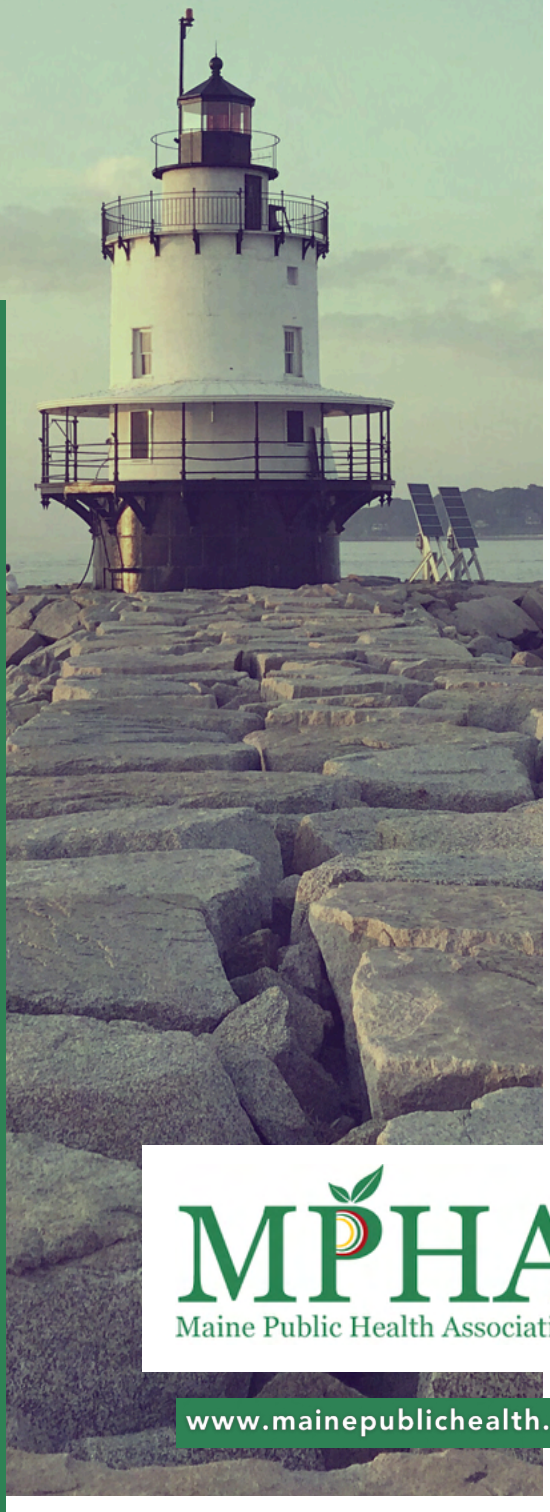
Invest in communities and put evidence-based policy solutions in place to reduce cancer rates in Maine.



Reducing Maine's Cancer Burden

A CANCER PREVENTION POLICY TOOLKIT

2025

MPHA
Maine Public Health Association

www.mainepublichealth.org

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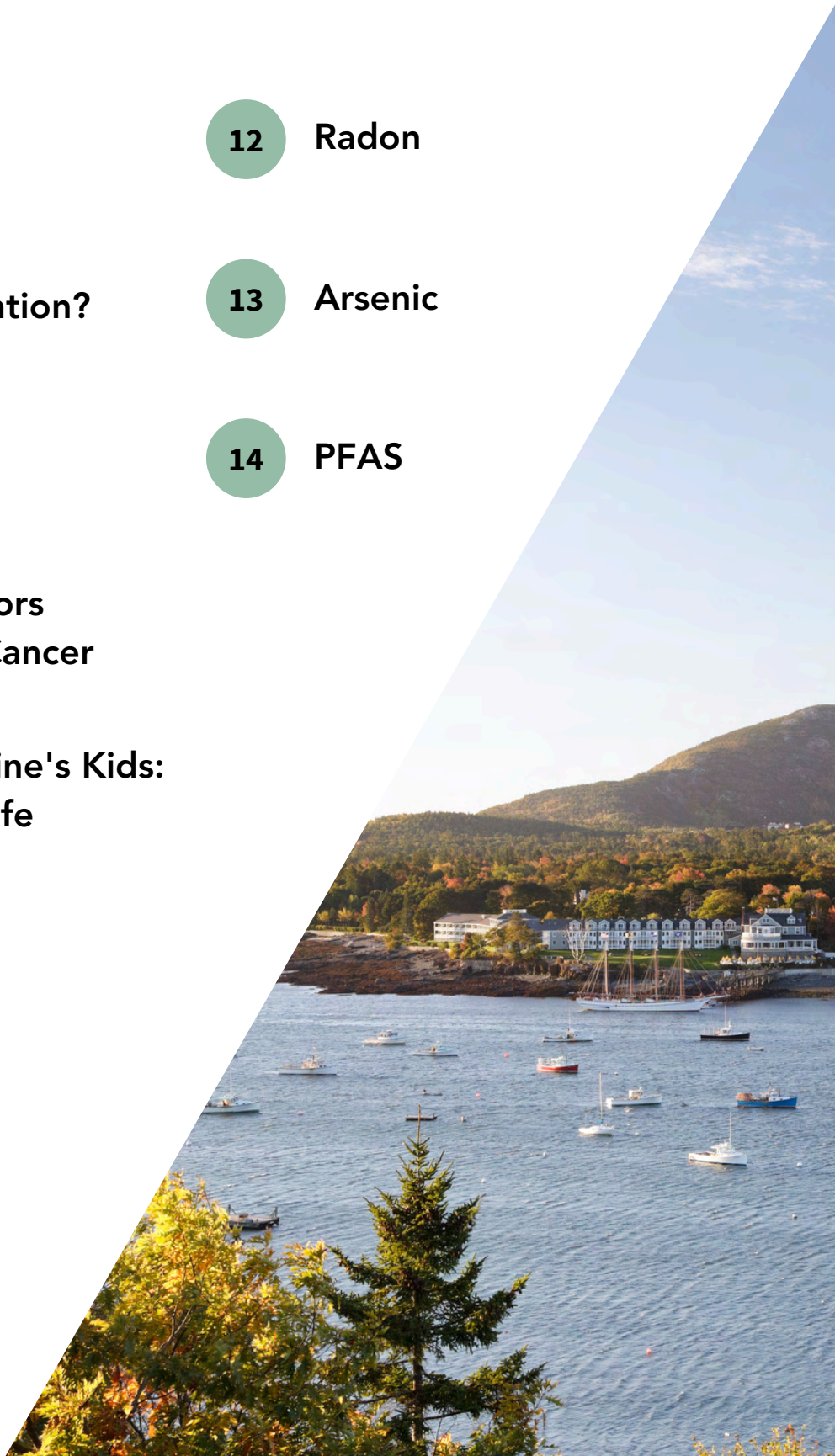


Maine has a cancer problem

Maine's often described as a big "small town." Our communities are tight knit, some families have lived here for generations; others have come more recently and quickly worked themselves into the fabric of the state. In such a close environment, we share each other's joys, and sorrows.

Most people in Maine have had a loved one who has been diagnosed with cancer. Maybe it was your spouse, a friend, or a neighbor.

1 in 3 Mainers will face a cancer diagnosis in their lifetime.

Our state has the highest overall cancer rate in New England, and cancer is the leading cause of death in Maine.

Maine also has unique challenges as the most rural state in the country. Most cancer treatment facilities are concentrated in southern Maine, in some cases more than 100 miles from patients who live in rural counties. Washington and Somerset Counties – which have the highest rates of deaths from cancer in Maine – don't have a single oncology practice (2024).

Why do we have such high rates of cancer in Maine, especially compared to the rest of New England?

It's a combination of factors:

Maine has the highest rate of adult smoking in the region, and high rates of exposure to carcinogens in the environment, like radon, arsenic and PFAS, and higher rates of obesity compared to the national average –

all of which are risk factors for cancer.

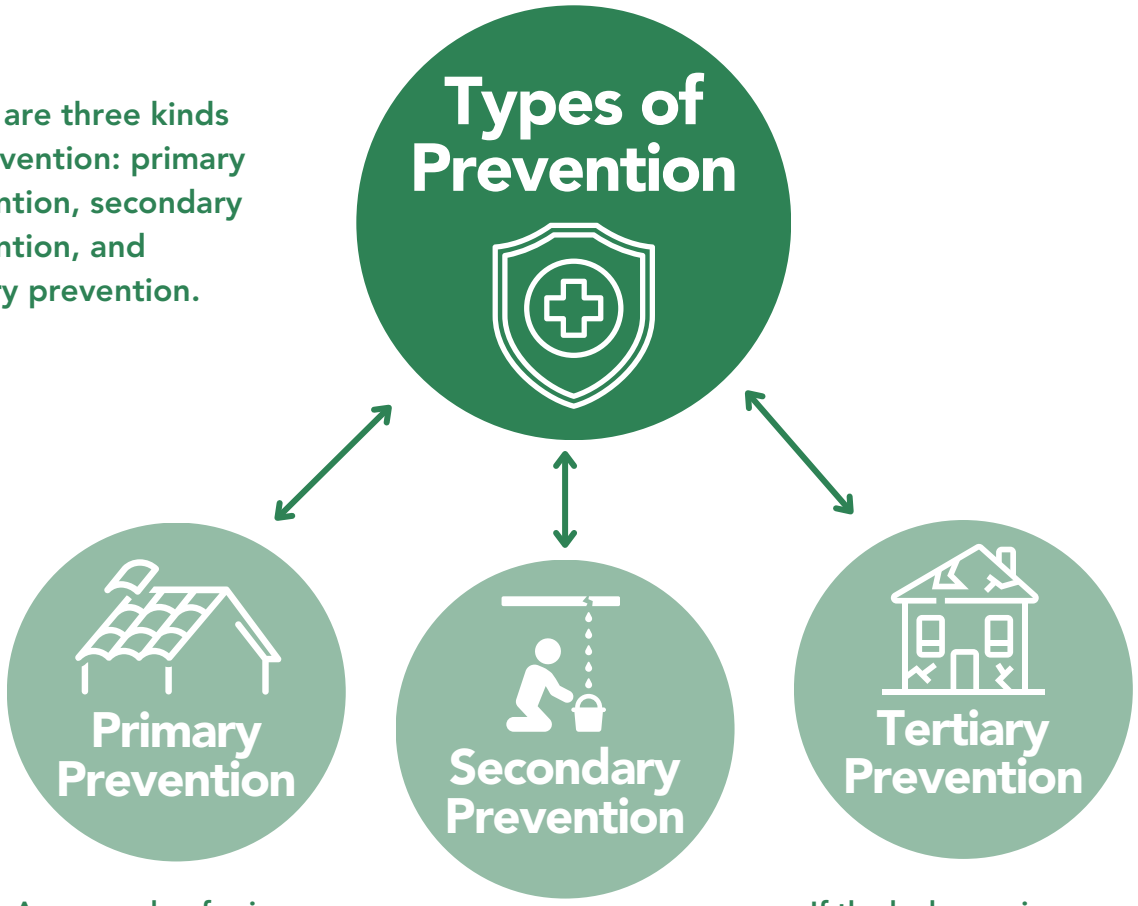
The Solution:

Invest in communities and put evidence-based policy solutions in place to reduce cancer rates in Maine.

An ounce of prevention is worth a pound of cure: But, what is prevention?

Think about taking care of a house. If your roof falls into disrepair, eventually, you'll spring a leak. And if the leak goes on too long, you could end up with a mold problem. And if that goes on too long, you'll have an even bigger, more expensive problem on your hands.

There are three kinds of prevention: primary prevention, secondary prevention, and tertiary prevention.



An example of primary prevention would be securing your roof from leaks before any problems occur.

If your roof does leak, then secondary prevention would be catching the leak early and fixing it before the problem gets worse.

If the leak remains unaddressed and a mold problem develops, you'll need to undergo a more significant investment to get rid of the mold and fix the roof – that's tertiary prevention.

