Mixed Messaging About Mixed Exposures: How to Communicate Agricultural Exposures and Cancer Risk Effectively

2024 Midwest Rural Agricultural Safety and Health Conference: Messaging Matters

November 8, 2024

Meet Your Speakers

Audrey Tran Lam, MPH
Environmental Health Program Director
UNI Center for Energy & Environmental Education

Caroline Powell, BA
Environmental Outreach Coordinator
Iowa Cancer Consortium

Roadmap

1. Learning Objectives
2. Why Are We Here?
3. Understanding Cancer
4. What Is Our Environment?
5. Cancer & The Environment Interactions
6. Agriculture & Occupational Cancer Risk
7. Meeting Upstream For Primary Prevention Communication
8. Discussion

Learning Objectives

- **Identify** evidence-based resources on environmental factors that can increase cancer risk in an agricultural setting and apply them to your own health and safety education materials
- **Discuss** what does and does not work in health and safety messaging together
- **Find** the overlap in goals and communication strategies between cancer control and agricultural safety and health professionals

Residents of small farm town in Iowa fear they're being poisoned as 'newspaper obituary pages are full of cancer deaths'

- **READ MORE:** Why has Iowa become America's cancer capital

"We Can't Sit Back" – Amid Polluted Water and Climbing Cancer Rates, Iowa Eyes Farm Chemicals

Iowa has second-in-the-nation cancer rate; Residents doubt cause

- Two in five Iowa residents will be diagnosed with cancer
- Research points to alcohol as major contributor to disease
- Iowa residents say pesticides, farm runoff may be factor

2024 average

Cancer rates in rural Iowa spark concern over farm pollutants

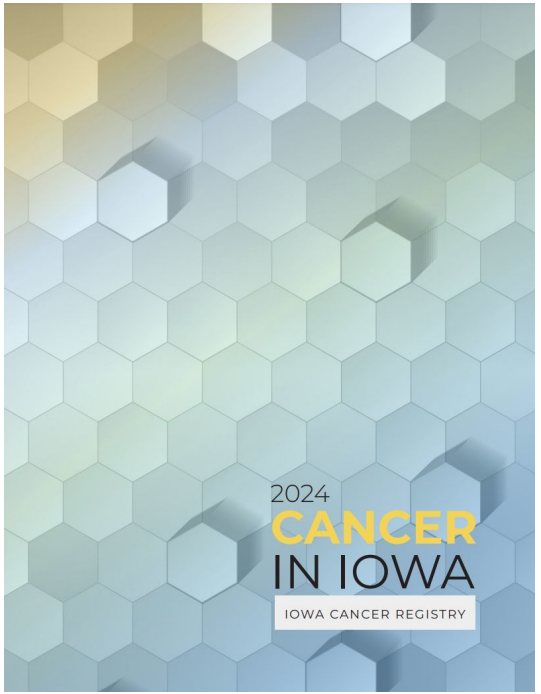
By EHN Curators ▪ Jun 17, 2024 ▪ 1 min read

Cancer in Iowa: What role does agriculture play in Iowa's high cancer rates?

Growing body of research links nitrate and pesticides to some types of cancer

The State of Cancer in Iowa

- For the 3rd year in a row, Iowa is #2 in the country for age-adjusted cancer incidence rate
  - **Note:** Based on 2017-2021 Iowa Age-Adjusted Rates (so it is **not** just because we're an older population!)
  - Who's #1?
- Only state for the last three study time periods with a rising, and fastest growing, age-adjusted incidence rate
- Cancer rates are similar in urban and rural populations in Iowa, with a steeper increase in urban



Iowa Cancer Registry

Where Does Iowa Rank Nationally?

