

Detecting an Influential Year in Understanding Linear Trend of National Breast Cancer Hospital Admission Rates in 1988-1994, USA

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National Hospital Discharge Survey Data of Breast Cancer in 1988-1994

The National Hospital Discharge Survey (NHDS) collects data from a sample of inpatient records obtained from a national sample of hospitals with certain restrictions. In this paper, we determine a linear trend of breast cancer hospital admission rates among age group in relation to White/African American (AA) women group. To do so, weighted linear regression is used for the data from NHDS from 1988 to 1994. The weights used in the weighted regression analysis are the reciprocals of the variances of the individual predicted values obtained from the SUDAAN program, then SAS was applied to do the regression analysis part. Linear trends in hospital admission rates as well as length of stay were determined. Influential year in determining linear trend in each category was determined by Cook's D^1 . We only investigated years 1989 to 1993 to be considered as an influential year to the linear trend.

A trend analysis²⁻³ of breast cancer patients using NHDS will provide an important background in understanding yearly changes of breast cancer patients admitted to the hospital. The data were grouped into race and age. In addition, the percentages of hospital admitted breast cancer patients with specific race/age were analyzed. Table 1 summarizes groups with significant linear trend with influential year in determining the linear trend.

TABLE 1. Hospital admission rates for white/AA women age specified with significant linear trend

Race	Scale	Age group	Linear trend	Influential year
white	rate	entire	-12.93	1993
white	rate	60-69	-25.59	1990
white	rate	70-84	-33.49	1990
AA	percent	20-44	2.34	1993
AA	rate	60-69	-55.91	1990

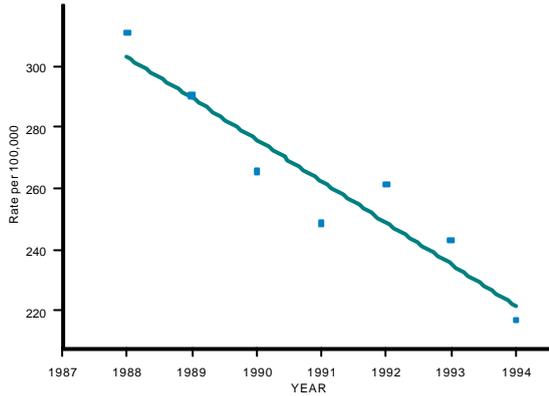


Figure 1. Breast Cancer Hospital Admission Rates among White Women

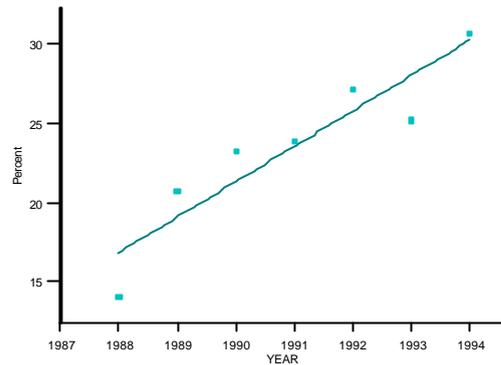


Figure 2. Breast Cancer Admission Rates among African American Women ages 20-44

What we can notice from the above table is national hospital admission rates indicating a linear trend are decreasing except the AA women age 20-44 group. Figure 1 shows a linear trend of decreasing breast cancer admission rates among white women over six-year period. The most influential year in determining linearity was 1993 with Cook's D of 0.204. For ages 20-44, the relative risk of hospital admission due to breast cancer was higher among AA than whites for the years 1989, 1992, 1993, and 1994. The percentages of white and AA women in the 20-44 age group for the years under study were respectively, 1988:17.4% and 14.1%, 1989:15.5% and 20.7%, 1990:19.1% and 23.2%, 1991: 18.4% and 23.9%, 1992: 18.2% and 27.2%, 1993: 21.1% and 25.1%, and 1994:18.2% and 30.6%. This phenomenon indicates that higher proportion in young AA women than whites across the years from 1988 to 1994. Especially since the AA women age 20-44 group is under the percent measurement that is percentage of the age 20-44 AA women relative to the entire age of AA women group, it indicates that young AA women have a significant increasing linear trend in national hospital admissions despite of decreasing linearity of the other categories (Figure 2). It is also noticeable that the AA women of age 60-69 shows a significant declining trend compared to the white women of the same age group. The year of 1990 is the most influential year in determining the linear trend of the hospital admission rates for both groups as well as white women of age 70-84.

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