
CANCER IN RURAL AREAS: A LITERATURE REVIEW

by Annie Gosschalk and Susan Carozza

SCOPE OF PROBLEM

- Cancer was the second leading cause of death in 1999.³⁶
- Cancer is virtually tied with psychoses as the fourth most frequently first-listed diagnoses for hospital discharges nationally.³⁷

GOALS AND OBJECTIVES

While positive strides have been taken to stabilize cancer incidence and reduce related mortality,²⁷ it remains second only to heart disease as a leading cause of death in the United States.¹ The direct and indirect costs in terms of premature death, disability, lost years of productivity, and medical expenditures, make cancer a significant public health concern² to all population groups regardless of age, gender, race, or geographic region, although certain populations are more at risk than others.³⁻⁵

Understanding the breadth and depth of the impact of cancer on the U.S. population is multi-faceted. It should be noted the United States does not currently have a nationwide cancer registry;²⁶ however, cancer data are collected through the National Program of Cancer Registries and the National Cancer Institute's (NCI) Surveillance, Epidemiology, and End Results (SEER) registry program.³⁸ For the many cancer types, there is variation in incidence, staging, and mortality among subpopulations by race/ethnicity, age, gender, and geographic region. This variability among subgroups makes drawing a concise picture of the scope of the disease complex.

Data indicate that certain populations, including the elderly and African Americans, are clearly at increased risk for cancer-related morbidity and mortality. Over one-half of first cancer diagnoses occur among those 65 and older.³⁹ Because of population growth and the aging of America, the number of cancer cases is projected to double by the

middle of this century.²⁷ There is also considerable variability in incidence and mortality rates by gender and race. For total cancers, African-American males have the highest cancer incidence, followed by white males, white females, and African-American females. Mortality data by race is consistent with incidence data, with the exception of total cancer mortality, which is higher among African-American females than white women.²⁶

There appears to be little difference in the incidence and mortality rates of rural and urban populations, with the exception of cancer staging. There is evidence to suggest rural populations are diagnosed at a more advanced stage of cancer.^{4, 5, 10, 14, 15, 17} This finding raises questions regarding availability and utilization of preventive, screening, and diagnostic services in rural areas as well as the existence of unique social and behavioral barriers.

Combating cancer is expressed in the Healthy People 2010 cancer goal—to reduce the

number of new cancer cases as well as the illness, disability, and death caused by cancer.⁸ The objectives addressed in this review are as follows:

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- 3-1. Reduce the overall cancer death rate.
- 3-11. Increase the proportion of women who receive a Pap test.
- 3-12. Increase the number of adults who receive colorectal cancer screening.

- 3-13 Increase the proportion of women aged 40 years and older who received a mammogram within the preceding two years.
- 3-14 Increase the number of states that have statewide population-based cancer registries.
- 3-15 Increase the proportion of cancer survivors who are living five years or longer after diagnosis.

Objectives 3.2 through 3.8 address mortality for specific cancer sites (e.g. lung, breast, cervix); however, these objectives will not be addressed individually primarily for a lack of appropriate mortality data.

IDENTIFIED BY PEOPLE LIVING IN RURAL AREAS AS A HIGH PRIORITY HEALTH ISSUE FOR THEM

According to the Rural Healthy People 2010 survey, cancer tied with the focus area of nutrition and overweight for 10th and 11th ranks among the Healthy People 2010 focus areas that were rated as rural health priorities; it was nominated by an average of 22 percent of the four groups of state and local rural health leaders.⁶ Cancer was most frequently rated as a priority by rural hospitals and least often by state agency respondents in comparison to local public health offices and rural health centers and clinics; this is a statistically significant difference. There were no significant differences in cancer nominations across the four regions of the country.⁷

Rural areas report a higher prevalence of chronic diseases, including heart disease and cancer.^{9, 10}

