2022 NPCR WEST VIRGINIA SUCCESS STORY

West Virginia Cancer Registry; Steve Blankenship

When an SIR Won't Do – Complementary Approaches for Investigating Community Cancer Concerns

National Program of Cancer Registries
SUCCESS STORY

SUMMARY

Community cancer concerns are often evaluated using a Standardized Incidence Ratio (SIR), but when the exposed population is small or there are multiple overlapping exposures, an SIR can be of limited use. We recommend additional comparisons that may help to identify patterns of excess cancers.

CHALLENGE

Community cancer concerns may be investigated by comparing the observed number of cancers in exposure to the expected number of cancers using a Standardized Incidence Ratio. When the exposed population is small, however, the SIR will have very low statistical power making any true significant difference difficult to detect. In other situations, such as highly industrialized areas, there may be multiple overlapping exposures that make a significant SIR difficult to interpret. For example, if an area is exposed to several environmental influences on breast cancer from different sources, a significant SIR for breast cancer could overestimate the influence of a single factor unless other contaminants are measured and accounted for. In such cases, additional location-based comparisons can be made to prevent an over-reliance on the SIR.

SOLUTION

Three solutions are to:

- Use different geographic data populated in the case files during geocoding to conduct exposed/not exposed comparisons across counties, zip codes, and census tracts.
- Map out the locations of cases of target cancers to look for evidence of case clustering.
- Use different statistical measures in these comparisons such as rates, percentage of cases by primary site, and trends over time.

A recent environmental investigation in our state involved one possible carcinogen in a highly industrialized area with a decades-long history of environmental concerns. Age-adjusted incidence rates in the county of exposure were compared to other counties in the state, showing no elevation in target cancers. Incidence rate trends by year of diagnosis for target cancers in the exposed county followed the same trends as seen in the rest of the state. The percentage of cases of target cancers were similar in the exposed zip codes in the county and the other, non-exposed zip codes in the county. The census tracts in the county with the highest rates of target cancer incidence showed no evidence of clustering around the facilities of interest. Mapping individual cases of the target cancer also showed no evidence of cases clustering near the facilities of interest.

Using multiple avenues of analysis, one can more thoroughly evaluate claims of excess cancer incidence in situations when an SIR by itself may be insufficient.

RESULTS

Most of the cancer concerns evaluated by our registry are not well-suited to the SIR approach, either due to the small size of the population involved, or due to multiple, overlapping exposures that make interpreting an SIR difficult. We take advantage of the rich location information in the cancer records, along with mapping tools, to evaluate each concern from several geometries to tease out irregular patterns of cancer incidence.

SUSTAINING SUCCESS

This process has become our registry's standard procedure for evaluating cancer concerns. Most concerns in our state come from rural areas that rarely have a population high enough for an SIR to have sufficient statistical power. Other concerns in more densely populated areas usually have a long and varied industrial history, making it much more difficult to associate any given cancer excess to one source. By using a more holistic approach, evaluating the issue at several geographic levels with different statistical measures, there may be more opportunities to identify unusual cancer patterns than by using an SIR alone.

STORY QUOTE

"Just because you can calculate a statistic doesn't make it meaningful." – Steve Blankenship, Epidemiologist

REGISTRY CONTACT INFORMATION

304-356-4953
West Virginia Cancer Registry Website

NATIONAL PROGRAM of CANCER REGISTRIES NPCR 1992 30th 2022

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention