We would like to get to know our audience.

Please put your answer to the following question in the chat.

What's your interest in environmental risk factors for cancer?
Environmental Carcinogens Action Team: 
*The Consortium in Action*

March 12, 2024  |  11 AM – 12:30 PM

New York State Cancer Consortium 
NYSCC QUARTERLY MEETING SERIES
Housekeeping

Please mute your line.

If you have a question, please type it in the Chat Box.

Questions will be answered after the discussion.

This meeting is being recorded.

A link to the recording will be e-mailed to everyone who registered.
About Us

We are New Yorkers from all walks of life who work together to reduce the burden of cancer.

www.nyscancerconsortium.org
Join Today!

➢ Learn about state-wide cancer prevention efforts

➢ Find resources to promote and implement Cancer Plan priorities and measure progress

➢ Collaborate with other members to achieve Cancer Plan goals and objectives

Join an Action Team to implement Cancer Plan priorities

- Colorectal Cancer
- Environmental Carcinogens
- HPV Coalition
- Lung Cancer
- Skin Cancer
- Survivorship
- HEAL
NYSCC Quarterly Meeting Series

Upcoming Meetings

- HEAL (Healthy Eating and Active Living) Action Team
  June 20th, 11:00 AM – 12:30 PM

- TBD
  September 24th, 11:00 AM – 12:30 PM
Pre-Meeting Poll Question

Please, rate your knowledge of environmental carcinogens.
Agenda

- Environmental Carcinogens Action Team: Who we are
- State of the evidence on environmental carcinogens
- What have we done and where are we going?
- Panel Discussion: Environmental Health Equity
- Q&A
Who we are
Environmental Carcinogens Action Team

Health providers, scientists, public health representatives and advocates from 19 organizations and institutions with expertise in cancer risk reduction, the health impacts of environmental exposures, environmental modeling and data science.

Mission: Reduce the burden of cancer diagnoses from known environmental risk factors for cancer in New York State (NYS) through:
• data monitoring and modeling
• education and outreach
Environmental Carcinogens Action Team Co-Chairs

Mary Beth Terry, PhD
Kimberly Burke, MPH
Susan Lloyd, MPH
Environmental Carcinogens Action Team

JOIN US!

Visit the New York State Cancer Consortium Website and become a member!
https://www.nyscancerconsortium.org/teams/environmental-carcinogens/

Email us!
Kimberly: krb2160@columbia.edu
Susan: sl4279@cumc.columbia.edu
Mary Beth: mt146@cumc.columbia.edu
The Latest Evidence on Environmental Carcinogens
U.S. Cancer Incidence Trends (1976 with projections to 2030)

1) Most cancers diagnosed 70+ yrs of age
2) Largest annual increase in incidence are in female adults < 55 years
3) Population impact of changing E (environment) in Rates
NYS has higher cancer incidence across all age groups

<table>
<thead>
<tr>
<th>Age Group</th>
<th>New York City</th>
<th>New York State</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ages 0-19 years</td>
<td>98.8</td>
<td>102.1</td>
<td>89.6</td>
</tr>
<tr>
<td>Ages 20-39 years</td>
<td>399.1</td>
<td>412.7</td>
<td>373.8</td>
</tr>
<tr>
<td>Ages 40-54 years</td>
<td>1,173.2</td>
<td>1,254.0</td>
<td>1,180.9</td>
</tr>
<tr>
<td>Ages 55-69 years</td>
<td>1,959.20</td>
<td>2,257.90</td>
<td>2,104.40</td>
</tr>
<tr>
<td>Ages 70 years and over</td>
<td>2,400.0</td>
<td>2,577.90</td>
<td>2,044.40</td>
</tr>
</tbody>
</table>

*Age-adjusted cancer rates by age group in New York City, New York State, and the U.S., 2015-2019*
How Are Carcinogens Identified?

