RADON AND LUNG CANCER: A Hidden Risk

Addressing the Second Leading Cause of Lung Cancer

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DISCLOSURE SLIDE

Faculty

Dr. Alison Wallace

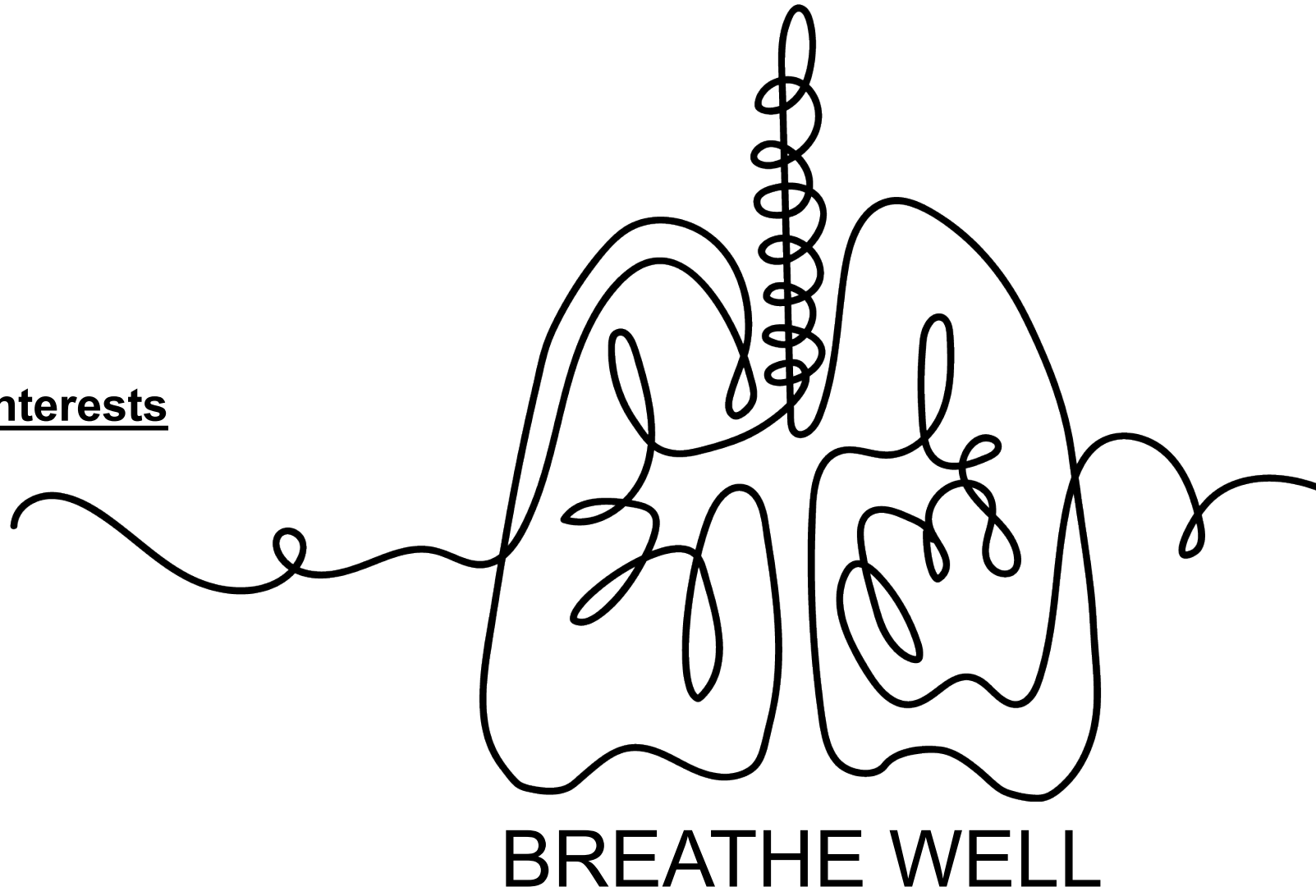
Relationships with financial interests

Honoraria

AstraZeneca
Bristol Myers Squibb
Merck

Advisory Boards

AstraZeneca
Bristol Myers Squibb
LungNSPEI



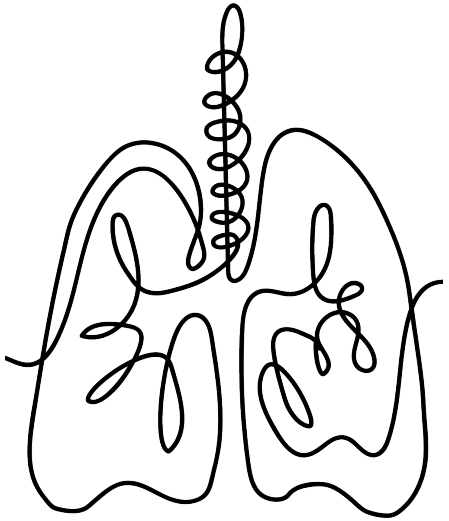
VANCOUVER

West Coast of Canada
Pacific Ocean

HALIFAX

East Coast of Canada
Atlantic Ocean

VANCOUVER



HALIFAX

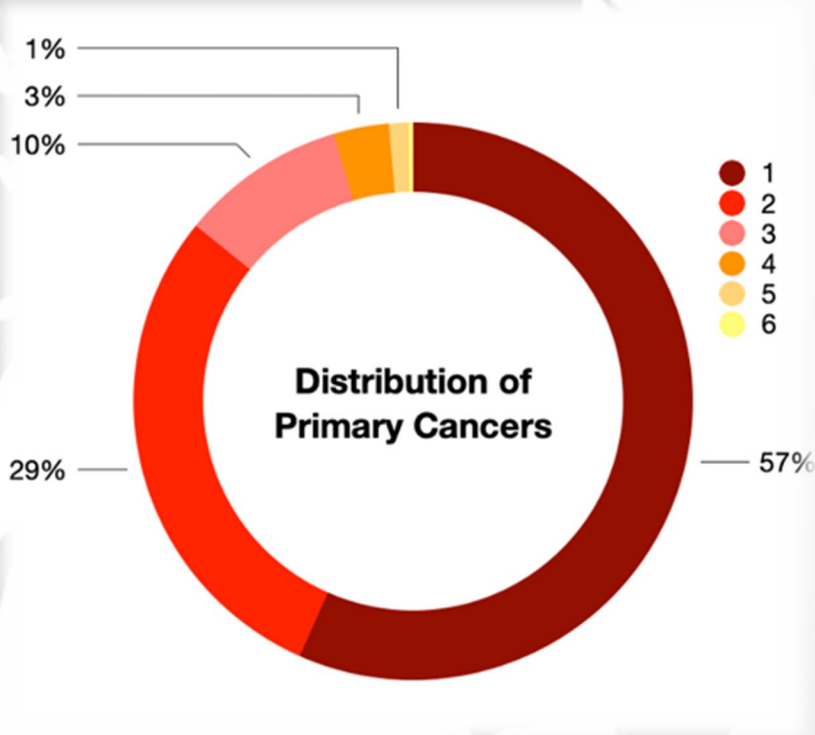
CANCER CRISIS IN NOVA SCOTIA

Lung cancer is Nova Scotia's #1 cause of cancer death.

Nova Scotia has some of the highest incidences of lung cancer in the country.

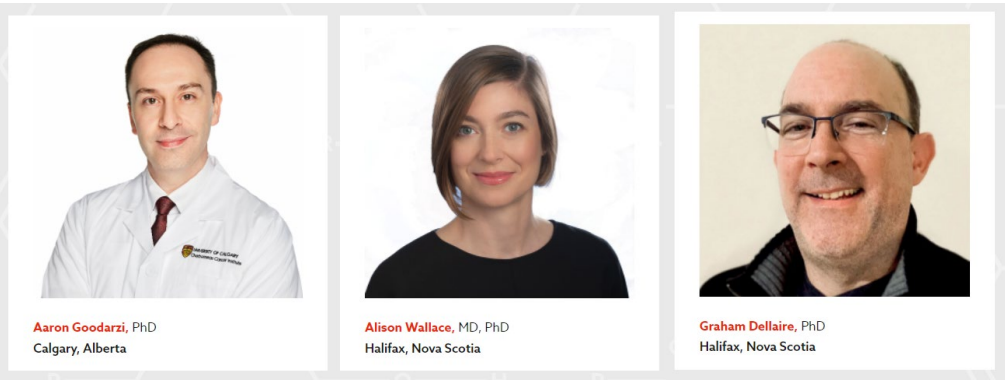
Nova Scotia has the worst lung cancer outcomes in the country.

43% of patients have multiple primary cancers.



43% MULTIPLE PRIMARIES

SOMETHING IN THE AIR AND WATER: Studying the cancer predisposing genetic and environmental factors that underlie the high lung cancer rates in Atlantic Canada and the emergence of Atlantic Cancer Syndrome.



Aaron Goodarzi, PhD
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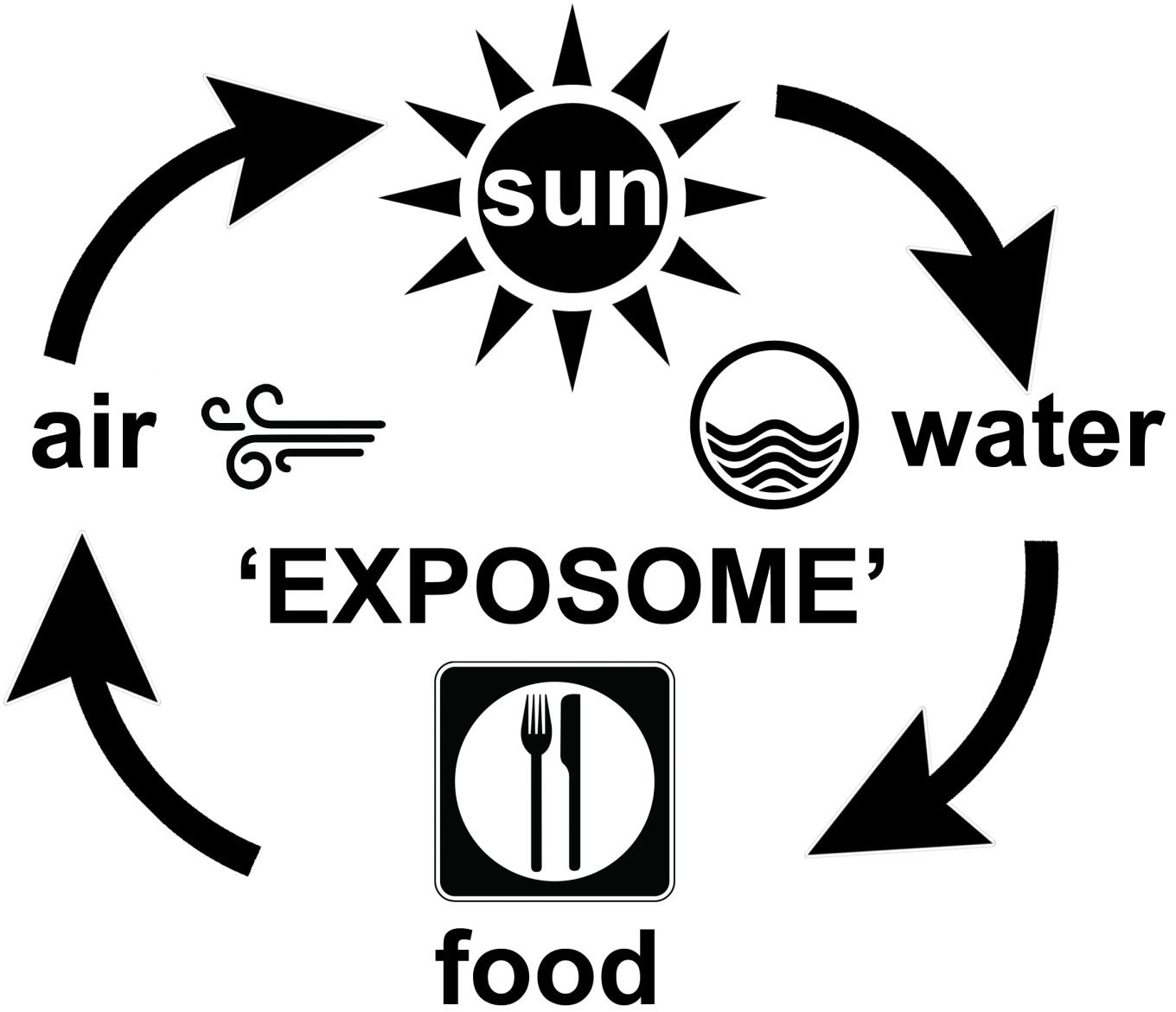
Halifax, Nova Scotia

ÉTUDE NATIONALE
EVICT RADON
NATIONAL STUDY



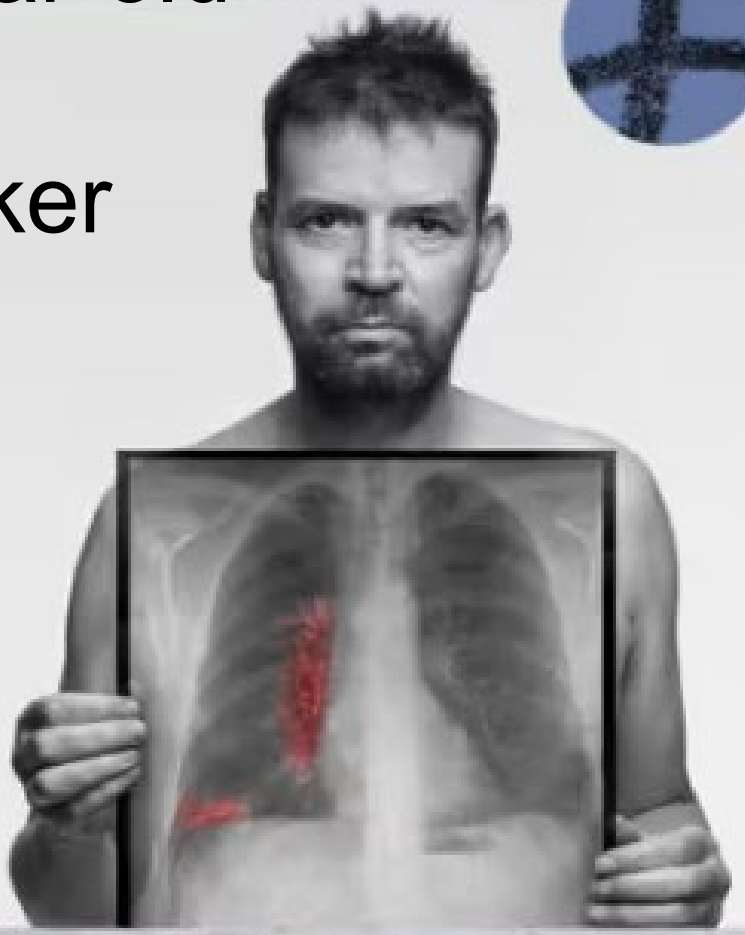
A PATIENT STORY

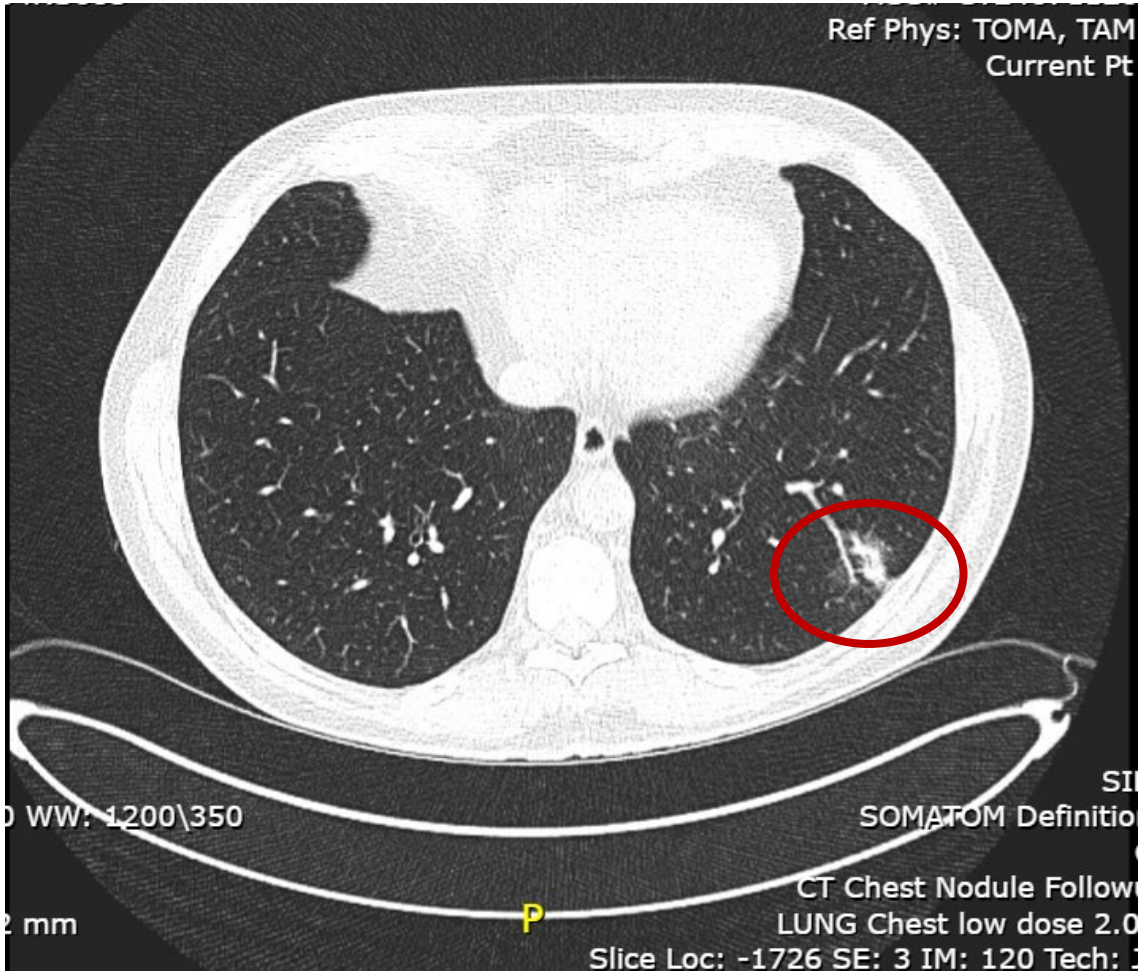
Healthy 50-year-old

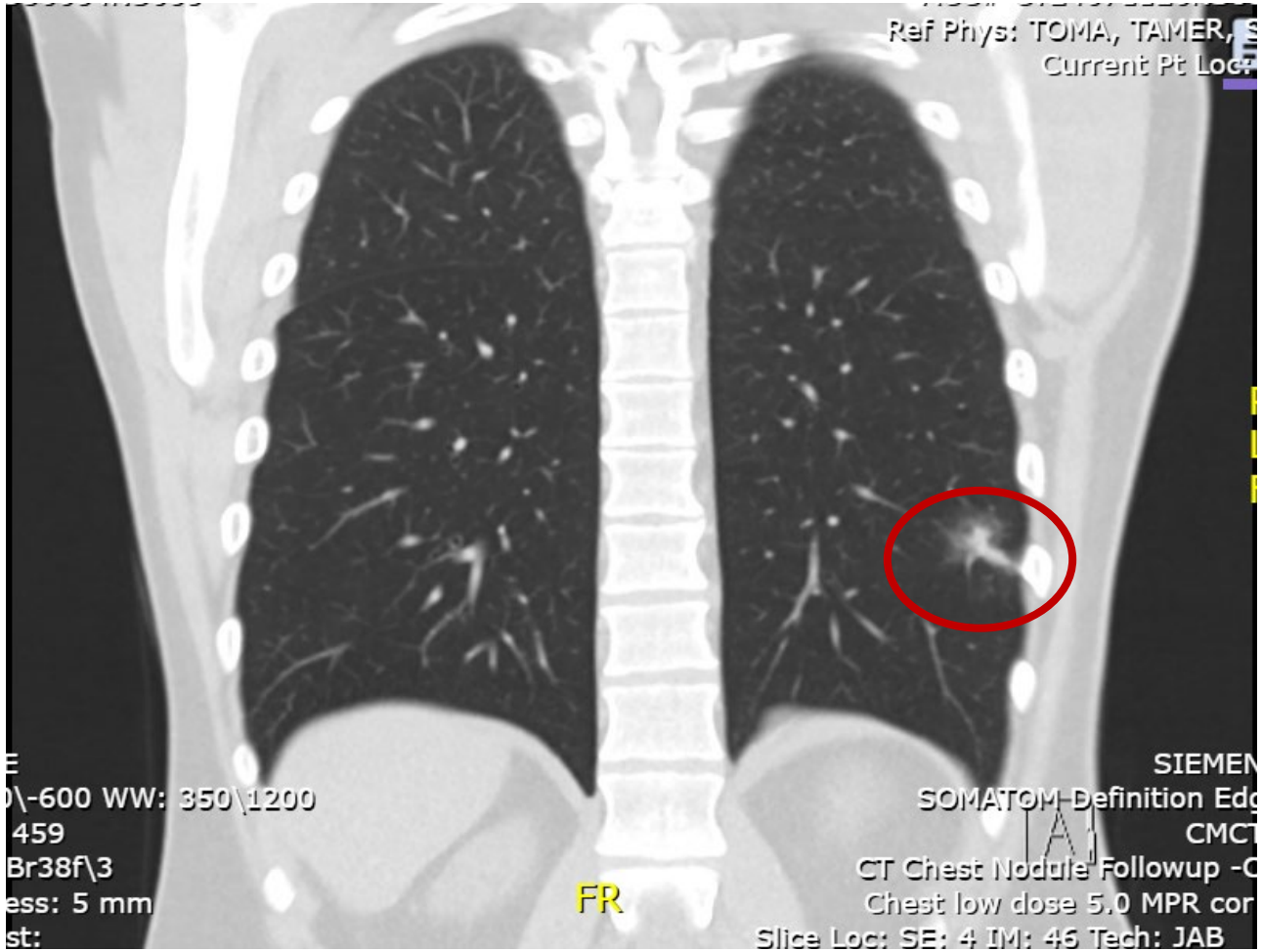
Never smoker

Fell off a horse

“Scar” left lung





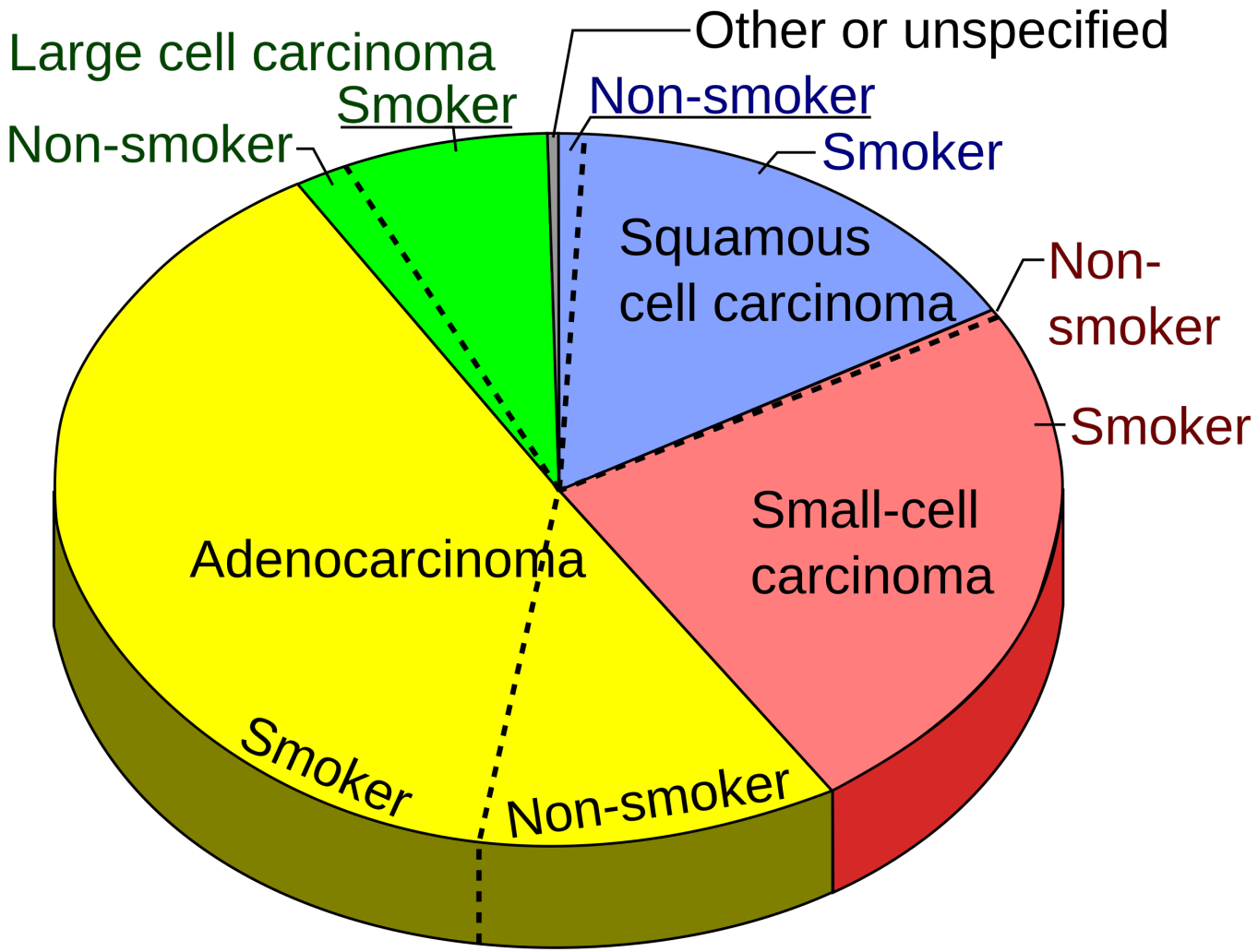


CT chest findings:

- Irregular subpleural curvilinear parenchymal density
- Measuring 2.5 x 1.4 cm left lower lobe
- Suspected to be post-inflammatory scarring

