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Cancer Surveillance and Outreach in Carlisle, Massachusetts: An Analysis of MDPH Cancer and Environmental Health Data in a Small Town Context

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Cancer Surveillance and Outreach in Carlisle, Massachusetts: An Analysis of MDPH Cancer and Environmental Health Data in a Small Town Context

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Central Questions
- How does one interpret cancer surveillance data in a small town, when sample size is limited and statistical significance cannot be inferred?
- When incidence is not statistically significant, what actions are recommended for cancer outreach, prevention efforts, and education?

Carlisle Resident Concerns
- Arsenic in drinking water: residents worried about possible presence of arsenic in private wells.
- Household radon: particular concern about radon in homes.
- Testicular cancer: recent cases in two young adults in Carlisle caused much discussion in town.
- Cases not yet visible in most recent MCR report.
- Cancer clusters: none identified, but testicular cancer cases increased concern about clusters and cancer in general. Carlisle is a very engaged community and local cancer cases are noted.

Results

- Figure 2: All cancers in Carlisle, 1995-2009. For both men and women, expected number of cases remained consistent over time, while observed cases increased over the same period.
- Figure 5: Breast cancer in Carlisle, 1995-2009. Expected number of cases has trended slightly downward, while observed number has remained relatively consistent.
- Figure 6: Prostate cancer in Carlisle, 1995-2009. Expected number of cases has trended slightly downward, while observed number has increased slightly.

Discussion
- Expected cancer cases for men and women are very low for many cancers. As a result, small changes in observed cases have a large statistical impact.
- Since expected & observed cases of all types of cancer are similar, increasing overall incidence of cancer may just be an alignment with expected rates.
- The only cancer with a statistically significant difference between observed and expected cases was melanoma in women. Observed melanoma cases in men are similar to expected numbers.
- The primary risk factor for melanoma is UV exposure. Some studies suggest that UV exposure is associated with socioeconomic status (SES). High rates of leisure time physical activity and high SES level in Carlisle could play a role in elevated melanoma rate.
- Breast cancer and prostate cancer cases exceed the number expected, but neither was statistically significant. High rates of cancer screening and high levels of SES may contribute to the slightly elevated total of observed cases.
- Survival for breast and prostate cancer has also been linked to SES. Diagnosis for both cancers is often delayed in low-income patients.
- Incidence of lung and bladder cancer is lower than expected for men and women in Carlisle.
- A primary risk factor for lung and bladder cancer is smoking. Low smoking rates in town likely account for the low incidence of lung and bladder cancer. YRBS data also indicates that smoking rates are declining among Concord-Carlisle high school students.
- The potential presence of arsenic in Carlisle drinking water should be noted. High-level arsenic exposure is linked to lung, bladder, and non-melanoma skin cancer; MassDEP’s 10 ppb limit is classified as low exposure.
- The low incidence of lung and bladder cancer suggests arsenic exposure is not contributing to cancer incidence at this time.
- In the absence of statistical significance for many cancers in Carlisle, outreach should focus on modifiable risk factors and preventable cancers.

Conclusion

Recommendations
- Advocate awareness of cancer risk factors, including family history and modifiable risk factors like smoking and UV exposure.
- The BOH should monitor MCR and MassDEP data for changes in cancer incidence or exposure. Testicular cancer incidence can be assessed in future data sets.
- Findings can be communicated via the local newspaper and at town events. Use of social media would enhance outreach efforts.
- BOH can advocate testing for arsenic in water & radon.
- Smoking prevention and cessation programs, including youth anti-tobacco programs, should continue.
- Sun protection programs and coordination with the town recreation department should be encouraged.

Limitations
- Carlisle’s population and small sample sizes in incidence data prevent definitive inferences and conclusions.
- The town’s one census tract and private wells preclude environmental and cancer incidence or exposure. Testicular cancer incidence can be assessed in future data sets.
- Findings can be communicated via the local newspaper and at town events. Use of social media would enhance outreach efforts.
- BOH can advocate testing for arsenic in water & radon.
- Smoking prevention and cessation programs, including youth anti-tobacco programs, should continue.
- Sun protection programs and coordination with the town recreation department should be encouraged.

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