

Geographical Distribution of the Cancer Burden in Michigan: Incidence, Mortality, and Stage at Diagnosis of Breast and Cervical Cancer over Time



May Darwish-Yassine, PhD; Chris Fussman, MS

Background

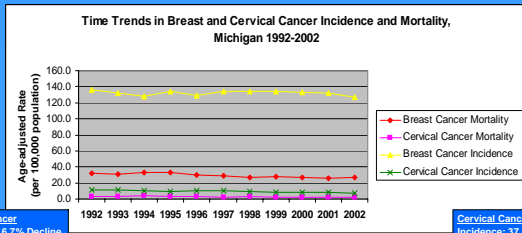
We conducted a descriptive analysis to examine the geographical distribution in breast and cervical cancer incidence, mortality, and stage at diagnosis for Michigan over a period of several years. The information used in this analysis was provided by the Cancer Surveillance Program of the Michigan Department of Community Health, Vital Records and Health Data Development Section. In order to estimate the county-level impact of public health programs, such as the Breast and Cervical Cancer Control Program (BCCCP), this analysis included the number of new breast and cervical cancer cases that occurred within each of Michigan's 83 counties for the years of 1987 through 2002, as well as the number of breast and cervical cancer deaths that occurred between 1994 and 2003. Stage at diagnosis data for each incident case were also used in order to investigate time trends in the early detection of these cancers.

The state of Michigan as a whole has made great progress toward increasing the early detection of breast and cervical cancers which, in turn, has aided in decreasing incidence and mortality due to these diseases. Most of Michigan's individual counties have made large improvements in increasing early detection and decreasing incidence and mortality due to breast and cervical cancer over the above time periods, while other counties have experienced minimal progress in early detection, incidence, and mortality over time.

Introduction

Over the past several years, mortality within Michigan due to breast and cervical cancer has decreased significantly (Figure 1), which has been influenced by an increase in the down staging of breast and cervical cancer diagnoses (Figure 2).

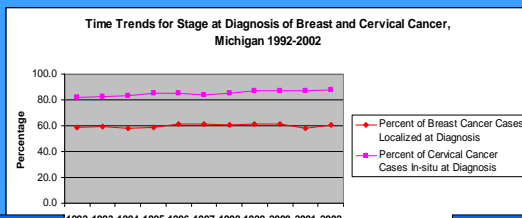
Figure 1.



Breast Cancer Incidence: 6.7% Decline
Mortality: 17% Decline

Cervical Cancer Incidence: 37.1% Decline
Mortality: 40% Decline

Figure 2.



Percent of Breast Cancer Cases Localized at Diagnosis: 3.2% Increase

Percent of Cervical Cancer Cases In-situ at Diagnosis: 7.5% Increase

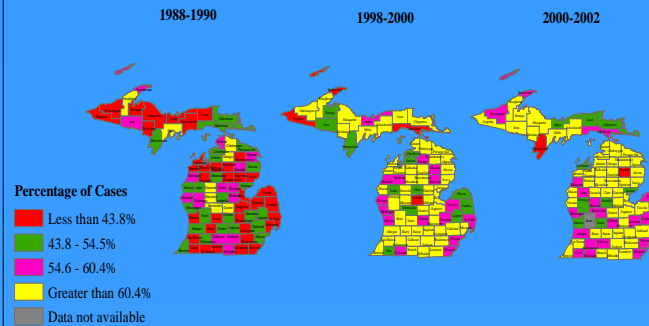
Methods

Case-specific data on new cancer cases and deaths that have occurred in Michigan between 1987 and 2003 were imported into SPSS 13.0 statistical software and used to calculate county-level age-adjusted incidence and mortality rates and stage at diagnosis percentages for breast and cervical cancer.

The rates and percentages calculated through SPSS were plotted to county-level maps of Michigan using ArcView GIS mapping software. Maps containing the age-adjusted incidence and mortality rates and stage at diagnosis percentages over different time intervals for each of Michigan's 83 counties were compared to one another in order to investigate the county-level impact of the BCCCP and other public health programs.

Figure 3.