TYPES OF LUNG CANCER

Lung biopsy
Adenocarcinoma

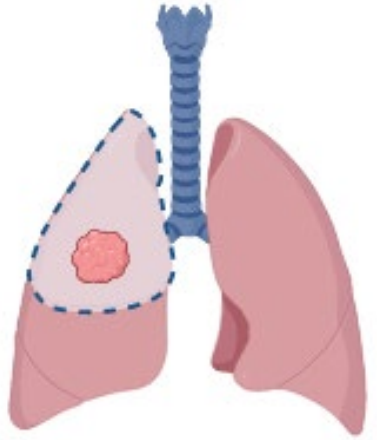


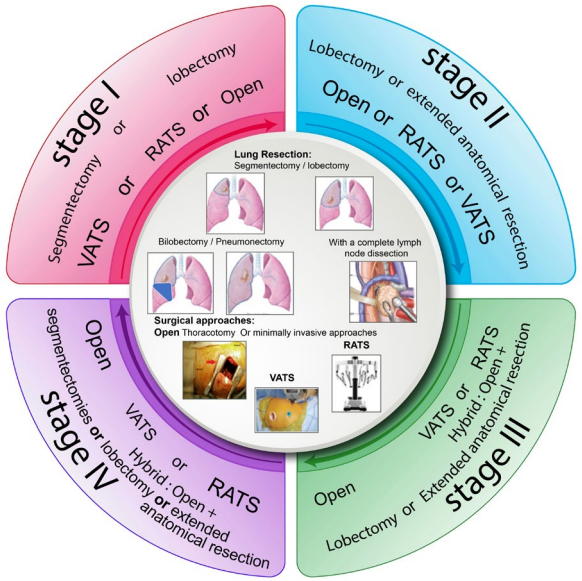
DIAGNOSIS

Stage 1 lung cancer
Adenocarcinoma

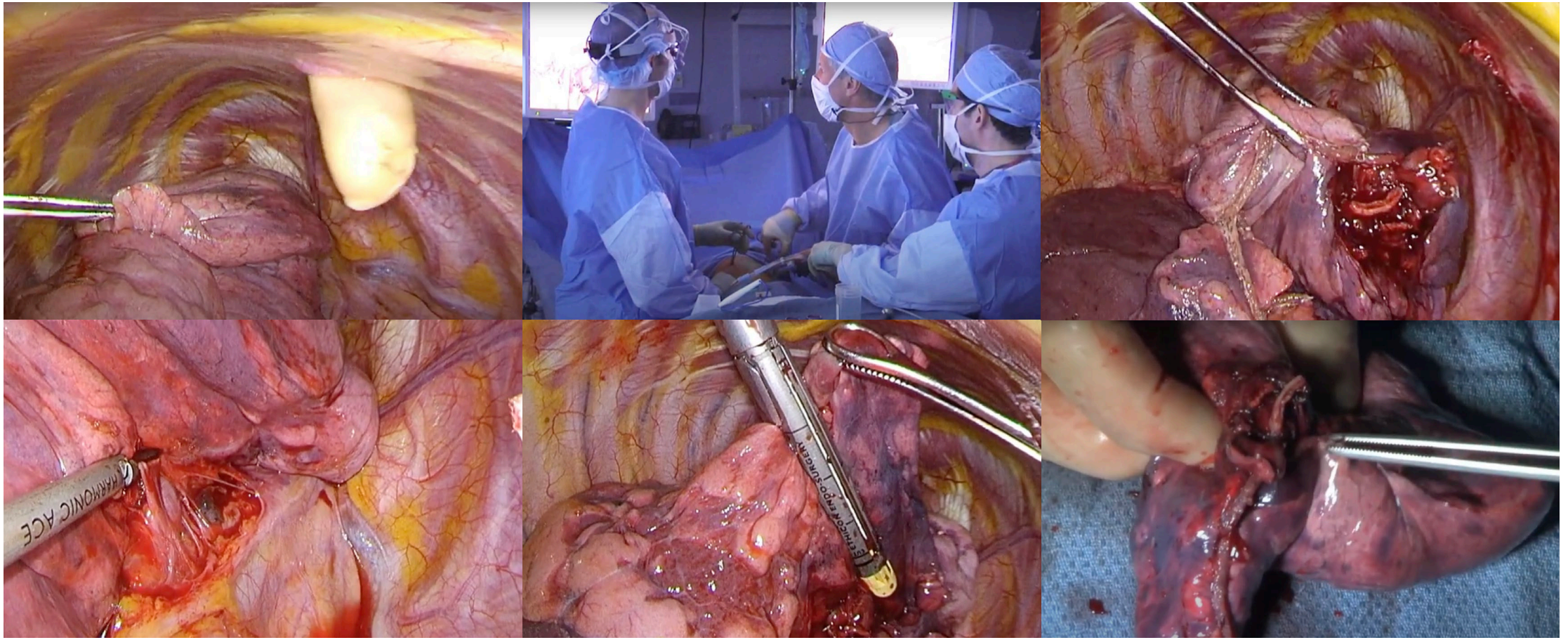
TREATMENT

Surgical resection
VATS lobectomy





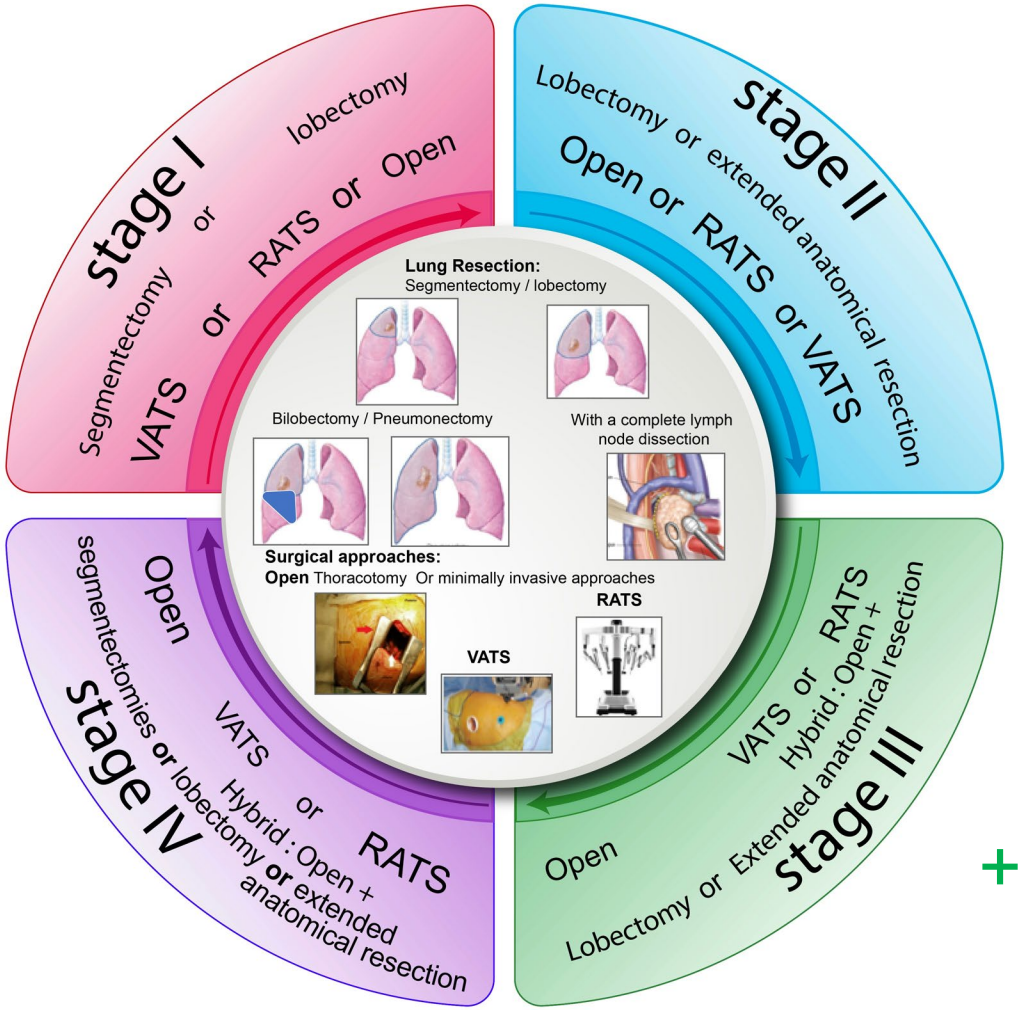
SURGERY FOR LUNG CANCER: VATS LOBECTOMY



LUNG CANCER DIAGNOSIS & TREATMENT BY STAGE

SURGERY

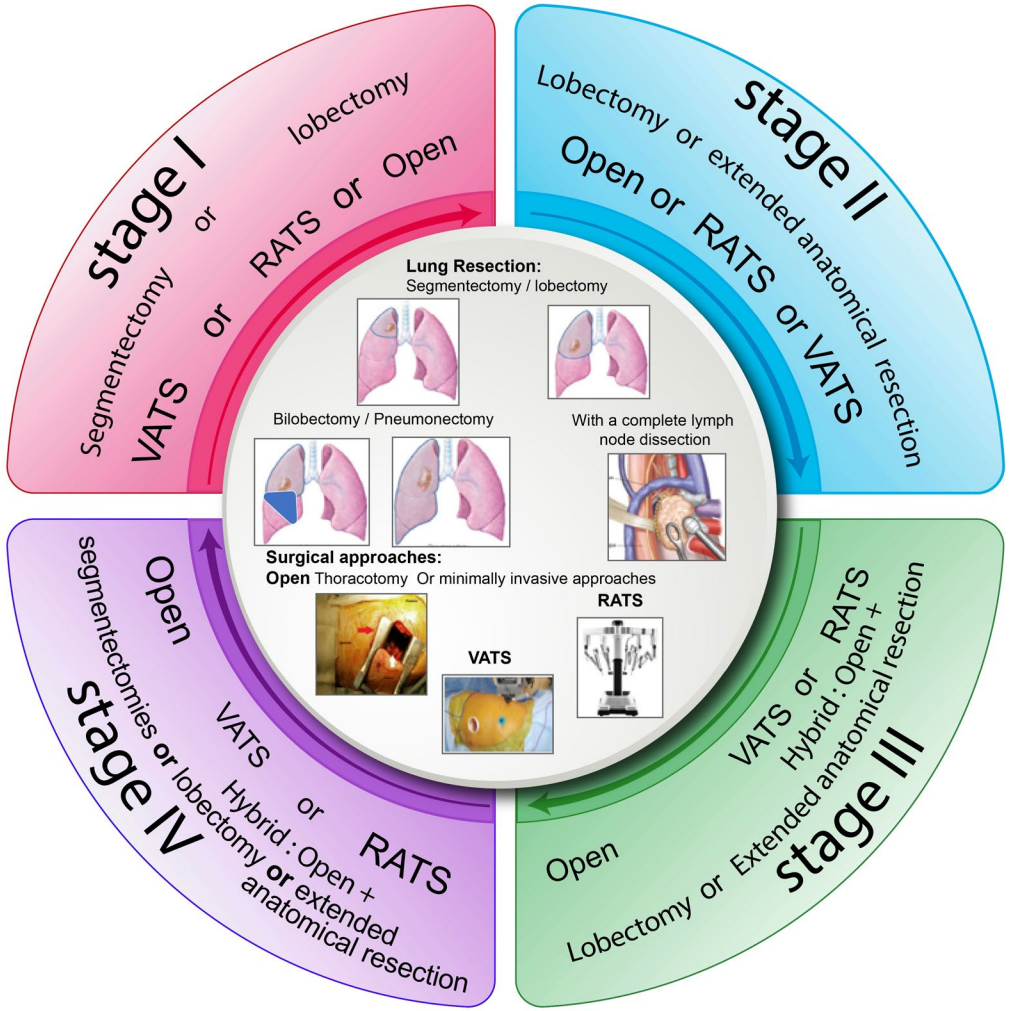
SURGERY
followed by
CHEMOTHERAPY

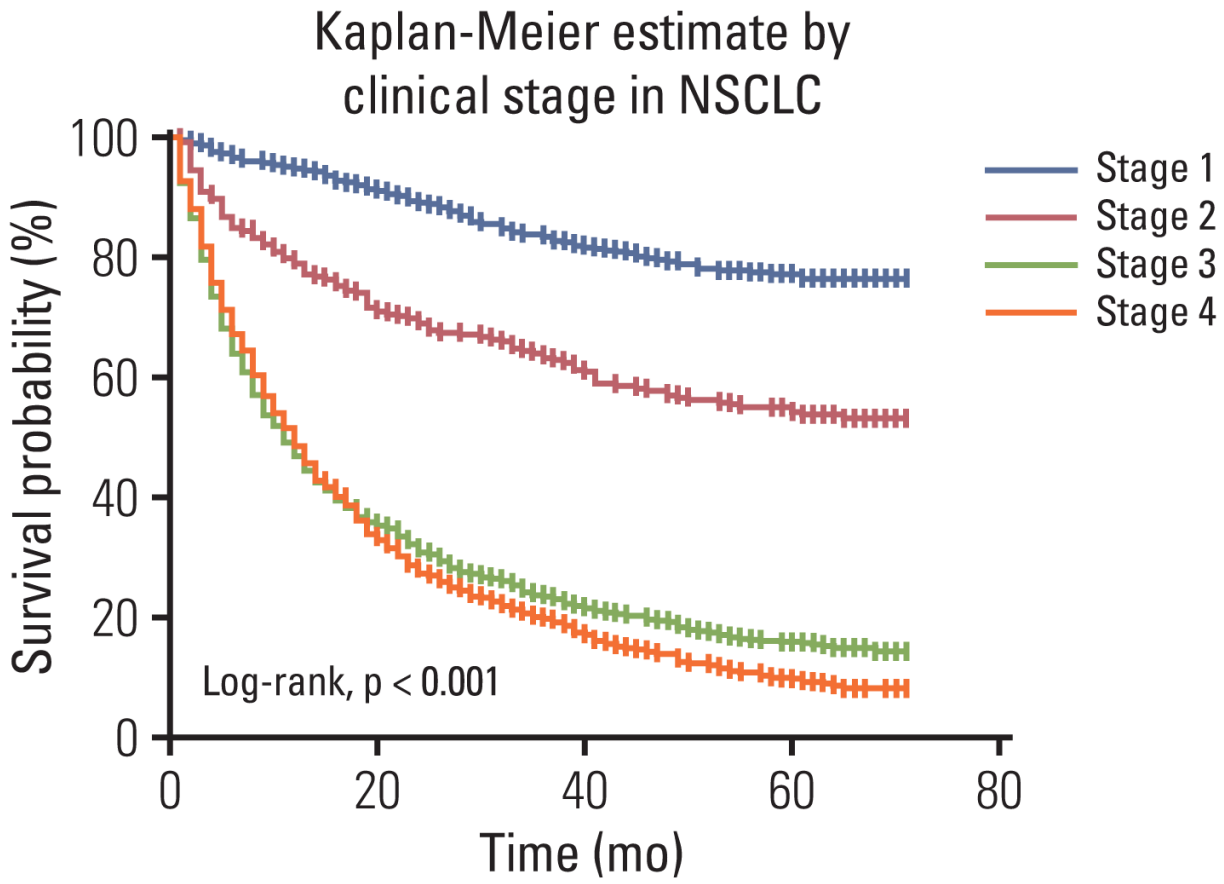


PALLIATIVE
TREATMENTS

CHEMOTHERAPY
+ IMMUNOTHERAPY
followed by
SURGERY

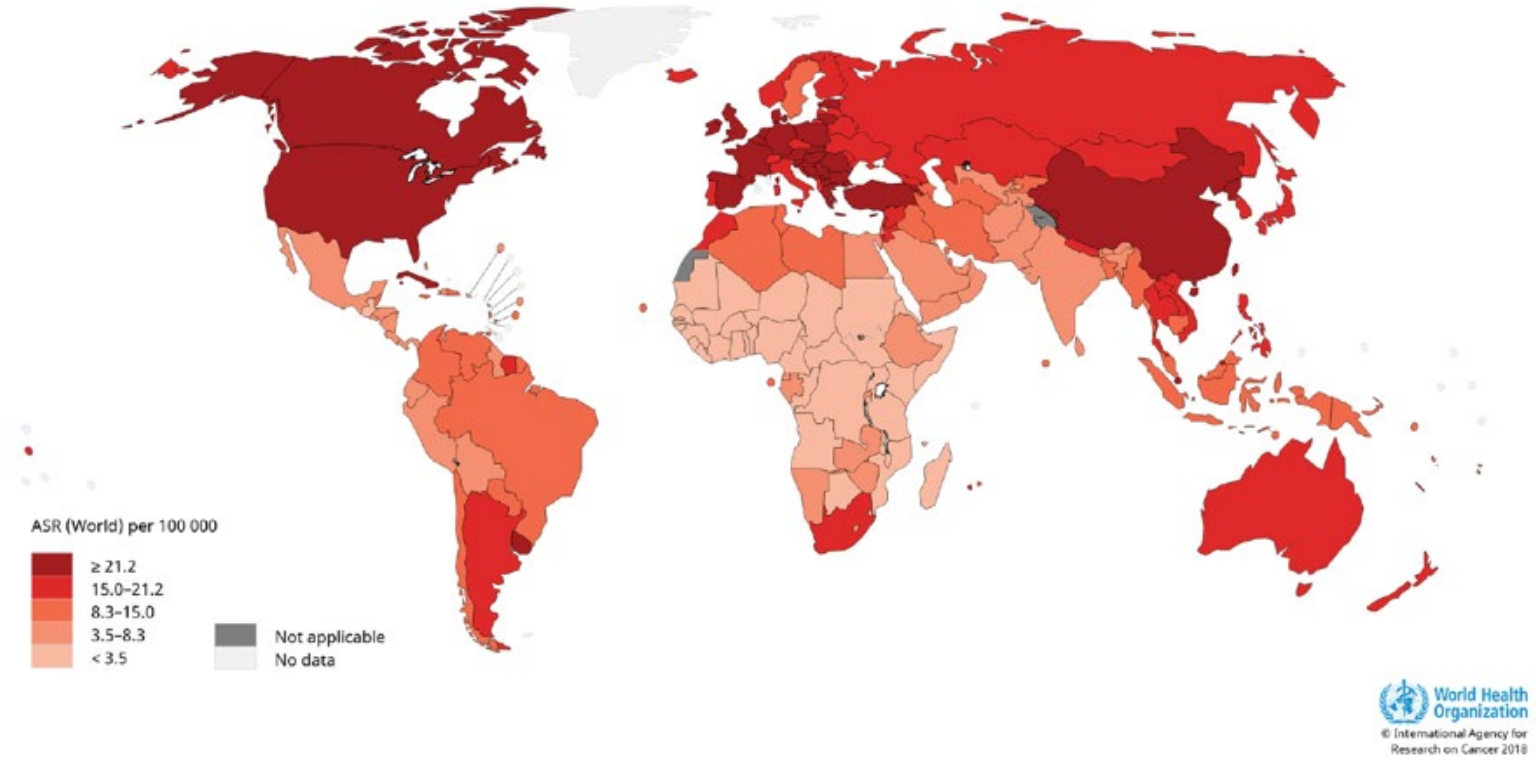
LUNG CANCER SURVIVAL BY STAGE





GLOBAL LUNG CANCER CRISIS

Image C Estimated age-standardized mortality rates (ASMR) for lung cancer, both sexes, all ages, World, 2018



LUNG
CANCER
is the number
1
CANCER KILLER
in the USA