In this report, we focus mostly on primary prevention strategies to reduce the likelihood that someone will get cancer. That's because oftentimes it's not individual choices that play the biggest part in whether someone has good health or bad health, it's the communities they live within that make it either easier or harder to live a healthy life.

Investing in Community

Smoking cigarettes is the single largest contributor to lung cancer – the leading cause of cancer deaths in Maine – and alcohol use is increasingly linked to several different cancers. Preventing youth tobacco and alcohol use should be top of mind for Maine's policymakers. Much of that effort starts with investing in communities.

Whether a young person has a strong connection to their community plays a big part in whether they'll use substances like tobacco or alcohol. Yet, according to the 2023 Maine Integrated Youth Health Survey (MIYHS), half of Maine high schoolers feel like they don't matter to their communities.

That lack of "mattering" is an alarm bell and a future indicator of a young person's likelihood to use substances, and their mental health. There's a clear need to invest in community infrastructure, which can help strengthen social ties, reduce substance use, and in the long run, prevent cancer.

Research shows that if a young person has a stable family life, positive adult role models, and teen-friendly places to go, like a skate park or rec center, then they'll be less likely to use alcohol or tobacco.

Policies that prioritize and invest in community infrastructure can help build these kinds of positive social spaces and supports.

Reducing Risk Factors That Can Lead to Cancer

We'll focus on six factors that contribute to cancer risk in this report:

Substance Use

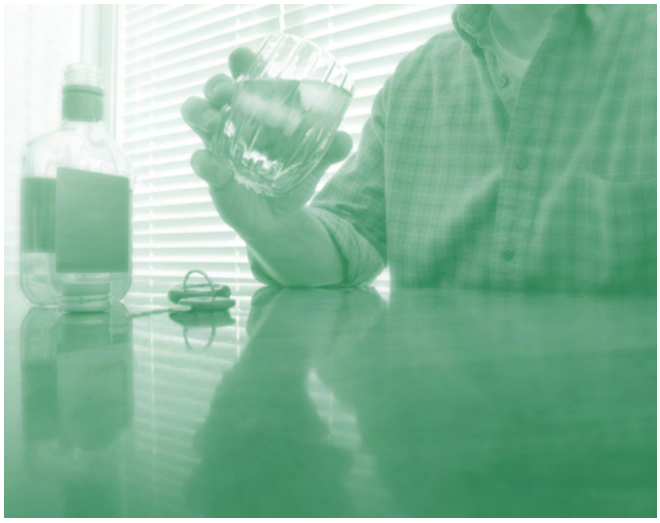
Tobacco

Tobacco use is the leading cause of preventable cancer diagnoses and cancer deaths in the United States. It has been linked to 40% of cancer diagnoses, including 11 types of cancer across the entire body. There is no safe level of exposure to tobacco. If no one in the United States smoked tobacco, 1 out of every 3 cancer deaths would be prevented.

Alcohol

Alcohol consumption is the third leading preventable cause of cancer in the United States, after tobacco and obesity. Alcohol increases the risk of seven types of cancer, including breast, colorectum, esophagus, voice box, liver, mouth, and throat; accounting for 3.5% of cancer deaths each year (or about 20,000 deaths).

How does alcohol increase cancer risk? It all comes down to abnormal cell growth. When DNA is damaged, a cell can begin to grow uncontrollably and create a cancerous tumor. Alcohol consumption increases inflammation and the production of chemicals that can damage your DNA.



Weight Status

Obesity is a chronic disease and is the second leading cause of 13 preventable types of cancer, including esophageal, breast, colorectal, gallbladder, stomach, kidney, pancreatic, thyroid, and liver.

Being overweight or having obesity is associated with long-term inflammation and high levels of insulin, insulin-like growth factors, and sex hormones that can cause cell damage and increase cancer risk. The more excess weight a person has, and the longer they maintain that heavier weight, the greater the risk of cancer.