IARC: International Agency for Research on Cancer

<table>
<thead>
<tr>
<th>Classification</th>
<th>Definition</th>
<th>IARC Monographs, Volumes 1-135</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 1</strong> Carcinogenic to Humans</td>
<td>There is enough evidence to conclude that it can cause cancer in humans</td>
<td>128 agents</td>
</tr>
<tr>
<td><strong>Group 2A</strong> Probably Carcinogenic to Humans</td>
<td>There is strong evidence that it can cause cancer in humans, but at present it is not conclusive.</td>
<td>95 agents</td>
</tr>
<tr>
<td><strong>Group 2B</strong> Possibly Carcinogenic to Humans</td>
<td>There is some evidence that it can cause cancer in humans but at present it is far from conclusive.</td>
<td>323 agents</td>
</tr>
<tr>
<td><strong>Group 3</strong> Unclassifiable as to Carcinogenicity</td>
<td>There is no evidence at present that it causes cancer in humans.</td>
<td>500 agents</td>
</tr>
</tbody>
</table>
How Are Group 1 Agents Identified?

<table>
<thead>
<tr>
<th>Classification</th>
<th>Evidence of Cancer in Humans</th>
<th>Evidence of Cancer in Experimental Animals</th>
<th>Mechanistic Evidence</th>
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<tr>
<td><strong>Group 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carcinogenic to Humans</td>
<td>Sufficient</td>
<td>Sufficient</td>
<td>Strong (exposed humans)</td>
</tr>
<tr>
<td><strong>Group 2A</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Possibly Carcinogenic to Humans</td>
<td>Limited</td>
<td>Sufficient</td>
<td>Strong</td>
</tr>
<tr>
<td></td>
<td>Limited</td>
<td>Sufficient</td>
<td>Strong (human cells or tissues)</td>
</tr>
<tr>
<td><strong>Group 2B</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Possibly Carcinogenic to Humans</td>
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<td>Sufficient</td>
<td>Strong</td>
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All other situations not listed above.
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Most Group 1 agents were identified from human (observational) studies.

Preamble to the IARC Monographs (amended January 2019):
Group 1 Carcinogens Include:

- Chemicals
- Occupational exposures
- Fibers
- Metals
- Tobacco (smoking and secondhand)
- Radiation
- Drugs
- Viral and bacterial infections
- Alcohol
- Air pollution
- Asbestos
Where are the occupational exposures and environmental pollutants?
Key Challenges

1) Combining all cancers together in terms of “attributable risk” masks the differences across cancer types in causes
   e.g., World Health Organization estimates 25% of cancers of the trachea, bronchus and lung, as well as 63% of mesothelioma, are attributed to occupational environmental exposures

2) Attribution is also very much related to how well we can measure or detect things
   e.g., Smoking is much easier to measure than environmental and chemical exposures

3) Some of these challenges in measurement have now been overcome due to better methods of measurement and ability to link to large environmental databases
Major Environmental Risk Factors for Cancer

- Tobacco
- Pesticides
- Volatile Organic Compounds
- Endocrine Disrupting Chemicals
- Metals
- UV Exposure
- Air Pollutants
Tobacco Smoke

First-hand smoke
- Lung
- Larynx
- Bladder
- Kidney

Second-hand smoke
- Breast cancer
- Childhood leukemia

Linked Cancers
- Pancreas
- Cervix
- Colon and rectum
- Liver
Pesticides & Herbicides

- Household and occupational exposures
- A 2018 Study of rural homes in NY state found pesticide residues present in all 132 homes sampled.¹

- Babies and children have higher exposure in home due to:
  - higher rate of respiration
  - time spent on the floor
  - touching and mouthing items

Linked Cancers:
bladder, breast, stomach, kidney, liver, lymphoma and leukemia in children

Volatile Organic Compounds (VOCs)

VOCs are compounds that easily become vapors or gases.

Paints, stains, varnishes

Cleaning products; industrial solvents

Air pollutants

Linked Cancers: Lung, blood
Metals

Arsenic, beryllium, cadmium, chromium, lead, nickel

Occupational exposures: Firefighters, miners and smelters, pesticide applicators, refiners, smelters, etc.