killing more people than breast, colon, pancreas & prostate cancers combined.

Each year, close to
160,000
people die of
LUNG CANCER

More than
2/3
of people diagnosed with lung cancer have never smoked or are former smokers

In the last 35 years, the lung cancer rate has fallen

21% among MEN

while increasing

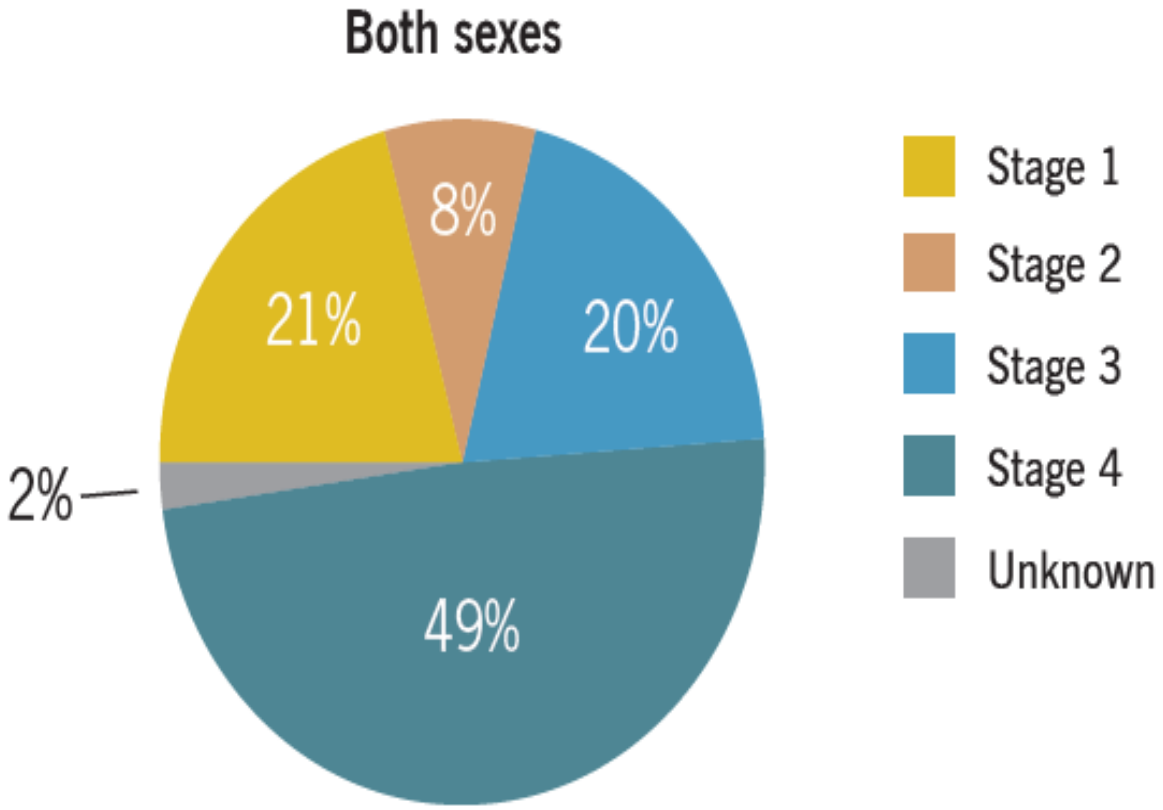
116% among WOMEN

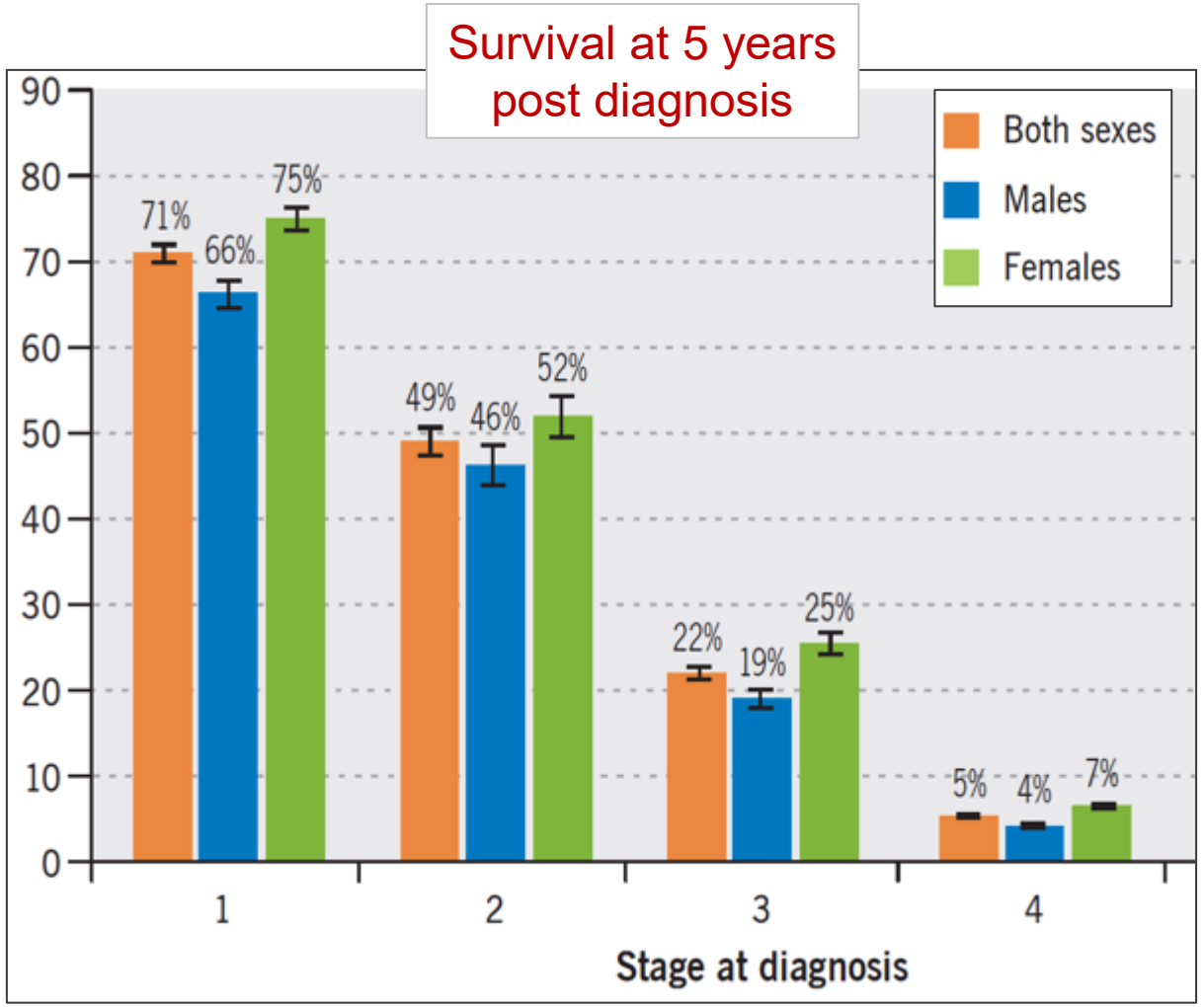
Only
15%
of lung cancer cases are currently found in the early stages, when the survival rate is
53.5%
Most lung cancer cases aren't diagnosed until later stages, when the survival rate is only
3.9%

Source: http://www.lung.org/

AMERICAN LUNG ASSOCIATION.
Fighting for Air

LUNG CANCER DIAGNOSED LATE





Analysis by: Centre for Population Health Data, Statistics Canada

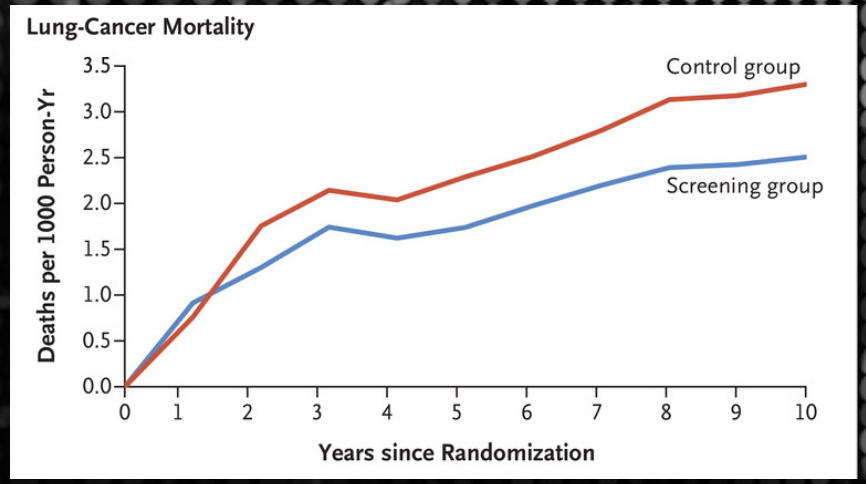
Data source: Statistics Canada, Canadian Cancer Registry database (1992–2016)

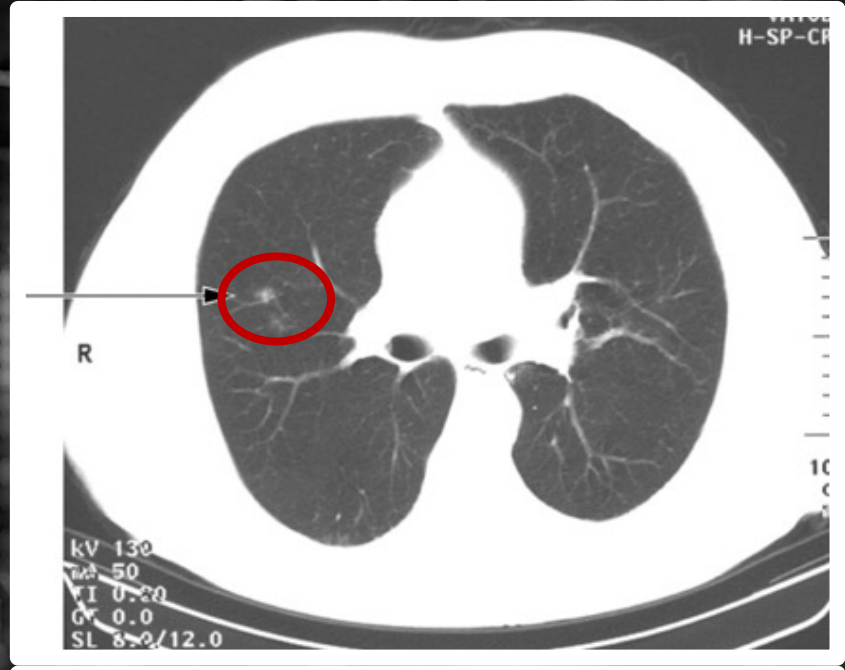
The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 AUGUST 4, 2011 VOL. 365 NO. 5

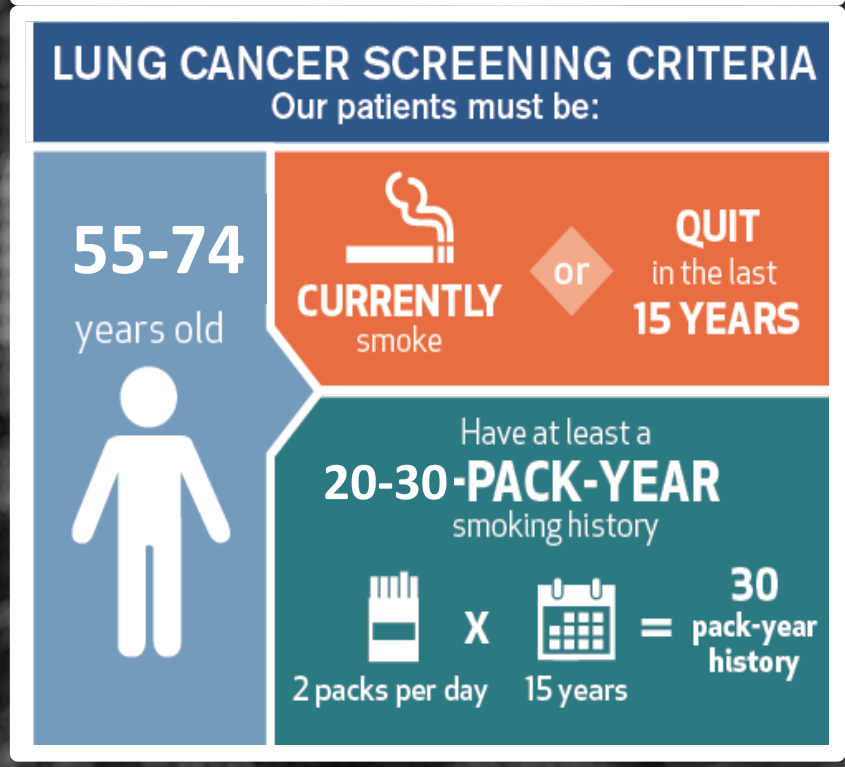
Reduced Lung-Cancer Mortality with Low-Dose Computed Tomographic Screening

The National Lung Screening Trial Research Team*



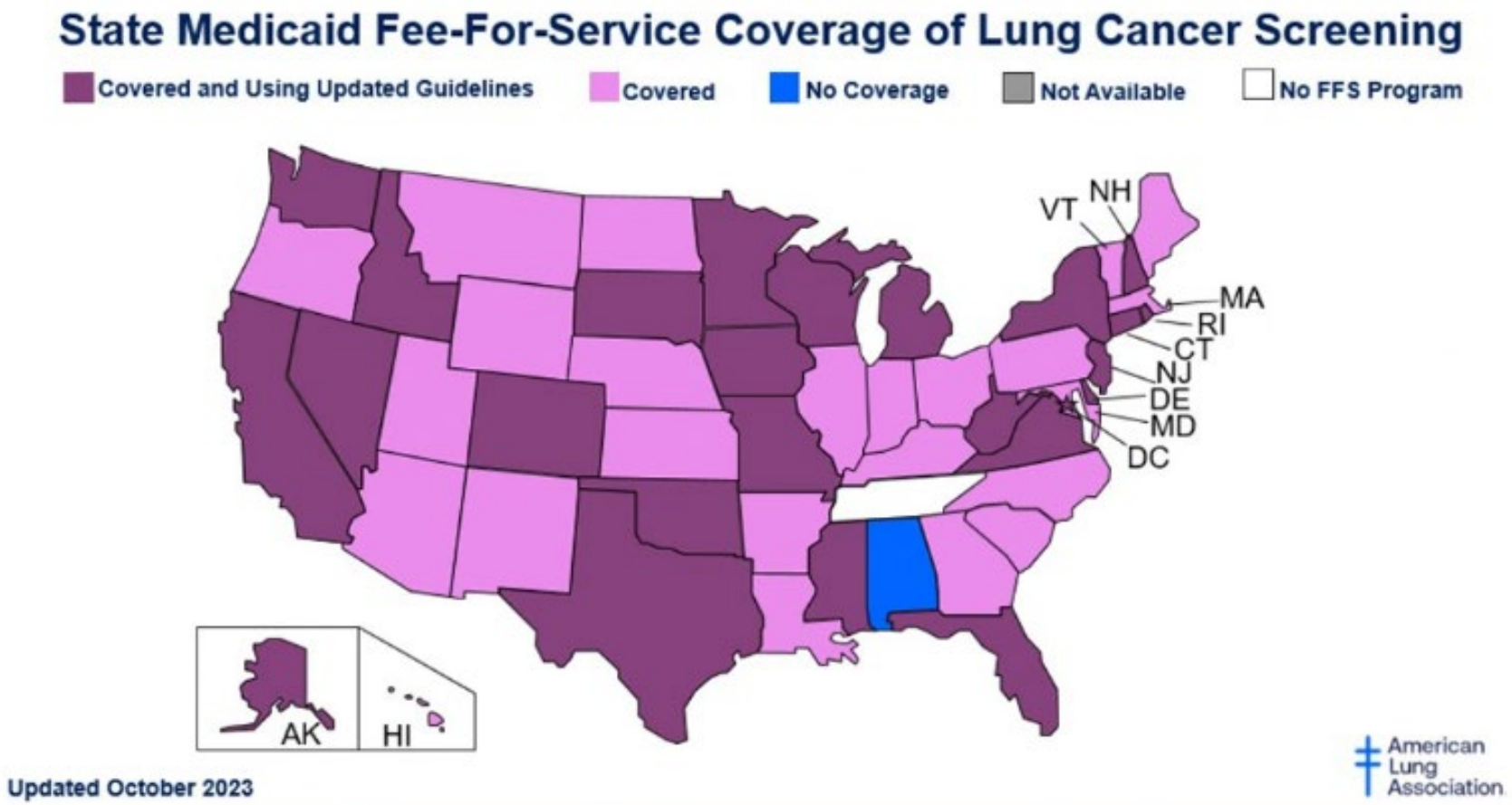


Lung Cancer SCREENING

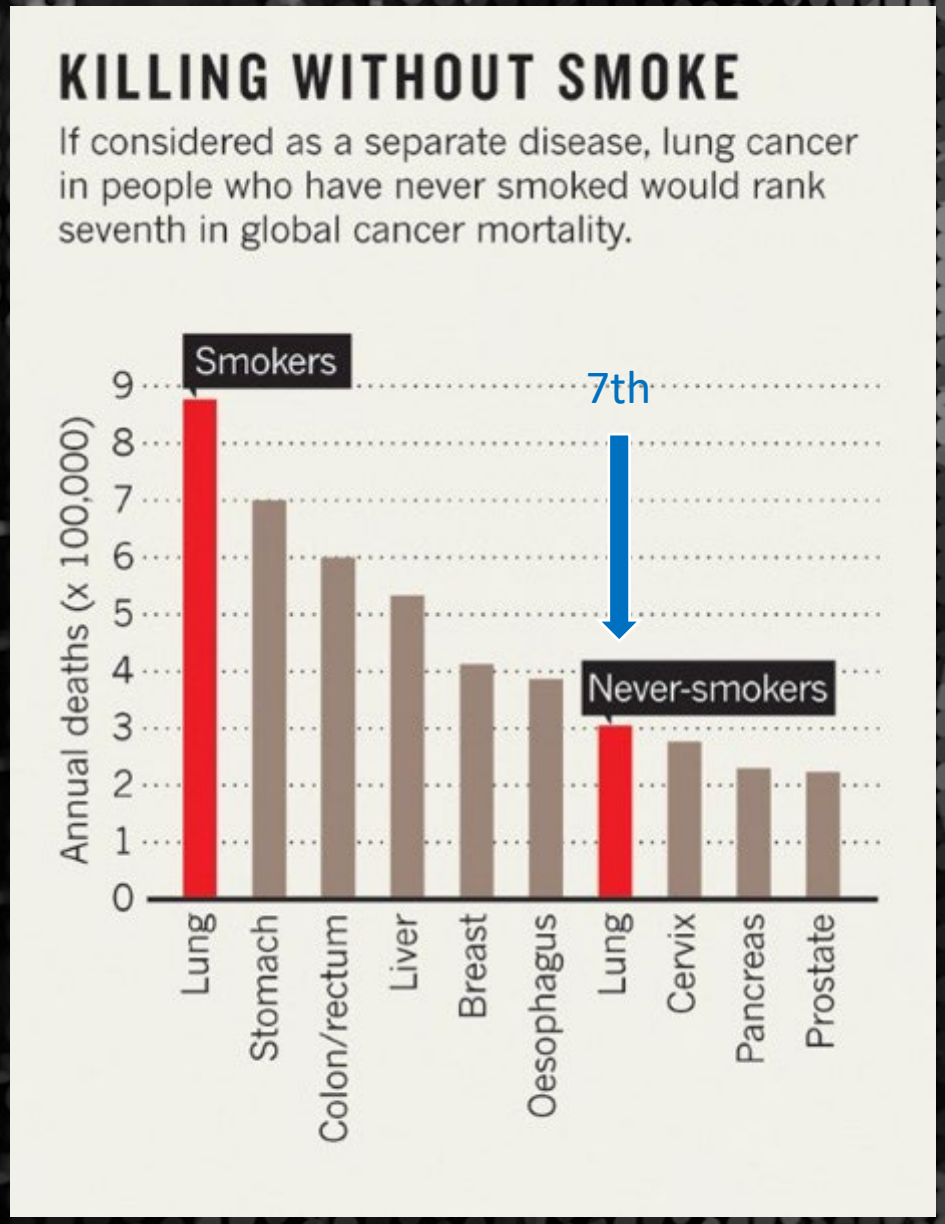


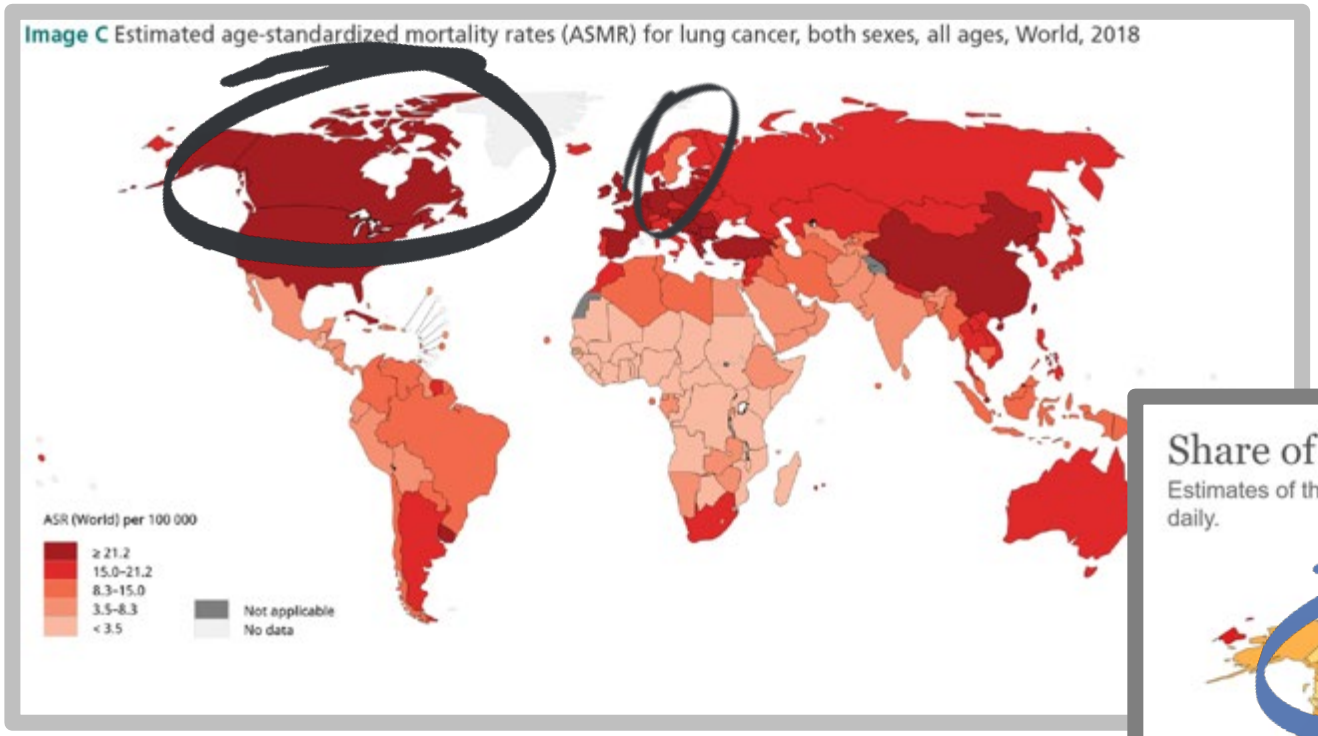
LUNG CANCER SCREENING PROGRAMS IN CANADA