Environment

Radon

Radon is the leading cause of lung cancer in non-smokers and responsible for about 21,000 lung cancer deaths each year. When you breathe in radon, its radioactive decay products can get trapped in your lungs. Over time, these radioactive materials increase the risk of lung cancer. It may take years before health problems appear. Tobacco use exacerbates the health risks of radon exposure, such that people who smoke and are exposed to radon have 10x greater risk of developing lung cancer from radon exposure compared with people who do not smoke and are exposed to the same radon levels. Maine homes have higher than average levels of radon with nearly 40% of homes having a high level due to the state's geology.

Arsenic

Arsenic exposure has been associated with increased risk of lung, bladder, and skin cancer. Arsenic comes in two forms: organic and inorganic. The inorganic form is more toxic than the organic form. People in the general population may be exposed to arsenic by smoking tobacco, being around tobacco smoke, drinking contaminated water, or eating food from plants that were irrigated with contaminated water. Inorganic arsenic is naturally present at high levels in the groundwater of certain countries, including the United States. Exposure to arsenic in contaminated drinking water is generally thought to be more harmful to human health than exposure to arsenic in contaminated foods. High levels of arsenic have been found in well water across Maine.

PFAS

PFAS, or per- and polyfluoroalkyl substances, are a class of "forever chemicals" found in air, soil, surface water, and groundwater (including drinking water); food and food packaging; commercial household products, and wildlife, like deer and fish, which have accumulated PFAS over time. PFAS remain in the body for prolonged periods of time (anywhere from months to years). PFAS contamination has been identified in well-water sources and farm fields across the state of Maine, increasing residents' risk of exposure. Half of people in Maine access water from private, residential wells.

PFAS are associated with significant health issues, including altered metabolism and fertility, reduced fetal growth, and increased risk of being overweight or developing obesity. PFAS exposure has also been associated with several chronic health problems, including increased cholesterol levels, liver dysfunction, and increased risk of testicular, thyroid and kidney cancers.

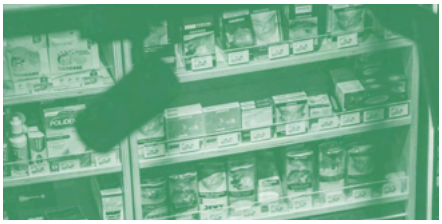
Illustration by Elizabeth Beier of Illustrating Progress

Tobacco use is the leading preventable cause of cancer and cancer deaths in the United States.

Tobacco use causes 20% of cancer diagnoses, including 11 types of cancer across the body, and 30% of cancer deaths in the U.S. In other words, if no one in the U.S. smoked tobacco, 1 out of every 3 cancer deaths would be prevented. 95% of adult smokers start before the age of 21 years, so preventing youth tobacco use is a priority for preventing cancer.

Policy: End the sale of flavored tobacco products.

After New York City's flavored tobacco ban, researchers found that teens had 37% lower odds of ever trying flavored tobacco products, and 28% lower odds of using any type of tobacco product.[1]



Policy: Increase the tax on cigarettes and other tobacco products.

Every 10% increase in the real price of cigarettes is associated with a 6-10% decrease in youth smoking rates.[2]

Policy: Limit the density of outlets that sell tobacco products.

A study of 10 different California neighborhoods found that youth living in areas with greater tobacco retailer density were nearly 1.5x more likely to use tobacco products, including e-cigarettes and nicotine pouches, than youth in neighborhoods with fewer tobacco retailers.[3]

Policy: Restrict public consumption of tobacco.

Curbing tobacco use on town main streets as well as at community events such as fairs, festivals, and farmers markets encourages positive behavioral modeling for children.

[1] Farley SM, Johns M. New York City flavored tobacco product sales ban evaluation. *Tobacco Control*. 2017;26(1):78-84.
[2] Association of State and Territorial Health Officials. Taxation strategies to reduce tobacco use. 2019. https://www.astho.org/topic/brief/taxation-strategies-to-reduce-tobacco-use
[3] Abdel Magid HS, Halpern-Felsher B, Ling PM, Bradshaw PT, Mujahid MS, Henriksen L. Tobacco retail density and initiation of alternative tobacco product use among teens. *J Adolesc Health*. 2020 Apr;66(4):423-430.

Weight Status

Obesity is the second leading preventable cause of cancer in the United States.

Policy: Fund chronic disease prevention and treatment programs.

