks is, as was suggested for pancreatic cancer, probably due to an underreporting of lung cancer deaths. Also, national mortality rates pertain to the total population, including small towns and rural areas where lung cancer is less likely to occur.

The large increase in incidence among blacks may result from improvement in the delivery of medical care to the black population resulting in better diagnosis of the disease and may also reflect greater changes in life-styles among blacks, many of whom in recent years have migrated to the central cities of large urban areas from a rural setting.

Chart 17 shows the geographic distribution of lung cancer incidence rates. Among males, we again note significantly low rates in Birmingham and Atlanta, compared with those in Pittsburgh. This observation is perplexing since, among white males, the incidence rate of lung cancer for Birmingham was significantly higher than that for Pittsburgh. In fact, white males in Birmingham had the highest incidence of lung cancer reported in the Survey.

Reproductive System. Female Breast. Among both black and white females, breast was the most frequently reported cancer although the rate was higher among white females than among blacks: 72.5 versus 56.1. Chart 18 indicates that breast cancer incidence has been increasing in blacks over time. There has been a leveling off in the incidence of breast cancer among whites, and it is thought that a similar trend may be seen among blacks as the incidence rate among black women approaches that for whites.

Survival rates have also been improving among females, with most recent data (3) indicating a 5-year relative survival rate of 47% among blacks compared with 62% among whites. There were very minor differences in incidence rates reported by each of the 6 areas (Chart 19), although Birmingham and Atlanta reported the lowest rates.

Uterus. Since the subsite of the uterus was not recorded in the 1937 survey, cancers of the cervix and corpus must be combined in order to examine trends. Chart 20 shows a decrease in both the incidence of and mortality from uterine cancer, although the decline in incidence has been much
BLACK FEMALES

**INCOME DISTRIBUTION BY GEOGRAPHIC AREA**

<table>
<thead>
<tr>
<th>Geographic Area</th>
<th>Median Family Income</th>
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<tr>
<td>All Areas</td>
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<td>Detroit</td>
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<tr>
<td>Pittsburgh</td>
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<td>Atlanta</td>
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<td>Birmingham</td>
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<td>Dallas</td>
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<td>Ft. Worth</td>
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<td>San Francisco</td>
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<td>Oakland</td>
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Worth, Birmingham, and Detroit reported high rates for cervical cancer. It is interesting to note that Dallas-Ft. Worth and Birmingham also reported the highest rates of cervical cancer for white women. In fact, both had reported rates among whites as high as or higher than for cancers of the corpus. These 2 areas also had the lowest median family incomes for blacks. On the other hand, San Francisco-Oakland reported a significantly low rate of cervical cancer, whereas the highest rate for corpus cancer among blacks was reported from that SMSA. Furthermore, San Francisco-Oakland had the highest incidence rate for corpus cancer among whites as well. Thus, while the cervix/corpus ratio is reversed among blacks versus whites, areas having high incidence rates of either cervical cancer or corpus cancer among blacks also had high rates among whites as well.

**Ovary.** Ovarian cancer occurs more frequently among white women, the black/white ratio being 0.8. The incidence of and mortality from ovarian cancer have been slowly increasing over time (Chart 23). White women have experienced some decline in the incidence of ovarian cancer between the Second and Third Surveys, while the mortality among whites in the United States as a whole has continued to increase. Five-year relative survival from ovarian cancer is about the same in the 2 groups, 28% for blacks compared with 32% for whites.

Chart 24 shows the geographic variation in the incidence...
of ovarian cancer. While the differences were not significant, relatively low rates were reported by Birmingham and San Francisco-Oakland.

**Prostate.** Cancer of the prostate was the second most frequently reported cancer among both black and white males. However, black males have an incidence 1.8 times higher than whites. Chart 25 indicates there has been a sizeable increase in the incidence of prostatic cancer with a smaller increase in mortality which seems to be leveling off. While the disparity between the incidence and mortality curves would indicate a high survival from prostatic cancer, the 5-year relative survival rate is 41% among blacks compared with 51% among whites. Again, as with previous sites, it seems more likely that mortality has been underreported than that incidence has been overreported.

Chart 26 reveals no significant geographic differences in the reported incidence of prostatic cancer.

**Bladder.** Compared with whites, blacks have a lower incidence of bladder cancer, the black/white ratio being 0.5 for males and 0.7 for females. Chart 27 shows a marked increase in bladder cancer since 1947 among males, while the incidence decreased among females. A similar pattern was noted among whites. With respect to mortality, there has been only a slight increase over time for both black males and females. Survival is much poorer among blacks, compared with whites, the 5-year survival rates being 29 versus 56% among males and 27 versus 56% among females.
However, only 50% of the black patients compared with 75% of the white patients were diagnosed while the disease was still localized (3).

Chart 28 shows the geographic variation with respect to bladder cancer incidence. For each sex, the highest rate was reported by Pittsburgh and the lowest, by Atlanta.