Lung Cancer Screening Coverage in State Medicaid Fee-for-Service Programs

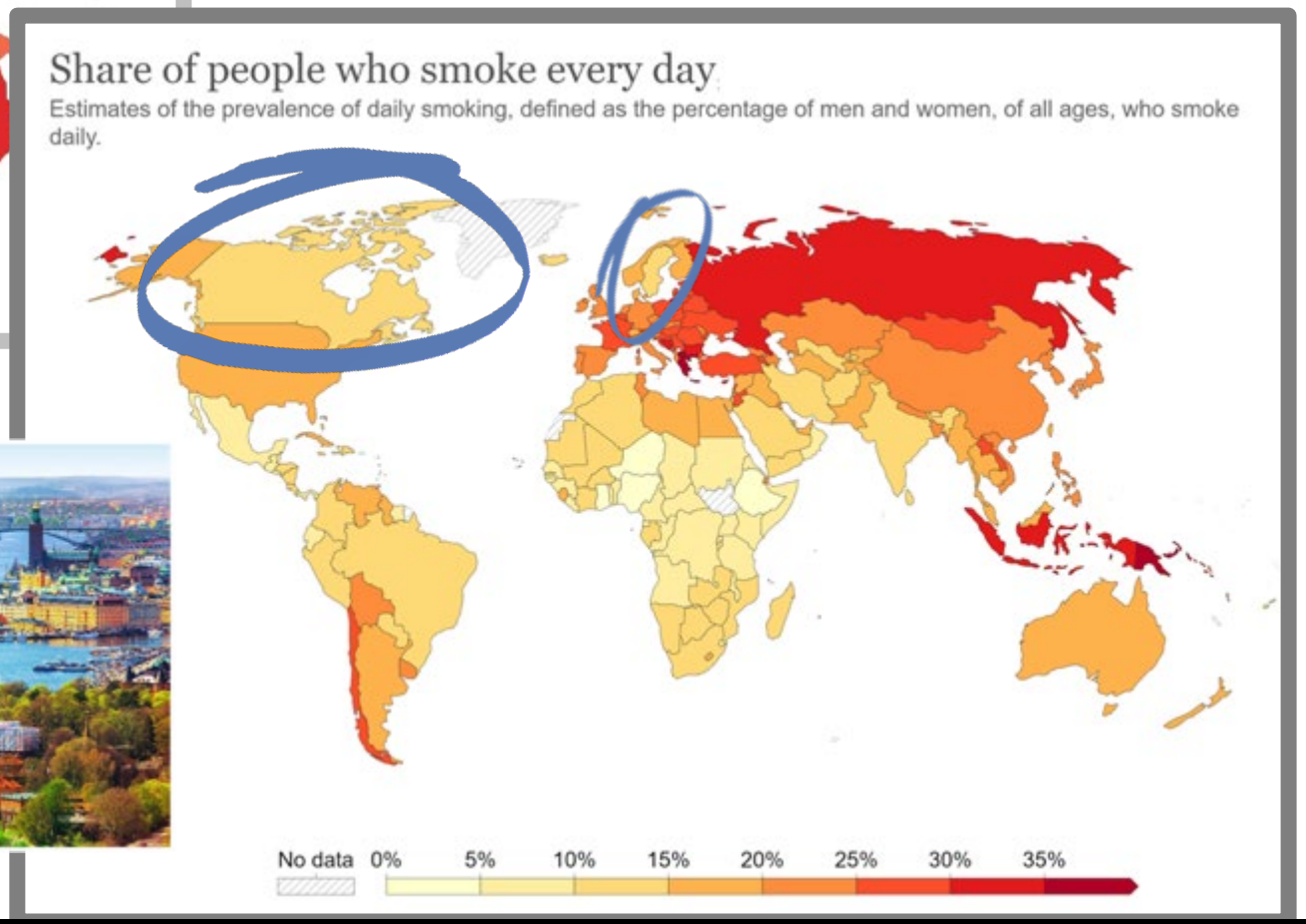


Lung Cancer SCREENING

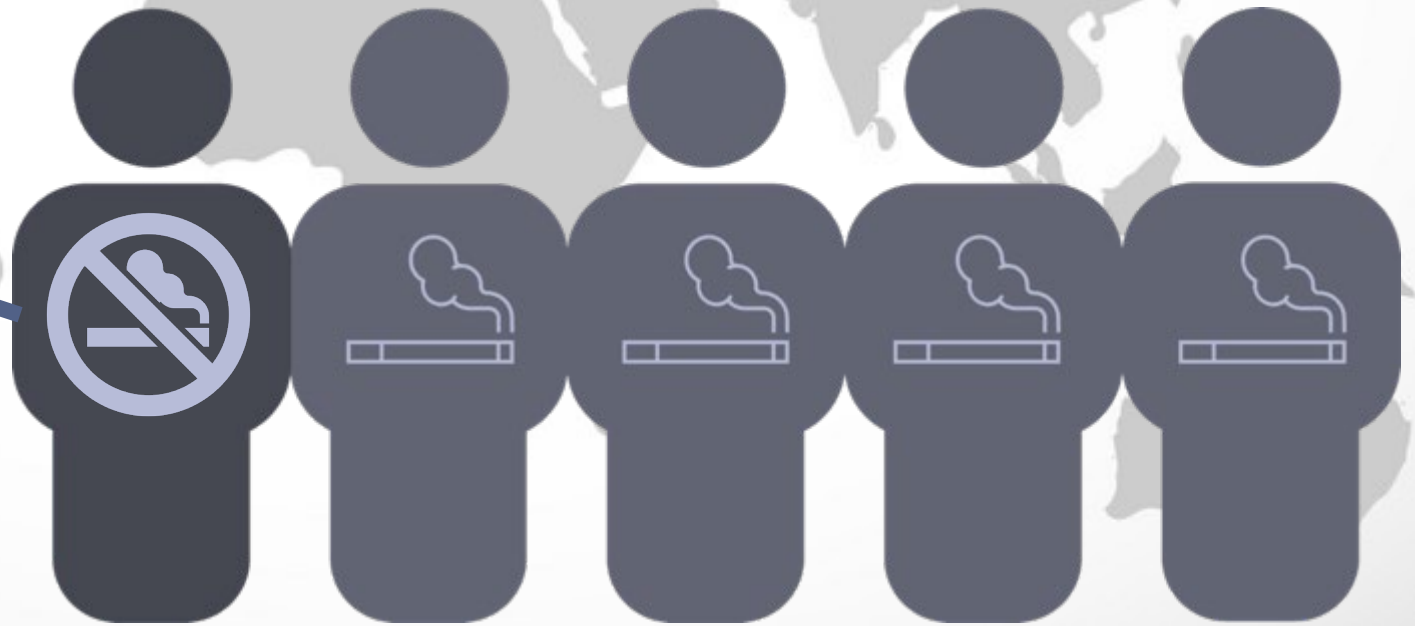




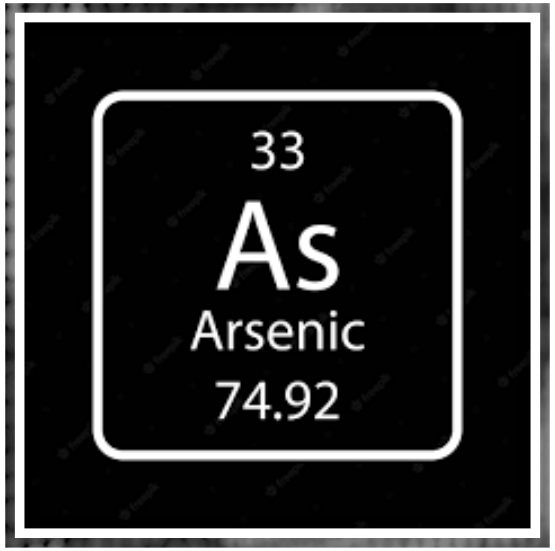
Prevalence of daily smoking in Canada and Sweden is the same but lung cancer rates differ significantly



1 IN 5 LUNG CANCERS ARISE IN PEOPLE WHO HAVE NEVER SMOKED



LUNG CANCER HAS MANY
NON-TOBACCO CAUSES



86
Rn
Radon

BIOMARKERS

EVIDENCE OF RADON EXPOSURE IN OUR BODIES

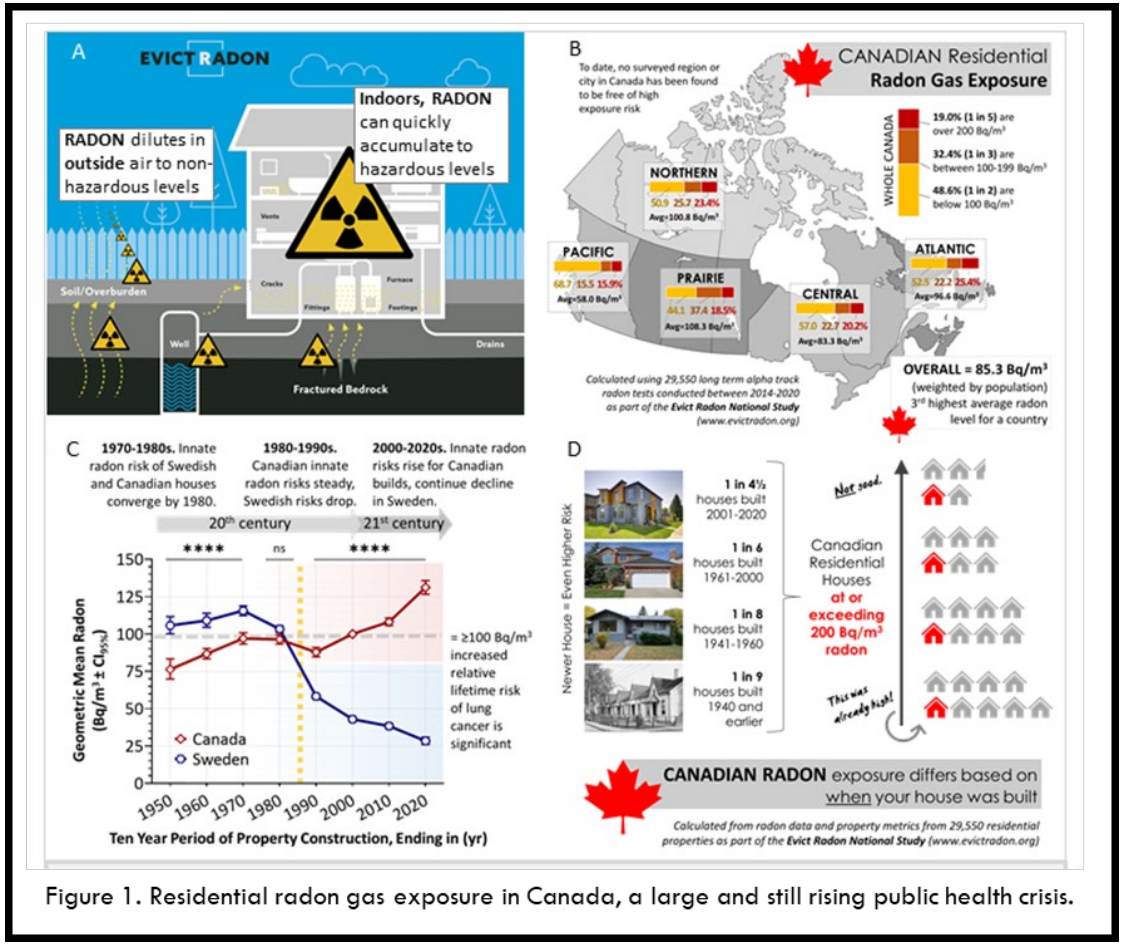
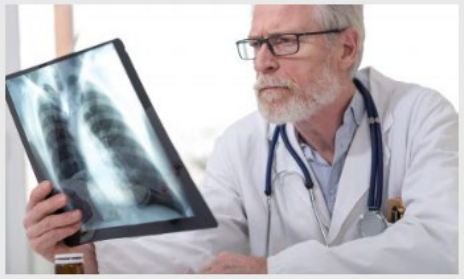
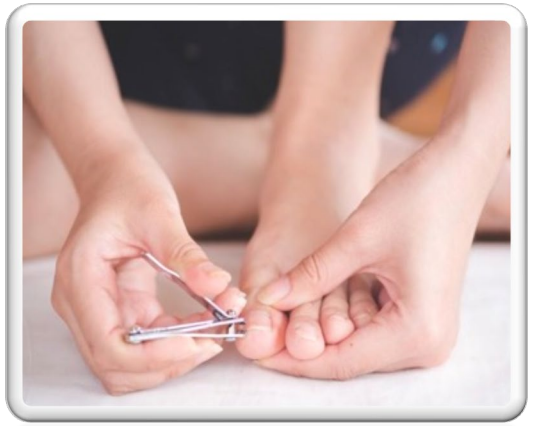


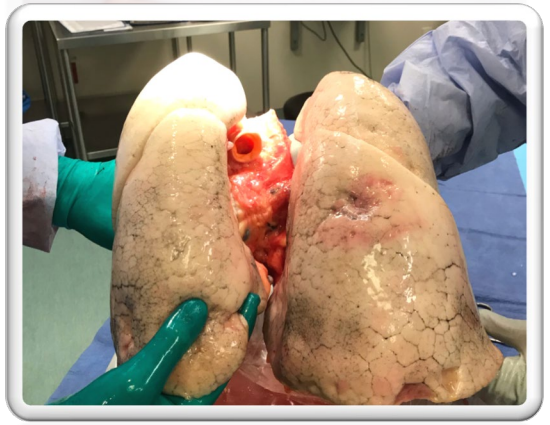
Figure 1. Residential radon gas exposure in Canada, a large and still rising public health crisis.