Household exposures: cadmium and lead in child products, arsenic in drinking water, vaping and e-cigs

Linked Cancers: skin, lung, bladder, kidney, liver, brain, nasal cavity
Air pollutants from combustion

Diesel exhaust; compounds that result from burning wood, fuel, and gasoline

Linked Cancers: Lung, skin, breast, bladder

PAHs
UV Exposure from Sun and Tanning Beds

Linked Cancers: Skin, eye
Endocrine Disrupting Chemicals

A man-made or natural chemical that interferes with the normal functioning of hormones in the body.

Phthalates  
Bisphenol A  
Flame Retardants

Linked Cancers: Breast and prostate cancers

High occupational exposures for firefighters
Per- and polyfluoroalkyl substances (PFAS)

Stain, water, and grease resistant products:
- Food packaging
- Waterproof fabrics
- Stain guard
- Cosmetics
- Cleaning products
- Firefighting foam
- Non-stick cookware

Widepread drinking water contaminant

Primary exposures through food and drinking water

Cancers: Testicular and kidney
Poll Question

What environmental carcinogens are you concerned about in your community?

Select your top 3.

- Tobacco smoke
- Air Pollution
- Pesticides
- Metals
- Volatile Organic Compounds
- Endocrine Disrupting Chemicals
- UV Exposure
- Chemicals in Consumer Products
- Radon
- PFAS
Unacceptable Risk Trailer

Watch the full video (15 minutes):
https://www.youtube.com/watch?v=U_Zi00wVB3E
What we have done
Environmental Action Team: Major Accomplishments

Manuscript from the Modeling Working Group: Cancer incidence in New York State and associations with common population-level exposures 2010-2018: an ecological study

Education and Communication Working Group: Training for health care providers – Cancer and the Environment Forum
Modeling identified several common environmental risk factors

Two-stage regression modeling for 10 top cancers in New York State, stratified by age group and sex

Identified key common environmental risk factors

<table>
<thead>
<tr>
<th>Type</th>
<th>Measure</th>
<th>Men</th>
<th>Women</th>
<th>Cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ozone</td>
<td>Number of days with maximum 8-hour average concentration exceed NAAQS</td>
<td>0.46* (0.18, 0.75)</td>
<td>0.24* (0.01, 0.48)</td>
<td>0.5* (0.26, 0.73)</td>
</tr>
<tr>
<td>Air Quality</td>
<td>Annual mean ammonia concentration (NH3)</td>
<td>0.5* (0.06, 0.53)</td>
<td>Breast</td>
<td></td>
</tr>
<tr>
<td>PM2.5</td>
<td>Annual mean black carbon concentration (BC)</td>
<td>0.69* (0.29, 1.14)</td>
<td>Thyroid</td>
<td></td>
</tr>
<tr>
<td>PM2.5</td>
<td>Annual mean fine dust concentration (SOD)</td>
<td>0.41* (0.14, 0.67)</td>
<td>Melanoma of the skin</td>
<td></td>
</tr>
<tr>
<td>PM2.5</td>
<td>Annual mean nitrate concentration (NO3)</td>
<td>0.54* (0.31, 0.78)</td>
<td>Melanoma of the skin</td>
<td></td>
</tr>
<tr>
<td>Water Quality</td>
<td>Mean concentration of THM (micrograms per liter) per year</td>
<td>0.2 (0.01)</td>
<td>Lung and bronchus</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>Percent of land used for agriculture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rate of reported acute toxic substance release incidents per 100,000 population</td>
<td>0.38* (0.09, 0.48)</td>
<td>0.24* (0.01, 0.47)</td>
<td>Melanoma of the skin</td>
</tr>
</tbody>
</table>

Key takeaways:

- Models estimated positive associations between ambient air pollutants (ozone and PM2.5) and prostate cancer, female breast cancer, and melanoma of the skin.

- Models including environmental risk factors were better able to explain the variation in cancer incidence data among 25-49 year-olds, supporting the impact of common environmental exposures on cancer development, particularly in younger age groups.

