Applying Environmental Data in Cancer Research

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National Cancer Policy Forum Workshop: Applying Big Data to Address the Social Determinants of Health in Oncology
October 28, 2019
Social determinants of health

https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health
The exposome

- First conceptualized by Chris Wild in 2005 as the totality of human environmental (non genetic) exposure from conception onwards

- Requires accurate and reliable exposure assessment of many exposures over decades

Vrijheid et al. Thorax, 2014; 69:876-878
Motivation for Environmental Cancer Research

• International variation in cancer incidence rates
• Geographic variation in incidence within countries
• Occupational studies of exposures also found in the environment
• Time trends in cancer incidence
Location matters
The power of place

• Computing advances allow geocoding of participant addresses over the lifespan

• Location data from smartphones or other technologies can also be used

• Allow assessment of contextual measures that can be mapped
Location-based environmental exposures
Center for Research on Environmental & Social Stressors in Housing Across the Life Course (CRESSH)

Directors:
Francine Laden, ScD (Harvard)
Jonathan Levy, ScD (Boston University)
Building a geospatial database of social and environmental determinants of health

- Compiled datasets
  - Greenness
  - Walkability
  - Census
  - Housing
  - Land surface temperature
  - Meteorology
  - And more...

- Indexes
  - Heat vulnerability
  - Environmental quality
  - Racial, economic, education segregation and dissimilarity
  - Community health center accessibility
  - Food access
  - And more...
One Key Takeaway

Exploring the impacts of SDOH on cancer or cancer survival without considering the environment eliminates a population-level approach to intervention.

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Acknowledgements

• Francine Laden
• Peter James
• Trang VoPham
• Jon Levy
• Patricia Fabian
• Kevin Lane

• CRESSH Funding
  • US EPA RD83615601
  • NIH/NIMHD & NIEHS P50 MD010428

• P30 ES000002
Thank you!

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