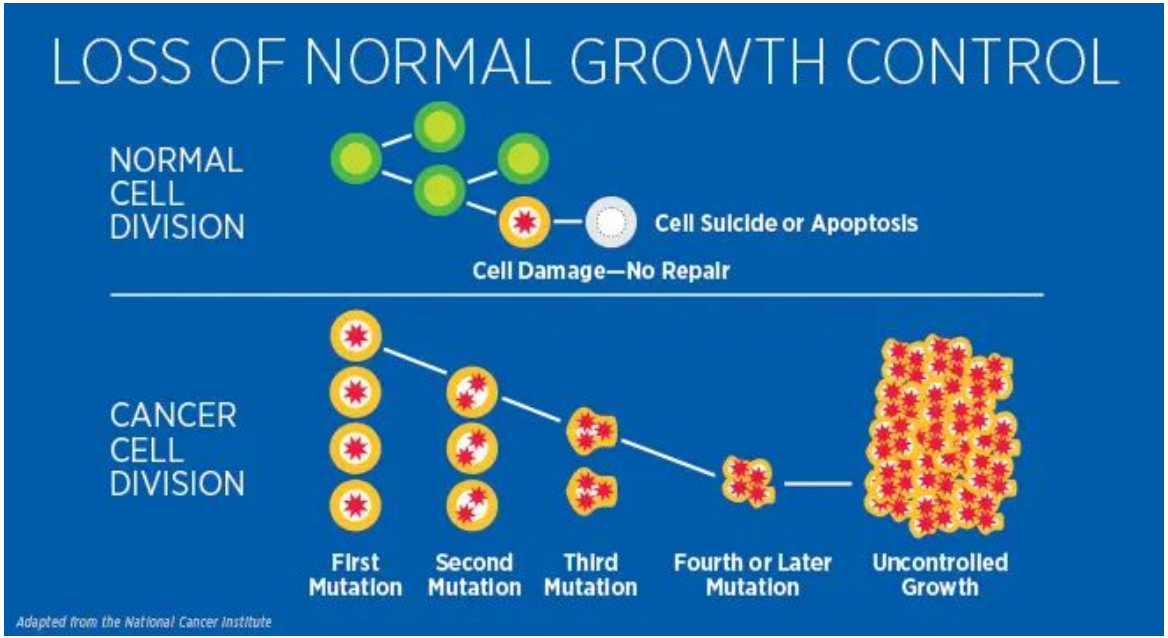
- 2017-2021 Cancer Incidence:
  - 1st in Oral Cavity/Pharynx
  - 3rd in Non-Hodgkin's Lymphoma
  - 4th in Leukemia, Esophagus, **Melanoma**
  - 8th in Kidney/Renal Pelvis, Bladder
  - 10th in Colorectal
  - 11th in **Breast**, Myeloma
  - 12th in **Prostate**
  - 13th in **Lung/Bronchus**, Uterine
  - 15th in Brain/Other Nervous System
  - 16th in Hodgkin Lymphoma

- 2017-2021 Cancer Mortality:
  - 6th in Melanoma
  - 8th in Childhood Cancer Ages <15, Ovarian
  - 10th in Childhood Cancer Ages <20
  - 11th in Non-Hodgkin's Lymphoma
  - 14th in Uterine, Leukemia, Myeloma, Prostate
  - 18th in Lung, Brain/ Other Nervous System

Iowa Cancer Registry & National Cancer Institute Surveillance, Epidemiology, and End Results (SEER) Program

Defining Cancer

"a collection of diseases caused by the uncontrolled division of abnormal cells that can start anywhere in the body"