Understanding the scale of radon exposure in Canada



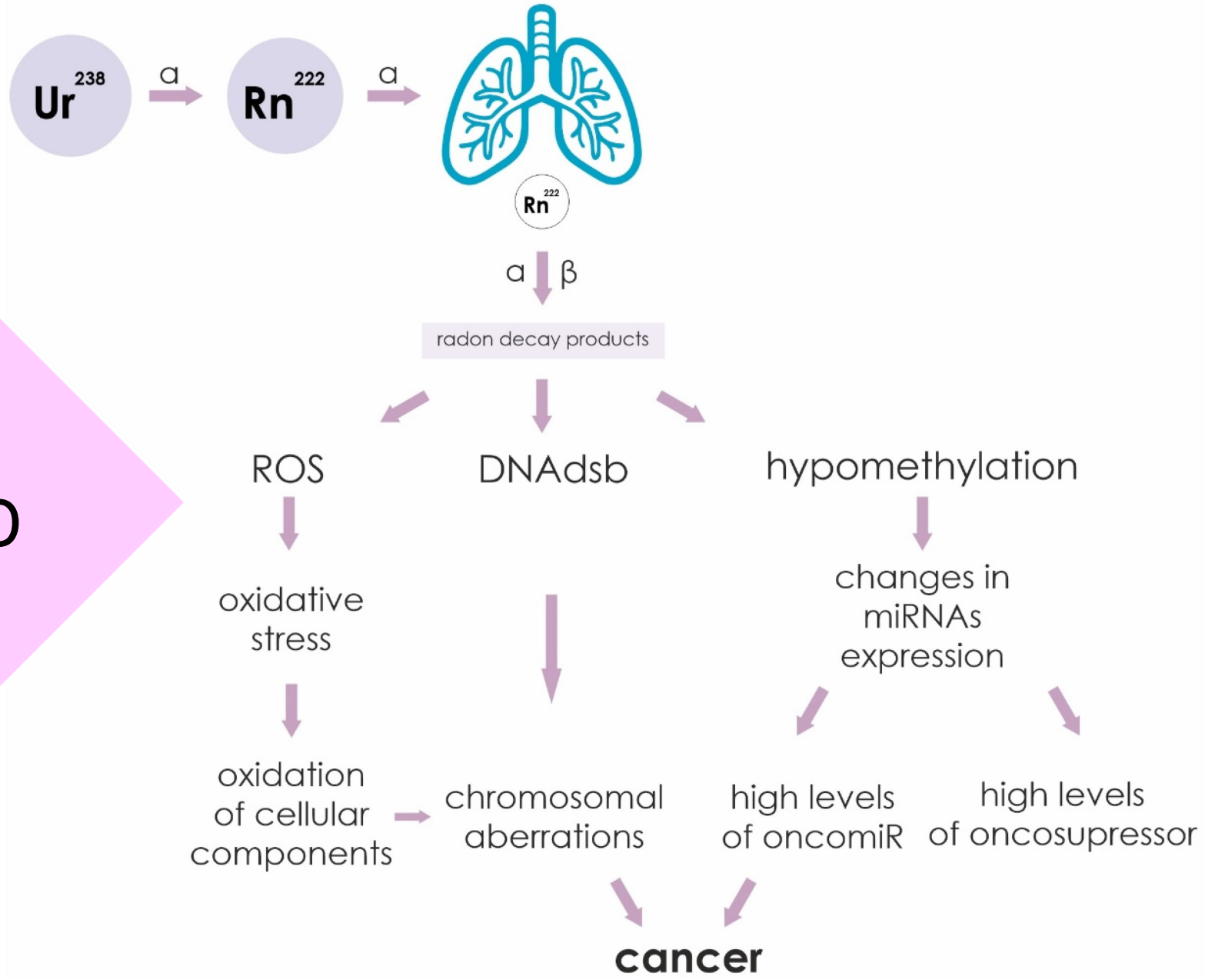
Developing a test for lifetime radon exposure





Correlate radon to ^{210}Pb in tissue

PATHOPHYSIOLOGY OF RADON-INDUCED LUNG CANCER



86

Rn

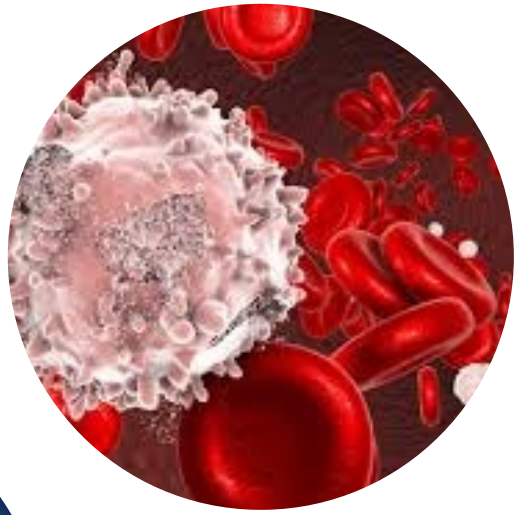
Radon

222.000

?

BRAIN CANCER

KIDNEY CANCER



BLOOD CANCER

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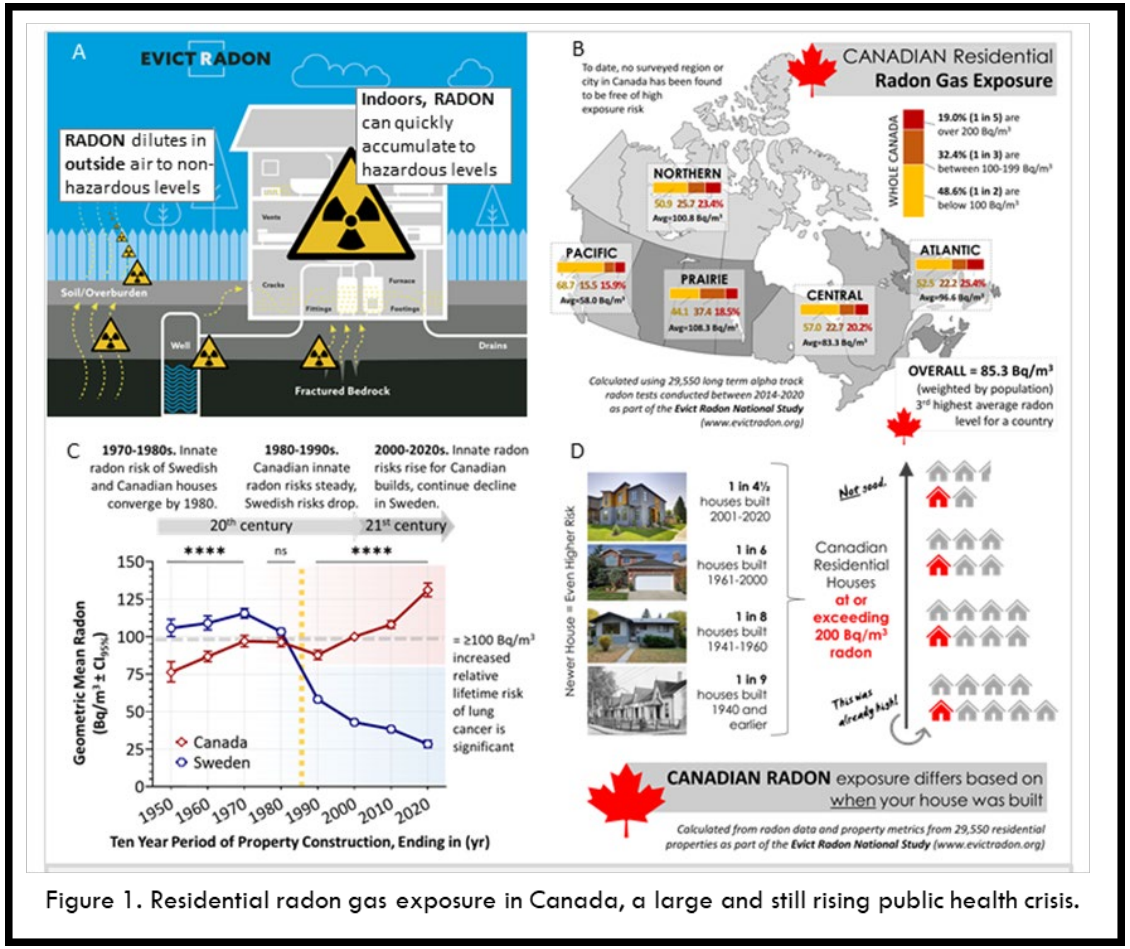
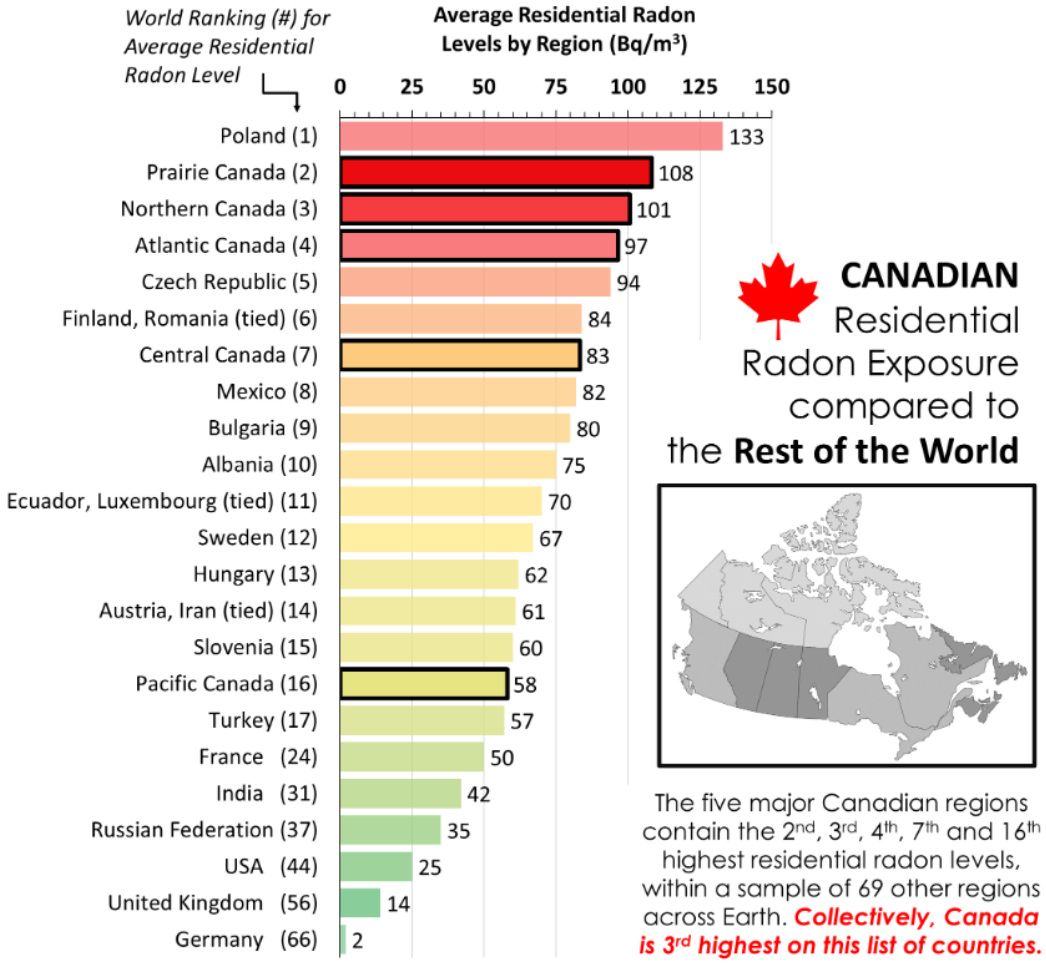


Figure 1. Residential radon gas exposure in Canada, a large and still rising public health crisis.

How does Canada compare to the rest of the world?