Modeling Working Group. *Cancer incidence in New York State and associations with common population-level exposures 2010-2018: an ecological study (manuscript under review)*
We know that cancer is related to whether you smoke and your diet.

But I don’t smoke and I eat well, what about the environment?
Reaching Health Care Providers: Cancer and the Environment Forum

- **One-day CME** event on state of the science of environmental carcinogenesis and the role physicians, nurses, community leaders and public health practitioners have in engaging in cancer risk reduction.
- **Hybrid event** hosted at Columbia University Irving Medical Center in New York City.
- **Target population:** Clinicians, nurses, community members, public health professionals
- **12 partner organizations** were involved in hosting this event including Clean and Healthy NY, Silent Spring Institute, Montefiore Cancer Center, Lowell Center for Sustainable Production, Cancer Free Economy, Cornell Center for Health Equity

**Activity Reach**
- 255 attended event
- 319 views on YouTube post-event

**Watch the recording:**
Cancer and the Environment Forum CME

87% reported some increase or a considerable increase in confidence to refer patients to appropriate resources for smoking cessation due to the CME.

98% reported some increase or a considerable increase in confidence to discuss strategies to reduce exposure to common environmental carcinogens.

62% reported that participation in this activity led to implementation of new strategies in their practice, research and training.
Where we are going
States that include environmental chemicals in their cancer plan

State Cancer Plans
- Include a section on environmental chemicals: 26
- Include a measurable objective on environmental chemicals: 19
- Include a measurable objective on environmental chemicals other than Radon: 9

Date Evaluated: Feb. 1, 2024
States that include environmental chemicals in their cancer plan

Example Measurable Objectives:

1. Increase gallons of displaced gasoline fuel due to alternative fuel use of compressed natural gas and biodiesel from 4.9 million to 5.2 million. (Colorado)

2. Reduce the average daily density of fine particulate matter in micrograms per cubic meter from 8.2 to 8.0 ug/m. (Iowa)

3. By 2025, increase the proportion of private wells tested for arsenic from 57.4% to 65.0%. (Maine)

4. Increase the number of counties with clean indoor air regulations from 31 counties to 39 counties. (West Virginia)
New York State 2024-2029
Comprehensive Cancer Plan

We are working with NYSCC to develop priorities and measurable objectives to include in the next version of the Comprehensive Cancer Plan.

Proposed Measurable Objectives include measures related to:

• Radon
• Air pollution
• Cancer screening, especially for high-risk occupations
Environmental Action Panel Discussion

Desiree Walker
Patient Advocate and Educator

Ginger Champain
Senior Contract Coordinator
New York State Department of Health

Janet Gray, PhD
Professor Emerita
Psychology/Neuroscience and Program in Science, Technology, and Society (STS)
Vassar College

Sarah Evans, PhD, MPH
Assistant Professor
Environmental Medicine & Public Health
Icahn School of Medicine at Mount Sinai
Questions and Answers
Contact Information

New York State Cancer Consortium Environmental Carcinogens Action Team:
https://www.nyscancerconsortium.org/teams/environmental-carcinogens/

Email us!
Kim: krb2160@columbia.edu
Susan: sl4279@cumc.columbia.edu
Mary Beth: mt146@cumc.columbia.edu
Post-Meeting Poll Questions

- Will you use what you learned in this webinar?

- After Participating in this webinar, please rate your knowledge of environmental carcinogens.

- What is your opinion of the balance of lecture and interactivity in this course?
Upcoming Consortium Meetings

- **New York State Human papillomavirus (HPV) Vaccination Summit**
  April 4th, 9:00 PM – 12:45 PM

- **Action Team Webinar – Colorectal Cancer Action Team**
  “Nobody Told Me I Needed to Be Screened” - Increasing Colorectal Cancer Screening
  April 16th, 1:00 PM – 2:00 PM

- **Quarterly Member Meeting - HEAL (Healthy Eating and Active Living**
  June 20th, 11:00 AM – 12:30 PM
Thank you for Attending

cancerconsortium@health.ny.gov