**Lymphomas and Leukemias.** As was mentioned earlier, leukemia and Hodgkin’s disease were not included in the First Survey (1937). An examination of data for the areas participating in both the Second and Third Surveys indicates that there has been a large increase among blacks of each sex with respect to the incidence of lymphoma. It is likely, however, that some of the increase may be due to definitional changes with respect to the 1947 data, i.e., probably not all diseases now included as lymphoma were collected in 1947. With respect to leukemias, there has been an increase in incidence among females and a slight decrease among males.

The incidence of lymphomas among blacks and whites is essentially equal. However, with respect to the various forms of lymphoma, there are important black/white differences. Except for multiple myeloma, male and female whites have a higher incidence of all forms of lymphoma including reticulum cell sarcoma, lymphosarcoma, and Hodgkin’s disease. However, the black/white ratio for multiple myeloma is 2.1 for males and 2.4 for females. Myeloma accounts for 45% of all lymphomas among black males and 55% among black females. The 5-year relative survival for multiple myeloma is 10% among black males and 9% among black females, with corresponding percentages for whites. Chart 29 shows the geographic distribution of lymphomas among the 6 areas. For each sex, Atlanta reported the lowest incidence rate for lymphoma.

With respect to leukemia, whites predominate for all forms combined and for each specific form. When leukemias are grouped into acute and chronic, the acute black/white ratio is 0.8 for males and 0.6 for females, and the chronic ratio is 1.0 for both males and females. The 5-year relative survival for acute leukemias is 1% among black males and 3% among black females, compared with 1 and 2% among whites, respectively. Corresponding data for chronic leukemias reveal rates of 18 and 22% among black males and females versus rates of 25 and 29% for whites (3).

Chart 30 presents data by geographic area for blacks with leukemia. While there were no significant differences, Dallas-Ft. Worth reported the highest rate for black males and the lowest for black females. Furthermore, among black males, Birmingham reported the highest rate for lymphomas while reporting the lowest rate for leukemias.

**Comparison with African Blacks.** Incidence data are available from various regions of Africa for varying time periods from the International Union Against Cancer (7). To facilitate comparison, TNCS data have been adjusted to the African standard. For the sites previously discussed, Table 2 shows United States data from the TNCS as well as data from Nigeria, Rhodesia, and 2 regions of South Africa, Cape Province and Natal. According to Petrakis (15), 75% of American Negroes are said to be derived from West Africa and 40% from the region of present-day Nigeria. Thus the comparison of United States data with data from Ibadan is of particular interest.

With the exception of rates reported from Bulawayo, Rhodesia, the United States blacks had rates exceeding...

Table 2
Average annual age-adjusted (African standard*) cancer incidence rates per 100,000 population for black males and females, several African countries, and United States blacks, various time periods

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<td>2.3</td>
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<td>1.7</td>
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<td>26.6</td>
<td>3.1</td>
<td>1.2</td>
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* Source, Cancer in Five Continents, Vol. 2 (7).
* Source, TNCS, 6 SMSA's (6).
* Includes in situ data.
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those reported from African areas. In fact, compared to Ibadan, the United States black rates were tripled for males and doubled for females. Among males, United States blacks reported higher rates than those from the African Nations, with the exception of esophageal cancer among Rhodesians, Bantus, and Natals, stomach cancer among the colored and Bantu of Cape Province, bladder cancer among Rhodesians, and lymphomas among the Nigerians.

Among females, United States blacks had higher rates than those reported from Africa for most sites, particularly breast and colon. Higher rates of esophageal cancer were again noted among Rhodesians, Bantus, and Natals, and higher rates of stomach cancer among the colored and Bantu of South Africa; cervical cancer was higher in Rhodesia and Natal, bladder cancer and leukemias were also higher among Rhodesians, and lymphomas (but not multiple myeloma) were higher among Nigerians.

Discussion

Much remains to be understood about the differences in cancer incidence patterns among United States blacks, compared with both United States whites and African blacks. To date, little effort has been expended in studying dietary and nutritional differences between United States blacks and whites. However, studies are being undertaken to investigate the increase of colon and pancreatic cancers among the black population.

It has been suggested that the high rates among black males can be explained by census underenumeration. However, Siegel (16) has shown that, while there was considerable underenumeration of black males, aged 20 to 54, there was an overenumeration of black males aged 65 and over. An application of Siegel's estimates of census underenumeration to survey populations for black males resulted in age-adjusted rates that were only slightly lower than those calculated using official census figures. None of the patterns previously discussed were significantly altered. Thus, high rates among black males cannot be explained on the basis of denominators that were too low.

An analysis of survey data by socioeconomic status is currently being undertaken by the National Cancer Institute utilizing census tract data. It is hoped that such an analysis will enable the black/white differences noted in this report to be further understood. Details of the socioeconomic analysis should be available within the current calendar year.

References

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