PREVALENCE AND DISPARITIES IN RURAL AREAS

Cancer is defined as an amassing and proliferation of cells² and is the result of internal and/or external causal factors (chemicals, radiation, viruses, and health behaviors such as tobacco use). Among men, the most common cancers (in order of incidence) are

prostate, lung and bronchus, and colon and rectum. For women, breast cancer, followed by lung and bronchus, and colon and rectum are the leading cancer types (in order of incidence). African-American males have higher prostate cancer incidence and mortality than white men. While white women have the highest incidence of breast cancer among all racial and ethnic groups, African-American women are more likely to die of breast cancer and colon cancer. Of all cancer types for men and women, lung and bronchus cancer are the leading causes of cancer death.²⁶

Only limited data are available to assess cancer incidence, cancer prevention behaviors, and cancer-related mortality within rural populations. Cancer registry data, both at state and national levels, are not presented by metropolitan areas versus nonmetropolitan areas or, when presented by urban/rural residence, data are not presented by individual cancer sites. In addition, when these data are available, the definition of rural is not consistent. Some discrepancies may also be attributed to the unique demographics of communities where these studies were conducted.⁴

What is known is that rural areas report a higher prevalence of chronic diseases,^{9, 10} including heart disease and cancer—a finding that has been attributed, in part, to a population that is older, poorer, and less educated.¹¹ The disproportionate prevalence of chronic disease is reflected in higher crude all-causes mortality rates reported for rural areas.^{3, 10} However, adjusting the data for age, race, and sex distributions effectively eliminates any rural disadvantage.¹⁰ According to Monroe,¹⁰ the majority of data available indicate there are no differences between rural and urban populations with regard to cancer incidence and mortality, but a number of studies find cancer incidence increases with population density,¹⁰ which is a characteristic of relatively more urban settings.

Nonetheless, notable exceptions exist among select rural subpopulations in incidence and mortality. One such area is the Appalachian region—a population representing 8.3 percent of the total U.S. population.¹² The death rate in rural Appalachia

(176.3/100,000) for all cancers is higher than all of Appalachia (173.1/100,000), and it is significantly higher than the national cancer death rate (166.7/100,000). This population may be at heightened risk due to behavioral factors such as increased prevalence of tobacco use as well as socioeconomic factors.¹² Skin and lip cancer mortality rates are higher in rural areas¹⁰ and may be attributed to increased sun exposure of rural residents, particularly among farmers.¹³ Results from a National Health Interview study³⁵ found farmers to be at risk occupationally and recreationally for skin cancer; however, this same group is reluctant to perceive risks associated with skin exposure and to change these risk factors.

Disparities exist between rural and urban populations in the stage of disease at first diagnosis.

Cancer staging refers to the degree of tumor extension and growth at first diagnosis.¹⁰ Early staging is considered an indicator of quality medical care and improves outcomes for many cancer types.¹⁰ Conversely, delayed diagnosis (unstaged or late stage) can result in poorer outcomes.⁴ Given the importance of staging, a number of state-level studies have analyzed the relationship between rurality (Note: the definition of rural is not consistent among studies) and tumor staging and found rural residents to be at risk for late-stage diagnosis.

In a Mississippi study, rural residents and particularly African-American women were shown to be diagnosed at a later stage of the disease compared to urban residents.⁵ This study also found higher proportions of rural cancer cases were unstaged at diagnosis. In fact, rural African-American women were found to be one and half times more likely not to have their cancer staged than urban African-American women.⁵ A breast cancer study in Florida revealed African-American women residing in remote rural areas were

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diagnosed at a much later stage than rural white women and urban white and African-American women.⁴ In an Illinois study, rural breast cancer cases were less likely to have staged tumors, and patients had significantly less access to state-of-the-art technology.¹⁷ In a study by Liff,¹⁴ it was found that rural Georgia residents in 10 rural counties were twice as likely to have unstaged cancers as Atlanta residents. A Texas study revealed similar findings, with a larger proportion of cancers diagnosed at the premalignant stage for urban residents.¹⁵ These findings suggest that rural cancer patients may be disadvantaged when compared to their urban counterparts.^{4, 10, 16-18}

