Cluster Analysis at a Glance

By Soundarya Radhakrishnan
North Carolina Central Cancer Registry
What is a Cancer Cluster

- A cancer cluster is a greater than expected number of cancer cases that occurs within a group of people in a geographic area over a defined period of time.
  - MMWR, Investigating Suspected Cancer Clusters and Responding to Community Concerns. [http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6208a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6208a1.htm)
Steps in Cluster Investigation

1. Concern from citizen on cancer incidence/Gather Information
2. Step 1: CCR database: Number of cancer cases from 1990 to latest year
3. Step 2: Compare latest 5-year incidence rates between county and state
4. Step 3: Environmentally linked cancer cases in county from 1990 to latest year
5. Step 4: Address special concerns/Geocoding
6. Step 5: Standard Incidence Ratio analysis
Gather Information

- Specific area of concern – streets/neighborhood
- Cancer sites
- Ages
- Environmental concerns
- Diagnosis years

Communicate to requestor about timeline
Examine distribution of cancer cases in county/area of concern from 1990 – current by:

- **Cancer Site:**
  - Top 4 cancers combined – 50% of total cancers
  - Cancers of concern – Compared to state

- **Age–Group:**
  - Pediatric cancers – Less than 2% of total
  - Ages 50 and older – 80% of total cancers

- **Year of Diagnosis**
Step 2: Comparison of Rates

Compare latest 5-year incidence rates between County and State by

- Cancer Site
- Age-group
Step 3: Cancers Linked to Environmental Factors

Examine distribution of cancers likely to be associated with environmental risk factors

- Liver
- Pancreas
- Brain/other CNS (Central Nervous System)
- Bladder
- Kidney
- Leukemia
- Multiple myeloma
- Non–Hodgkin Lymphoma
Step 4: Geocoding

- Concern expressed on specific area such as landfill – request referred to geospatial analyst.

- Spatial analyst geocodes at Census Block Groups/Census Tract level – determine if cases are concentrated in concerned area.

- Geocoded data used for analysis.
After completion of analysis, standard cluster report sent to
- Requestor
- Occupational and Environmental Epidemiology Branch
- Local Health Department
Step 5: Standardized Incidence Ratio (SIR)

- SIR analysis will be conducted for further investigation

- SIR is calculated to see if occurrence of cancer in concerned (study) population is higher compared to general (reference) population
Standardized Incidence Ratio (SIR)

- SIR – Ratio of number of observed cases to number of expected cases

- Observed cases – Cases occurred in concerned (study) population in a specific timeframe (cases from CCR database)

- Expected Cases – Cases that would occur in the concerned population if cancer occurrence is same as the reference population (generally state)
Standardized Incidence Ratio (SIR)

- Expected cases – Estimated using the State cancer incidence by age and population of concerned area for the specific time period

- Divide observed cancer cases in the area for the specific time period by the expected number of cases
  Observed cases/Expected cases = SIR

- SIR of > 1.0 – Indicates that observed number of cases is greater than the expected number of cases – cause for concern
Limitations

- CCR report only includes North Carolina Residents (Address at Diagnosis State, North Carolina) – NC residents diagnosed out of state are included but out of state residents are not included.

- Time lag in reporting – It takes at least 6 months from time of diagnosis, for facilities to report to CCR.

- CCR analysis includes only ‘Address at the time of diagnosis’.

- Small numbers – Lead to uncertainty and instability of rates
For more information on cancer cluster investigations and cancer cluster guidelines, please visit
http://www.cdc.gov/nceh/clusters/

http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6208a1.htm
For questions or concerns please contact the North Carolina Central Cancer Registry at (919) 715–7289

Chandrika Rao, Director, NC Central Cancer Registry, Chandrika.Rao@dhhs.nc.gov; Phone: (919) 715–4574

Soundarya Radhakrishnan, Statistical Supervisor, NC Central Cancer Registry, Soundarya.Radhakrishnan@dhhs.nc.gov; Phone: (919) 715–3740
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