Preventative Measures
Assessing the Incidence & Mortality of Breast Cancer in Massachusetts

Overview
Between 2002 and 2006 invasive breast cancer accounted for nearly 15% of all cancer-related deaths and approximately 28% of all newly-diagnosed cancer cases among women in Massachusetts. While the mortality rate has decreased significantly over time, the incidence of breast cancer in the Massachusetts remains higher than the national average. Furthermore, although the incidence of breast cancer is highest among Caucasian women in Massachusetts, the mortality rate is highest among African-American and Hispanic women. These statistics cohere with study results and findings of the American Cancer Society and social scientists alike that suggest that cancer-related deaths are most prevalent among American minority women.

Key Findings
1. MA Breast Cancer Rates are High: Invasive breast cancer is the most prevalent type of cancer in Massachusetts women of all ethnicities. Nationally, 317 women per 100,000 are diagnosed each year. In Massachusetts, 392 women per 100,000 are diagnosed each year. Between 2002 and 2006 there were over 25,000 new diagnoses and between 2004 and 2006 there were nearly 3,000 breast cancer deaths in the state.
2. Rates Among Women of Color are on the Rise: Since 2001, the rate of incidence in White, non-Hispanic women has decreased; but, incidence has risen in Black, non-Hispanic women and Asian women during the same period. Also since 2001, the mortality rate in Hispanic women has increased from 22.5 per 100,000 women to 24.5 per 100,000 women.
3. Relationship Between Spatial Distribution & High Cancer Rates Exists: Rates are highest in the more densely populated areas in the state. Total breast cancer incidence and mortality are highest in Northeast, Metro West, and Southeast MA. Among minorities incidence and mortality are highest in the Boston Region and Western MA—areas with large areas of minority populations. In Boston alone, minorities account for 29% of breast cancer incidence and 36% of breast cancer mortalities between 2002 and 2006. This spatial relationship is illustrated on a regional level in Figures 1 & 2, and on a specific county level in Figure series 3.

Conclusion
While breast cancer incidence and mortality rates are disproportionately higher among minority women in the state, exceptional disproportion exists in Suffolk County. Spatially it makes sense that the highest proportion of incidence and mortality are found in the county with the largest Black population, and a large Hispanic population. However, there are additional demographic characteristics that may also be affecting health outcomes. The most notable correlation is that between health disparities and income disparity/level of poverty. As illustrated in Figure Series 3 some of the poorest communities (median income < $22,200) are also home to large populations of Blacks and Hispanics. In Boston, for example, 35% and 50% of the population is Black or Hispanic respectively. 21% of the Black population and 4% of the Hispanic population lives below the poverty line. Boston comprises the largest city in Suffolk County. It is also where the largest concentration of incidence and mortality is traced (See Figure 1).

Furthermore, the increase in incidence among Asian women and Black women that occurred between 2001 and 2006 may be attributed to enhanced screening techniques and public outreach. However, despite such efforts mortality rates in Hispanic women have increased and in Asian and Black women they occur at a higher rate per 100,000 than White women. Thus, awareness campaigns and prevention initiatives do not appear to have adequately addressed mortality once the cancer has been detected. Based on these findings, and given the demographic characteristics of Suffolk County, it has been concluded that high rates of poverty and limited access to medical resources promote high rates of mortality among Black and Hispanic women. It is my recommendation that in addition to promoting healthy living as the focus of its Comprehensive Cancer Prevention and Control initiative, the Massachusetts Department of Public Health and its partner organizations, place greater emphasis on outreach and accessibility to treatment for patients in low-income communities.

Using the Breast Cancer Project as a Case Study

The purpose of this project is to analyze cancer statistics compiled by the Massachusetts Cancer Registry and overlaid onto spatial and demographic data taken from the 2000 census and Massachusetts Geographic Information Systems (MassGIS). From this information, it is possible to determine the areas where breast cancer incidence and mortality are most prevalent. It is also possible to draw conclusions about possible shared demographic and spatial characteristics of these places and to use this information to determine what, if any strategies of awareness and prevention may be implemented most effectively.

Methodology
The Massachusetts Cancer Registry, the Massachusetts Executive Office of Health & Human Services, and the National Cancer Institute compile and make publicly available cancer incidence and mortality data for Massachusetts. Much of the initial research for this project consisted of reviewing all the information made available by these agencies and compiling breast cancer-specific datasets based on the findings and published reports of incidence and mortality rates by county and EOHHS region in Massachusetts. Where possible, incidence by citiytown was also compiled and mapped.

Those datasets were then imported into GIS as data layers and joined with 2000 census tables (available at uscensus.gov) and town and EOHHS region tables (available at MassGIS). This procedure allowed for incidence and mortality to be mapped by region county. That information was then laid over/compared to county demographic characteristics maps. To fully illustrate specific demographic qualities within the selected county, additional data was mapped by census tract. In this way, conclusions may be drawn about the areas where cancer incidence and mortality are highest among minority population subgroups, even without being able to map by census tract the exact occurrence of cancer.

| FIGURE 1: Regional Incidence & Mortality at a Glance |
| FIGURE 2: Regional Incidence & Mortality by Ethnicity |

| TABLE 3.1: Total Count—Incidence & Mortality by Ethnicity |

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<th>Province</th>
<th>Total</th>
<th>White, non-Hispanic</th>
<th>Black, non-Hispanic</th>
<th>American Indian/Alaska Native, non-Hispanic</th>
<th>Asian, non-Hispanic</th>
<th>Hispanic</th>
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