American Association for Cancer Research

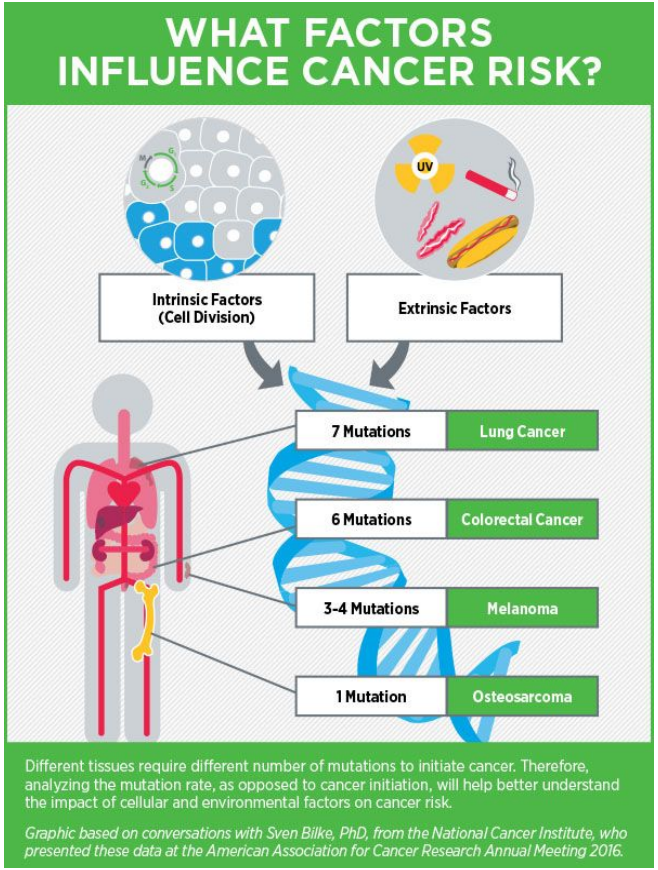
Risk Factors for Cancer

Intrinsic (Genetic)

- Age
- Family History

Extrinsic (Behavioral/Environmental)

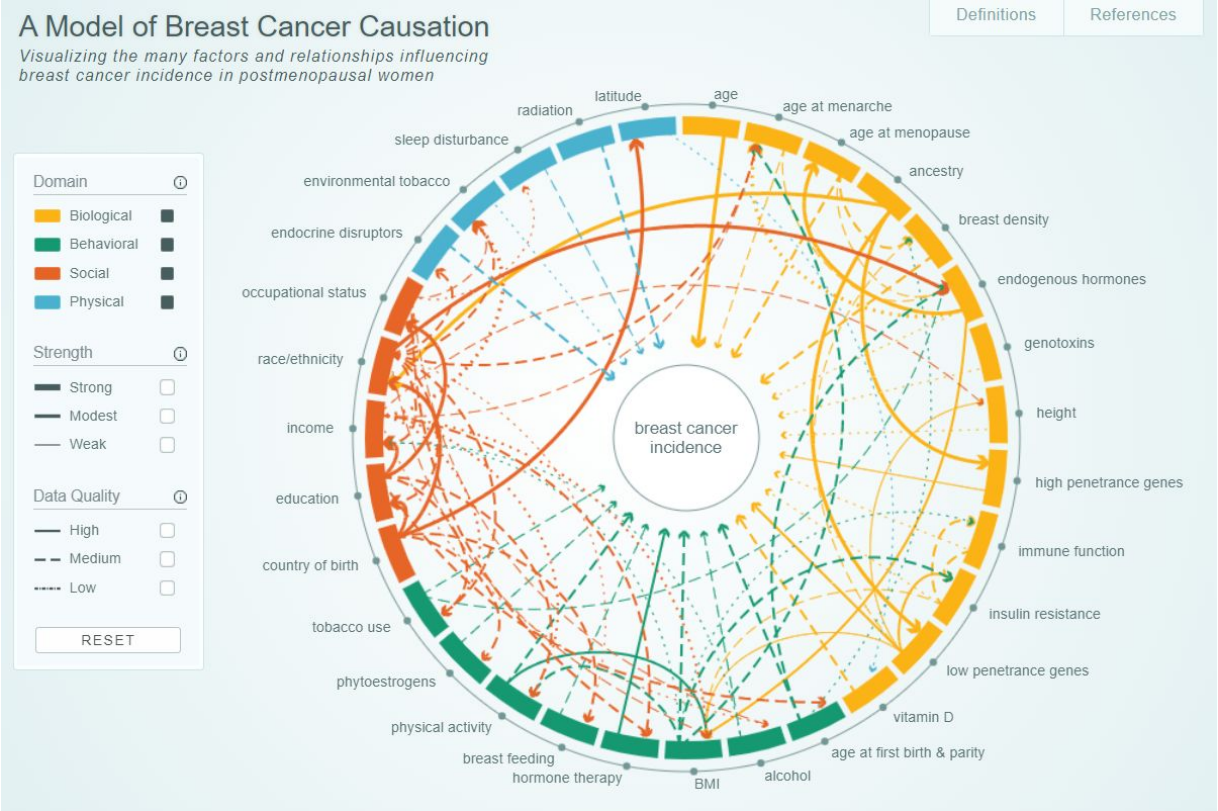
- Alcohol
- Cancer-causing substances
- Chronic Inflammation
- Diet
- Hormones
- Immunosuppression
- Infectious Agents
- Obesity
- Radiation
- Sunlight
- Tobacco



National Cancer Institute: Most Studied or Suspected Risk Factors

American Association for Cancer Research

Many factors **and their interactions** need to be considered at the same time, rather than one factor at a time, in cancer development, especially in agricultural settings.

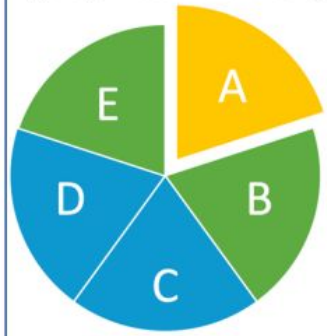


University of California San Francisco, 2014

IMPORTANT

There is no singular cause of cancer.

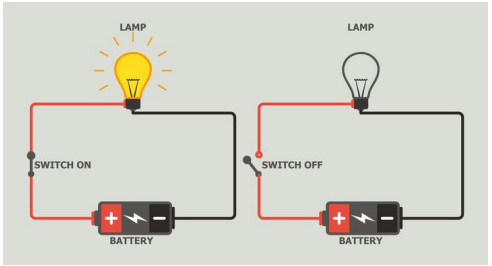
Figure 3: The Sufficient-Component Cause Model



- Slices A-E represent component causes of cancer.
- When slices A-E are present, there is sufficient cause for the cancer.
- If we can just prevent one component cause from occurring, slice A, we can prevent cancer.

Adapted from Rothman KJ. Epidemiology— An Introduction. Oxford: Oxford University Press; 2002.

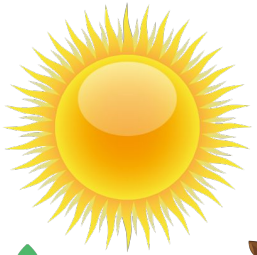
Cancer & Environment Network of Southeastern Pennsylvania, Environmental Chemicals and Cancer Science Companion Document, 2021



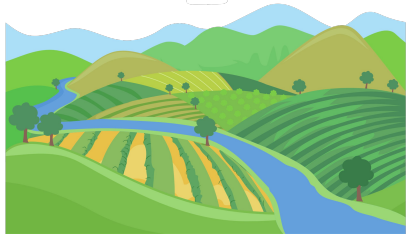
Defining the Environment

"the surroundings or conditions in which a person, animal, or plant lives and operates"

Not just natural...






but also built & sociocultural






Cancer-Causing Substances in the Environment

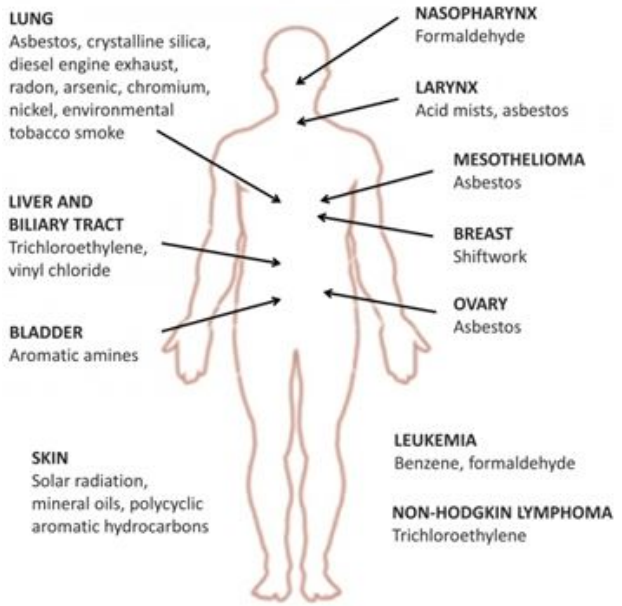
- Only about 5-10% of cancers are caused by inherited mutations. **The remaining 90-95% of cancers are caused by mutations that happen during a person's lifetime as a natural result of aging and exposure to environmental factors.**

- Many external environmental risk factors we typically focus on are tied to individual lifestyle behaviors like smoking or drinking alcohol, but there are others that are not tied to lifestyle, like living in an area with high air pollution or unsafe radon levels.

1. National Cancer Institute's Common Cancer Myths and Misconceptions
2. Impact of Lifestyle Behaviors on Cancer Risk and Prevention (Choi and Hua, 2021); AACR: Air Pollution: WHO:Radon

What Influences Occupational Cancer Risk?

- Different agricultural practices influence type and frequency of exposure to carcinogens
  - Chemicals like herbicides, insecticides, fertilizers
  - Diesel engine exhausts
  - Solvents
  - Organic dusts
  - Radiation
  - Metals
  - **Mixtures of these substances**
- Long latency period between exposure and a cancer diagnosis makes pinpointing a specific cause difficult
- Lack of evidence of harm for a workplace substance does not imply safety



Selected cancers and associated workplace exposures

Cancer Care Ontario

The Agricultural Health Study

- Applicators in the study have **lower overall cancer risk compared to the general population**
  - Notably lower for oral cavity, pancreas, and lung cancers
- **Do have higher rates of certain cancers**
  - Lip
  - Prostate
  - Leukemias
  - Thyroid
  - Testicular
  - Lymphomas like multiple myeloma
- Associations of these cancers with certain environmental exposures vary in evidence strength

Note: Other acute and chronic health effects like pesticide poisoning or incidence of Parkinson's have been studied here.

Study Updates

The AHS Study Update provides participants, scientific collaborators, partners, and others with an overview of study activities and findings.

2024 Study Update

Drinking water quality, inflammatory bowel disease, and information about the fourth-cohort wide follow-up.

View 2024 Updates

2022 Study Update

Pesticide use and thyroid cancer, shingles risk, kidney cancer and other kidney disease, and information about ongoing and new studies.

View 2022 Updates

2021 Study Update

Dicamba use and cancer incidence, updates on mortality, stress and farming, and information about ongoing and new studies.

View 2021 Updates

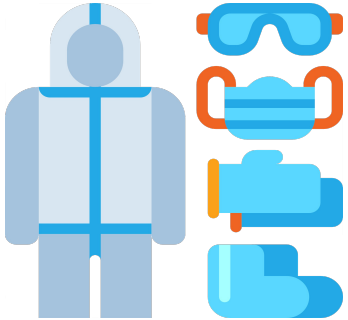
2020 Study Update

Autoimmunity and autoimmune diseases in the agricultural health study, the AGRICOH consortium of agricultural cohort studies, and information about ongoing and new studies.

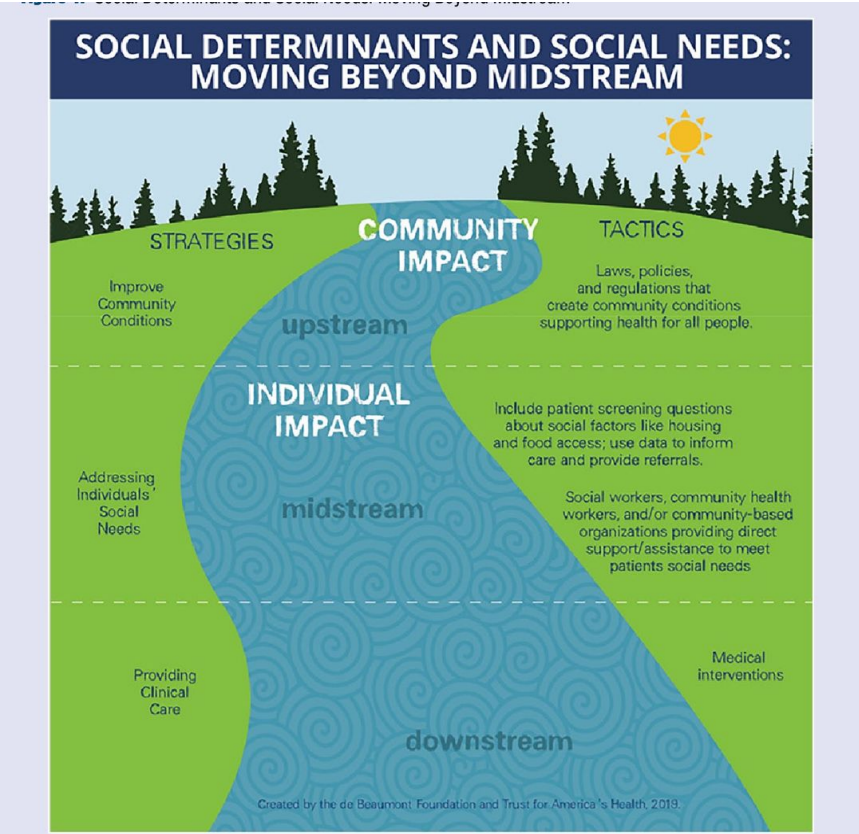
View 2020 Updates

Risk Reduction is Possible in Agriculture

"Environmental exposure to carcinogens and environments that may relate to health behaviors are important to examine as they can be modified to lower cancer risks." (Larsen et al., 2023)



Meeting Upstream: Primary Prevention



Note. Castrucci and Auerbach (2019). Copyright 2019 by the de Beaumont Foundation and Trust for America's Health. Reprinted with permission.

Moving Prevention Upstream, Wisconsin Department of Health Services

Talking Points We've Used

- Cancer is a disease of many genetic, behavioral, social, and environmental factors.
- Some chemicals do not cause cancer until they combine with other chemicals.
- Not every chemical is a carcinogen.
- Not all environmental factors are within the control of the individual to mitigate, but they are still considered modifiable risk factors.
- A substance may not definitively be harmful, but that does not mean it is health-promoting or protective.

Cancer Risk Reduction Conversations You Can Start

Have you tested your home or business for radon?

Have you tested your well water?

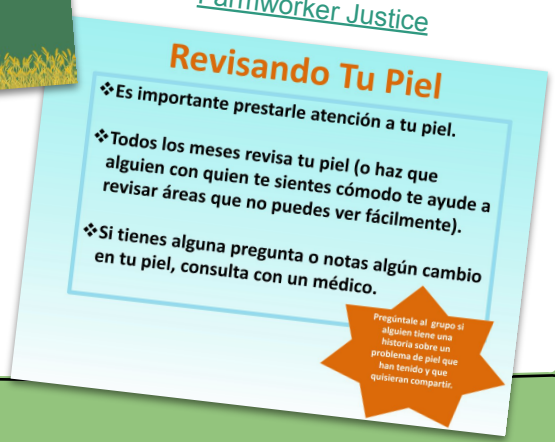
What does chemical safety look like in your operations?

How are you protecting yourself in the sun?

??????

Keep Cancer Risk Communications S.I.M.P.L.E.

- **S**pecific
- **I**nclusive
- **M**otivating
- **P**ractical
- **L**ocalized (geographically and culturally-relevant)
- **E**vidence-based and Engaging



Get Involved!

minnesota cancer alliance

Illinois Cancer Collaborative

NC2 Nebraska Cancer Coalition

INDIANA CANCER CONSORTIUM

MISSOURI CANCER CONSORTIUM

SOUTH DAKOTA CANCER COALITION

Wisconsin Cancer Collaborative

Ohio Partners for Cancer Control

Iowa Cancer Consortium

As health and safety professionals, you are already practicing cancer control. By keeping workers healthier in the present, you are helping prevent disease in the future.

Additional Resources

- U.S. President's Cancer Panel 2008-2009 Report on Reducing Environmental Cancer Risk
- World Health Organization's International Agency for Research on Cancer
  - Monographs on the Identification of Carcinogenic Hazards to Humans
  - Environmental Exposures
  - Occupational Exposures
- Toxic-Free Future
- Silent Spring Institute
- Safer States Toxics Policies Tracker
- Izaak Walton League of America's Nitrate Watch Free Kit Request
- Childhood Cancer Prevention Initiative & Cross-Sector Strategies Report
- New Hampshire Well Water Community Action Toolkit
- Taking an Environmental History (American Academy of Pediatrics)
- Exposure History Form (Example from Agency for Toxic Substances and Disease Registry)
- Minnesota Department of Health's Cancer and the Environment Resources
- Iowa Public Health Tracking Portal: Environment
- Iowa's Private Well Grants Program
- Rise St. James

Questions?

Let’s talk!

Audrey Tran Lam

audrey.tranlam@uni.edu

Caroline Powell

powell@canceriowa.org