The Return-On-Investment for chronic disease prevention programs in Maine is $7.52 in economic output and $5.60 in health care savings for every $1.00 invested. Implementing evidence-based prevention programs will reduce some types of cancer by 2.5% within 10 to 20 years.[1]

Policy: Invest in healthy community design, including active transportation and safe places for physical activity, and engage schools, businesses and other community partners.

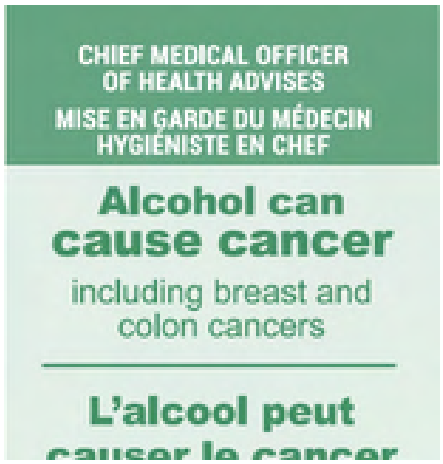
A community-wide intervention in Somerville, MA, which focused on increasing physical activity and availability of healthful foods within before-, during-, after-school, home, and community environments, resulted in the prevention of unhealthy weight gain among school-aged children. Subsequent research has shown spillover effects to adults, and long-term beneficial changes.[2]

Policy: Implement a tax on sugary drinks.

In a study of 5 US cities, researchers found that a 33.1% increase in sugar-sweetened beverage prices (92% pass-through of taxes to consumers) was associated with a 33% reduction in purchase volume, with no impact on cross-border sales, and a sustained impact months after the policy went into effect.[3]

[1] Trust for America's Health. 2009. Prevention for a Healthier America: Investments in disease prevention yield significant savings, stronger communities. https://www.tfah.org/report-details/prevention-for-a-healthier-america/.
[2] Economos CD, Hyatt RR, Goldberg JP, Must A, Naumova EN, Collins JJ, Nelson ME. A community intervention reduces BMI z-score in children: Shape Up Somerville first year results. *Obesity*. 2007;15(5):1325-36.
[3] Kaplan S, White JS, Madsen KA, Basu S, Villas-Boas SB, Schillinger D. Evaluation of changes in prices and purchases following implementation of sugar-sweetened beverage taxes across the US. *JAMA Health Forum*. 2024;5(1):e234737.

Alcohol consumption is the third leading preventable cause of cancer in the United States.



Policy: Clear packaging for age-restricted alcohol products, including a cancer warning label.

Several studies have found that adding a warning label about cancer on alcoholic beverages is effective at educating the public about cancer risk associated with alcohol consumption; however, to date, industry influence has prevented widespread adoption of this prevention policy. The warning label should be conspicuously placed and message-tested for effectiveness.[1,2]

Policy: Increase the liquor sales tax.

The Maine sales tax for alcohol has not been raised in 25 years. Research shows this is an effective strategy for reducing alcohol consumption. The impact of the tax is proportional to the increase (the greater the tax, the greater the impact).[3]

Policy: Regulate zoning and outlet density.

Research has shown that regulating alcohol retail density may reduce excessive alcohol consumption and associated harms - particularly if it's also stratified by on-premises and off-premises consumption (e.g., restaurants vs liquor stores).[4,5]

Policy: Prohibit delivery services and reinforce defined hours of sale.

Alcohol delivery has been found to increase overall alcohol consumption, including binge drinking.[6]