Among the reasons suggested for this disparity is that rural areas have a disproportionately high percentage of high-risk groups. Rural residents, who are typically older,¹⁹ less educated, and poorer, have less access to or utilization of early cancer detection programs^{20, 21} than their urban counterparts. In addition, rural people regularly experience variation in the quality, availability, and accessibility of services when evaluated against their urban counterparts.⁴ Limited access to quality medical care facilities, and particularly cancer prevention programs,⁴ may negatively affect health outcomes for cancer patients. As Amey⁴ notes, the situation for rural residents is compounded by “fewer physician visits a year, underutilization of community-based health resources, and entrance into the health-care delivery system later and sicker than urban residents.” In summary, while rural populations apparently experience lower overall cancer incidence, the prognosis for rural cancer patients is poorer.¹⁰

The role of insurance and socioeconomic status may also play a role in cancer screening, diagnosis, staging, and treatment. In a North Carolina study of men with prostate cancer, later disease stage at diagnosis was associated with income and health status for African-American men.²² Silverstein,²¹ in analyzing data from the Savannah River Region Information System Cancer Registry, found an association between residence in an area with a high Medicaid population to be associated with an advanced stage of esophageal cancer. A statewide

Michigan study²³ also found that the low income groups (defined as receiving Medicaid) had a disproportionately large share of cancer as well. A Florida statewide study also found those insured by Medicaid and the uninsured were at a greater risk of late-stage diagnosis.²⁴

IMPACT OF THE CONDITION ON MORTALITY

According to the Centers for Disease Control, in 2002, 1,284,900 new cases were expected to be diagnosed, and more than 555,600 people were expected to die from cancer.^{1, 25} The number of new cases does not include a projected 1.3 million cases of basal and squamous cell carcinoma of the skin.²⁶ Cancer mortality overall for all age groups has decreased during the period 1993 to 1999 for men and women, while incidence has stabilized in the period 1995-1999.²⁷

Because of the comparatively later stage at diagnosis, outcomes for rural populations may be poorer.^{4, 10, 17} Rural residents who are also older, represent minority populations, or are low income use fewer screening services, which contributes to poorer survival rates.²⁸ Research has also documented that physicians are less likely to suggest screening of older and minority women.^{33, 40} Data from the 1997 Behavioral Risk Factor Surveillance System²⁰ found rural residents were less likely to obtain certain cancer-screening services according to the timeline established by national standards. Individuals with low income, low education, and no insurance were found to significantly underutilize screening services, such as mammography and Pap smears.⁴¹

IMPACT OF THE CONDITION ON MORBIDITY

In 1999, there were an estimated 8.9 million people alive with a history of cancer.²⁵ The probability of a person recently diagnosed with cancer being alive in five years is 59 percent.²⁶ However, this number represents an average for *all sites*. Five year survival rates vary considerably depending on cancer type. For instance, the five year survival for the most common forms of cancer are as follows: prostate cancer, 92 percent; breast cancer, 85 percent; colon

cancer, 62 percent; and lung cancer, 14 percent.²⁶ The survival rates underscore the need for early staging and treatment.

Beyond the tremendous personal toll exacted by cancer on individuals and families, the costs in terms of medical expenditures and lost years of life and productivity are staggering. The National Institute of Health estimates that \$180.1 billion was spent in 2000 on direct and indirect cancer-related costs. This figure includes \$60 million in direct medical expenditures plus \$120 million in indirect costs of lost productivity years due to morbidity and premature mortality.²

CONTRIBUTOR TO MANY OTHER HEALTH PROBLEMS

The treatment of cancer can contribute to other health problems, but cancer itself has not been proven to be a precursor to other diseases.

BARRIERS

As with the limited data on individual cancers in rural areas, there is also limited information on attitudes, social support, and other related behavioral characteristics present within rural populations with respect to cancer. However, a variety of uniquely rural attitudes and barriers may impact the stage of diagnosis. Attitudes such as fatalism,⁴² fear of the stigma associated with cancer, and denial of presenting symptoms may all contribute to delayed screening and thus diagnosis.³¹

Beyond attitudinal barriers that may impact the stage of diagnosis, a number of other barriers, such as access to services and limited resources, also contribute to all phases of cancer in rural populations. Such factors previously identified are enumerated below:

- poor access to health care services, including specialists;^{4, 5, 10, 16}
- limited geographic access to new, effective therapies and technologies;^{5, 10, 16}
- sub-optimal care for cancer patients;¹⁶