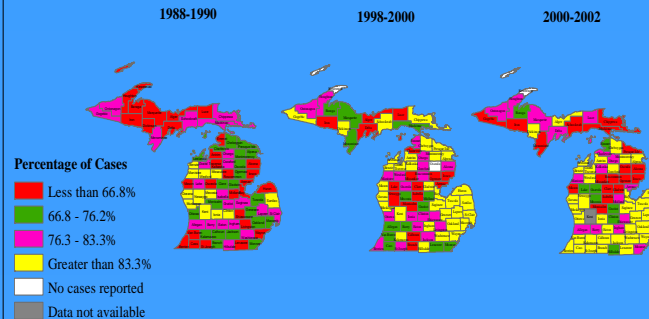
Percentage of Breast Cancer Cases Localized at Diagnosis by County



Percentage of Cases
 Less than 43.8%
 43.8 - 54.5%
 54.6 - 60.4%
 Greater than 60.4%
 Data not available

Figure 4.

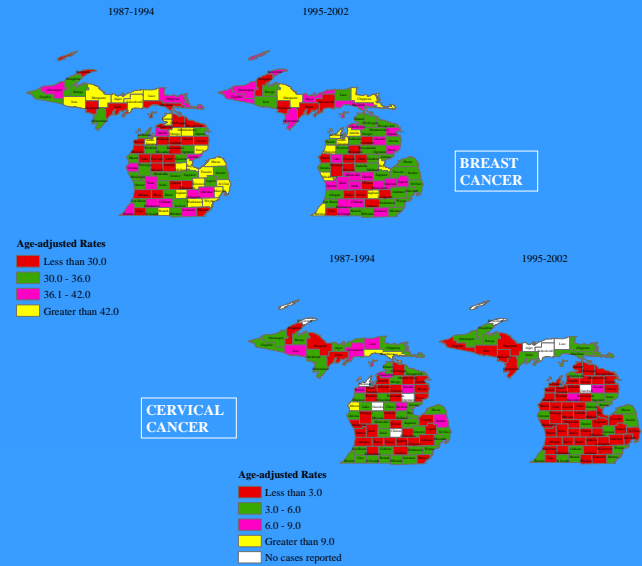
Percentage of Cervical Cancer Cases In-situ at Diagnosis by County



Percentage of Cases
 Less than 66.8%
 66.8 - 76.2%
 76.3 - 83.3%
 Greater than 83.3%
 No cases reported
 Data not available

Figure 5.

Age-adjusted Incidence Rates (per 100,000 population) of Late Stage Breast and Cervical Cancer Cases at Diagnosis, by County

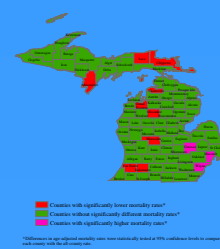


Age-adjusted Rates
 Less than 30.0
 30.0 - 36.0
 36.1 - 42.0
 Greater than 42.0

Age-adjusted Rates
 Less than 3.0
 3.0 - 6.0
 6.0 - 9.0
 Greater than 9.0
 No cases reported

Figure 6.

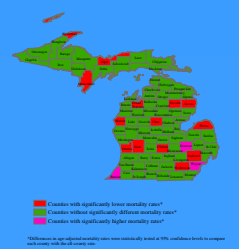
Breast Cancer Mortality Rates by County, 1994-2003



Countries with significantly lower mortality rates*
 Countries without significantly different mortality rates*
 Countries with significantly higher mortality rates*

Figure 7.

Cervical Cancer Mortality Rates by County, 1994-2003



Countries with significantly lower mortality rates*
 Countries without significantly different mortality rates*
 Countries with significantly higher mortality rates*

Key Findings

Since the establishment of the BCCCP program in 1991, most of Michigan's counties have experienced vast improvements in the early detection of Breast and Cervical cancer [Figure 3-4].

Increased early detection of these diseases has contributed greatly toward reducing county-level age-adjusted incidence rates associated with late stage Breast and Cervical cancer diagnoses [Figure 5].

Mortality due to Breast and Cervical cancer has also improved substantially over the past several years. There are currently only a select few counties within the state that have Breast and Cervical cancer mortality rates higher than that of the state average [Figure 6-7].

Over the years, concerted efforts for promoting screening and public health programs, such as the BCCCP, have clearly contributed significantly to improving the incidence, mortality, and early detection of Breast and Cervical cancer throughout the state of Michigan.