[1] Hobin et al. Testing alcohol labels as a tool to communicate cancer risk to drinkers: A real-world quasi-experimental study. *J. Stud. Alcohol Drugs*. 2020;81(2):249–261.
[2] Stockwell et al. Cancer warning labels on alcohol containers: A consumer's right to know, a government's responsibility to inform, and an industry's power to thwart. J. Stud. Alcohol Drugs. 2020:81(2), 284–292.
[3] Elder RW, Lawrence B, Ferguson A, Naimi TS, Brewer RD, Chattopadhyay SK, Toomey TL, Fielding JE; Task Force on Community Preventive Services. The effectiveness of tax policy interventions for reducing excessive alcohol consumption and related harms. *Am J Prev Med*. 2010;38(2):217–29.
[4] Campbell CA, Hahn RA, Elder R, Brewer R, Chattopadhyay S, Fielding J, Naimi TS, Toomey T, Lawrence B, Middleton JC. The effectiveness of limiting alcohol outlet density as a means of reducing excessive alcohol consumption and alcohol-related harms. *Am J Prev Med*. 2009;37(6).
[5] Fliss MD et al. Measuring and mapping alcohol outlet environment density, clusters, and racial and ethnic disparities in Durham, North Carolina, 2017. *Prev. Chronic Dis*. 2021;18.
[6] Grossman ER, Benjamin-Neelon SE, Sonnenschein S. Alcohol consumption and alcohol home delivery laws during the COVID-19 pandemic. *Substance Abuse*. 2022;43(1):1141-1146.

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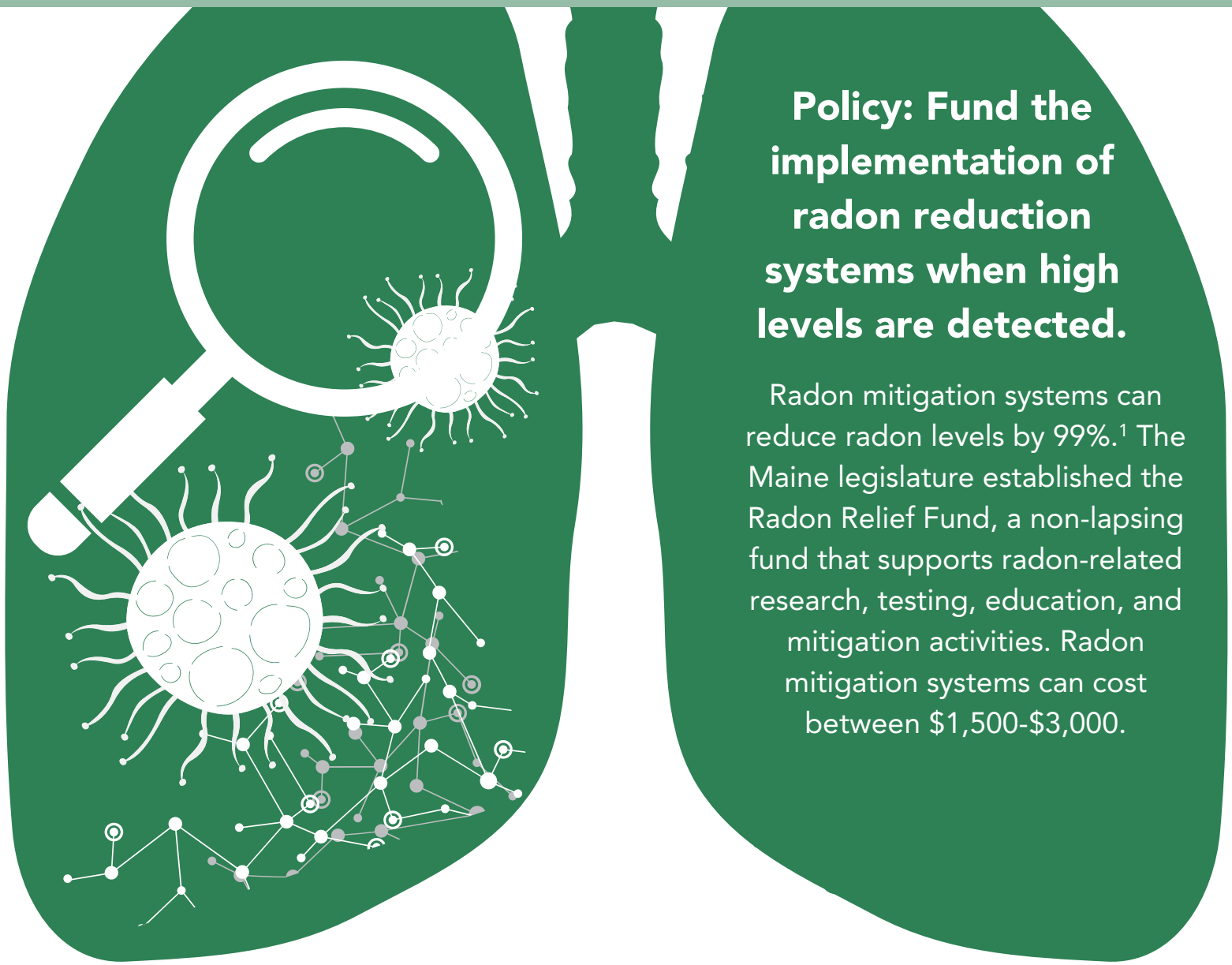

