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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.
- 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

- The National Cancer Institute estimates approximately 40.8 percent of men and women will be diagnosed with cancer at some point in their lifetime.
- The project’s primary goal was to compare expected and observed cases for all 351 Massachusetts cities.
- Expected & observed cases were compared for all 351 communities in Massachusetts.
- Central questions could not be answered.
- Expected & observed cases were compared for Carlisle.
- Expected & observed cases tended to exceed the expected cases for many cancers. As a result, recommended actions included small changes in observed cases to have a larger statistical impact.
- Since expected & observed cases of all types of cancer were similar, increasing overall incidence of cancer may just be alignment with expected rates.
- 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.

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 alignment with expected rates.
- 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.

Conclusion

- A primary risk factor for both 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 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.

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 health behavior analysis.
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