- minimal transportation options for either cancer screening or treatment;^{16, 30}
- low participation in health promotion programs;^{5, 30}
- limited knowledge of cancer, particularly the importance of early detection through regular screening;^{31, 32}
- low education levels;^{10, 31} and
- prohibitive cost of cancer screening and treatment.^{20, 30, 31, 33}
- low income, poverty, low socioeconomic status;^{16, 28, 44}
- race;²⁶
- low education level;¹⁰
- knowledge levels regarding cancer risks and need for screening;^{31, 32}
- residence in rural areas;⁴
- older age;^{3, 39}
- personal or family history of cancer;² and
- excessive exposure to ionizing radiation, industrial substances, and certain chemicals.²

KNOWN CAUSES OF THE CONDITION OR PROBLEM SO EFFECTIVE INTERVENTIONS OR SOLUTIONS CAN BE IDENTIFIED

A number of behavioral and social factors have been identified as related to an increased risk of a variety of cancers. Smoking, excessive alcohol use, other modifiable behaviors associated with cancer risks,²⁹ and limited knowledge of cancer and the importance of early detection and regular screening are often addressed through health education efforts to raise awareness and change behavior. Social factors, such as living in poverty and having limited education, are far more difficult to address but often are more significant in terms of contributing to the risk of cancer. Factors in both categories are outlined below.

The following behavioral factors have been identified as being related to an increased risk for cancer:

- cigarette smoking;^{2, 43}
- heavy use of alcohol;^{2, 43}
- poor diet and nutrition, including a high-fat and/or low-fiber diet, as well as low intake of fruits and vegetables,² often resulting in obesity;
- physical inactivity;^{2, 30, 43} and
- sexual behavior and sexually transmitted infections.²

The following social factors have been identified as being related to an increased risk for cancer:

PROPOSED SOLUTIONS OR INTERVENTIONS THAT ARE FEASIBLE IN RURAL COMMUNITIES

The failure to distribute cancer prevention and treatment to rural populations creates a major obstacle in the national effort to diminish cancer mortality.¹⁶ Medicare has been mandated by federal legislation to cover certain screening processes such as Pap smears and mammograms as well as improvements in quality standards of testing.²⁸ Certain intervention efforts, such as directing federal funds to states to expand screening programs at the state level and promoting behavioral research,⁴¹ may help reduce avoidable morbidity and mortality from cancer. Yet, the availability of screening measures does not immediately guarantee their correct use.²⁸

Solutions or interventions are intimately tied to access to health care resources. Many of the solutions most often advanced in the literature are dependent on access to primary care and clinical preventive services. Solutions most frequently articulated and potentially feasible in rural settings are listed below.

- Provide cancer education within the community, particularly emphasizing the importance of early detection through regular cancer screening.^{31, 34}
- Encourage primary care providers to comply with the current screening regimen within each area of

cancer, making use of simple screening devices that possibly already exist in their practice.³⁴

- Encourage the use of sun block, hats, and staying inside or in the shade during peak sun hours.^{2, 13, 31, 35}
- Develop and sponsor smoking cessation programs within the community.²

COMMUNITY MODELS KNOWN TO WORK

See the Models for Practice section in Volume 1 for a catalog of models.

SUMMARY AND CONCLUSIONS

Mortality rates for various cancers vary by demographic attributes including age, race, sex, and residence, creating a diverse pattern of cancer survival not reflected in mortality rates. The clear conclusion to be made from the literature and data reviewed is that rural residents demonstrate a lesser adjusted rate of cancer than urban residents; this comparative advantage, however, may be offset by higher deaths of rural residents diagnosed at later stages of disease. Even though the adjusted incidence rate of cancer is lower in rural areas than in urban, the factors related to barriers to care increase the likelihood of negative outcomes.

Despite positive strides in reducing cancer incidence and mortality, the prevalence of cancer is expected to increase as the population ages. While urban and rural America are both faced with meeting the health care needs of an aging population, the impact may be especially challenging for rural areas with a disproportionate number of elderly in combination with limited resources. Ultimately, combating cancer requires a multi-dimensional approach aimed at improving access to health services, including the imperative need for early cancer screening and detection, and improving patient knowledge regarding modifiable risk factors.

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