Policy: Fund the implementation of radon reduction systems when high levels are detected.

Radon mitigation systems can reduce radon levels by 99%.[1] The Maine legislature established the Radon Relief Fund, a non-lapsing fund that supports radon-related research, testing, education, and mitigation activities. Radon mitigation systems can cost between $1,500-$3,000.

[1] U.S. EPA. Consumers guide to radon reduction. 2016. https://www.epa.gov/sites/default/files/2016-12/documents/2016_consumers_guide_to_radon_reduction.pdf.

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Arsenic exposure has been associated with increased risk for lung, bladder, and skin cancer. Arsenic comes in two forms (organic and inorganic); the inorganic form is more toxic than the organic form.

People may be exposed to arsenic by smoking tobacco, being around tobacco smoke, drinking contaminated water, or eating food from plants that were irrigated with contaminated water.

Policy: Fund the implementation of arsenic mitigation systems.

In Maine, a point-of-use reverse-osmosis system reduced well water arsenic concentrations from a median of 71.7 µg/L to 0.8 µg/L and from a mean of 105 µg/L to 14.3 µg/L. More than half (53%) of the systems reduced arsenic in tested water to below 1 µg/L. Treatment systems were less likely to fail if installed by a vendor instead of a home owner. The 7-fold reduction of arsenic in the treated water reduced skin cancer risk alone from 3,765 in 1 million to 514 in 1 million.[1]

[1] Yang Q, Flanagan SV, Chillrud S, Ross J, Zeng W, Culbertson C, Spayd S, Backer L, Smith AE, Zheng Y. Reduction in drinking water arsenic exposure and health risk through arsenic treatment among private well households in Maine and New Jersey, USA. *Science of The Total Environment*;2020:738.

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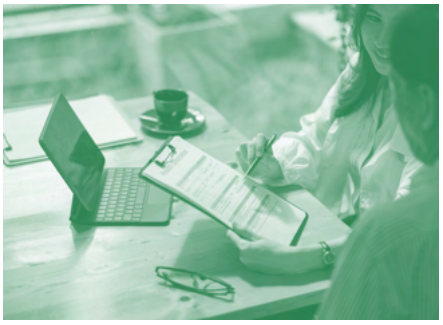

Policy: Require health insurers to cover PFAS blood serum testing.

Adverse health effects from PFAS start at blood levels between 2 and 20 ng/mL; there's an even greater risk of adverse effects at blood levels higher 20 ng/mL. Blood testing allows healthcare providers to monitor patients for negative health effects.[1]

Policy: Fund in-home testing and filtration kits.

Effective water treatment processes, such as adsorption and advanced oxidation, are effective for removing PFAS. The cost of PFAS mitigation systems ranges from $500 (under-sink filter) to $5,000 (whole house system).[2]

[1] National Academies of Sciences, Engineering, and Medicine. 2022. Guidance on PFAS exposure, testing, and clinical follow-up. Washington, DC: The National Academies Press. https://doi.org/10.17226/26156.

[2] Alazaiza MYD, Alzghoul TM, Ramu MB, Abu Amr SS, Abushammala FM. PFAS contamination and mitigation: A comprehensive analysis of research trends and global contributions. *Case Studies in Chemical and Environmental Engineering*. 2025;11.

Invest in communities and put evidence-based policy solutions in place to reduce cancer rates in Maine.

This policy toolkit was compiled by Maine Public Health Association and supported by Maine Cancer Foundation.

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