The five major Canadian regions contain the 2nd, 3rd, 4th, 7th and 16th highest residential radon levels, within a sample of 69 other regions across Earth. ***Collectively, Canada is 3rd highest on this list of countries.***

Canada has some of the highest rates of residential radon exposure in the world

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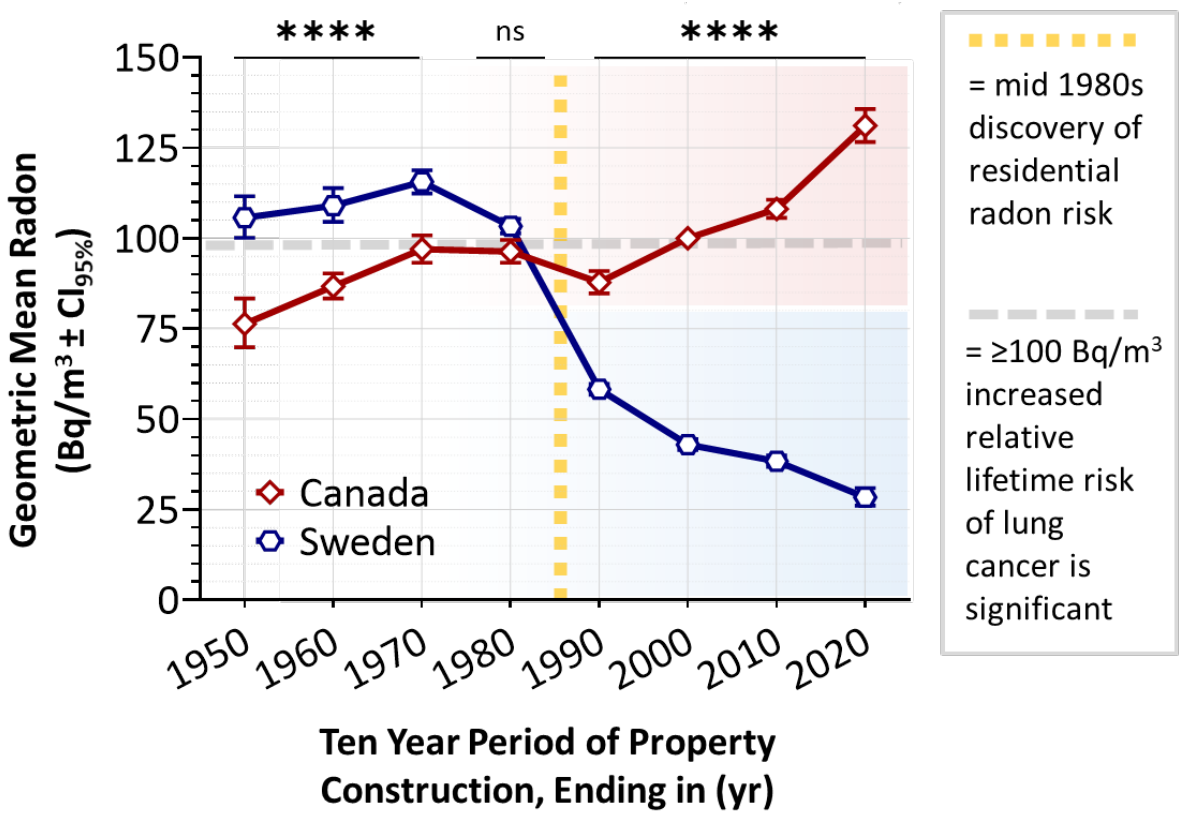
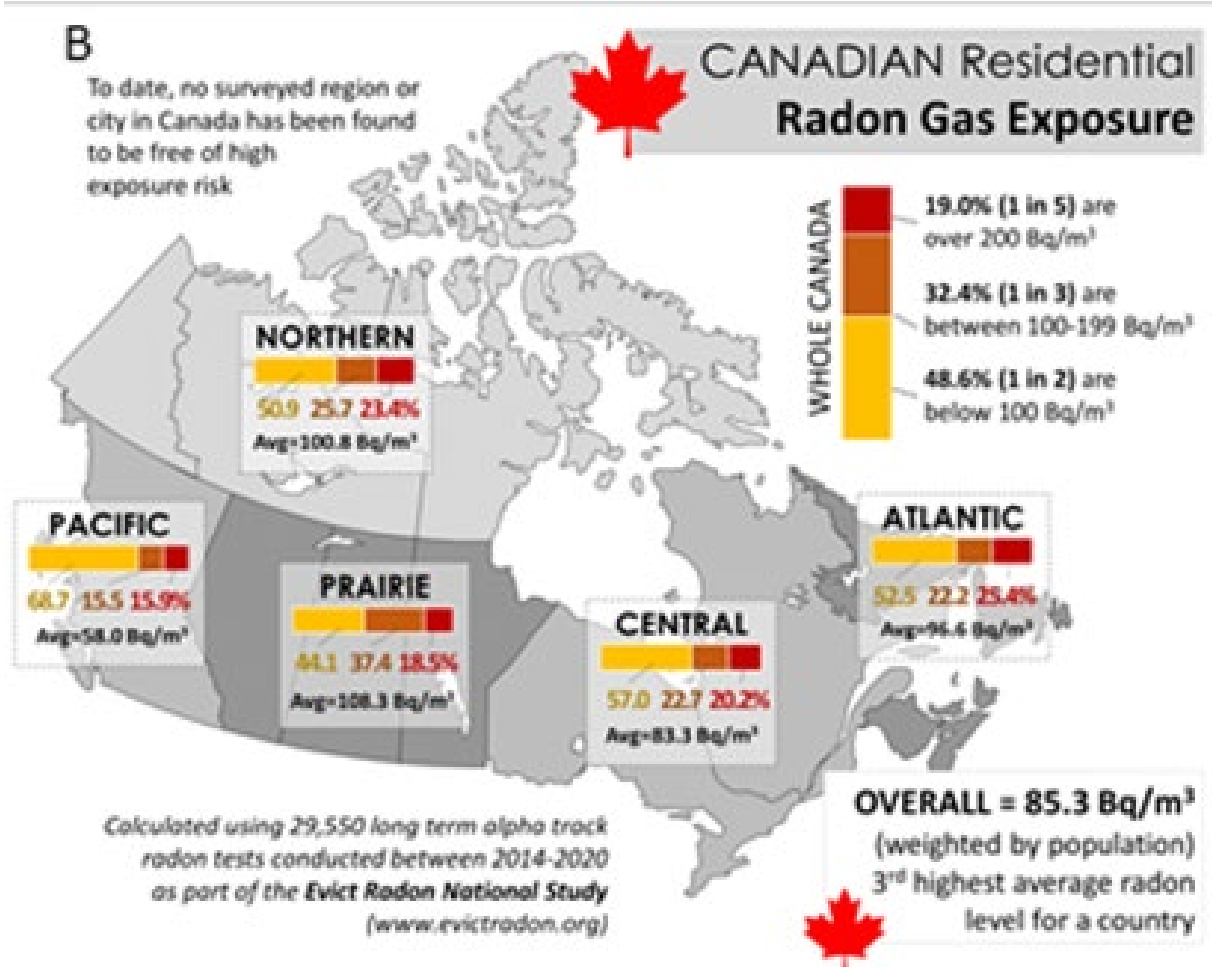
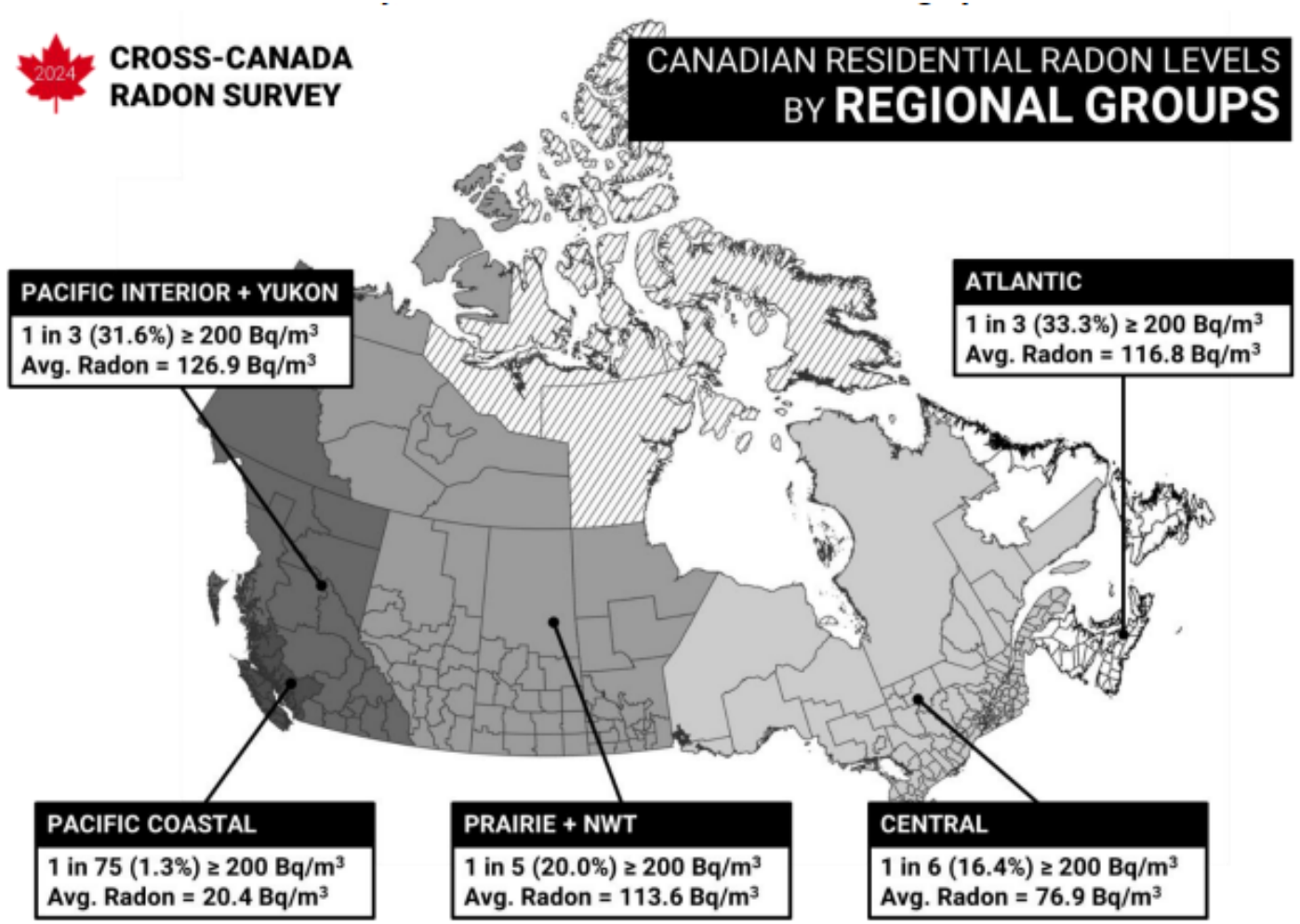




Indoor radon levels - rise in Canada - decline in Sweden



The **KEY FINDINGS** for a Canadian regional overview of residential radon levels are:

- **1 in 3** Atlantic properties are at or above 200 Bq/m³
- **1 in 6** Central properties are at or above 200 Bq/m³
- **1 in 5** Prairie and NT properties are at or above 200 Bq/m³
- **1 in 3** Pacific Interior and YT properties are at or above 200 Bq/m³
- **1 in 75** Pacific Coastal Canadian properties are at or above 200 Bq/m³

Atlantic Canadian residential radon levels are amongst the highest observed for any geographic area in Canada and should be considered a priority area for radon testing and mitigation

ÉTUDE NATIONALE
EVICT RADON
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VI. RADON LEVELS IN ATLANTIC CANADA

The Atlantic Canadian Region encompasses the provinces of Nova Scotia (NS, pop. 969,383), New Brunswick (NB, pop. 775,610), Newfoundland and Labrador (NL, pop. 510,550), and Prince Edward Island (PEI, pop. 154,331), and contains 8% of all Canadian residential building types reported on in this study.

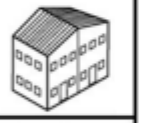
SINGLE-DETACHED

83.7% of residential buildings are single-detached properties

1 in 3 (34.6%) ≥200 Bq/m³
Avg. Radon = 122.2 Bq/m³

SEMI-DETACHED

12.2% of residential buildings are semi-detached properties such as duplexes



1 in 4 (28.0%) ≥200 Bq/m³
Avg. Radon = 88.1 Bq/m³

ROW-STYLE

4.1% of residential buildings are row-style (attached) properties

1 in 5 (22.9%) ≥200 Bq/m³
Avg. Radon = 90.8 Bq/m³

2024 CROSS-CANADA RADON SURVEY

RESIDENTIAL RADON LEVELS FOR **ATLANTIC CANADA**

ATLANTIC REGION POPULATION = 2,409,874
(based on 2021 Canada Census)

OVERALL

1 in 3 (33.3%) ≥200 Bq/m³
Avg. Radon = 116.8 Bq/m³

URBAN COMMUNITIES

29.6% of residential buildings are in urban communities

1 in 3 (29.8%) ≥200 Bq/m³
Avg. Radon = 106.3 Bq/m³

RURAL COMMUNITIES

70.3% of residential buildings are in rural communities

1 in 3 (34.8%) ≥200 Bq/m³
Avg. Radon = 121.2 Bq/m³

BY PROVINCE

NOVA SCOTIA:
1 in 3 (36.8%) ≥200 Bq/m³
Avg. Radon = 125.3 Bq/m³

NEW BRUNSWICK:
1 in 4 (24.6%) ≥200 Bq/m³
Avg. Radon = 99.4 Bq/m³

NEWFOUNDLAND + LABRADOR:
1 in 5 (21.7%) ≥200 Bq/m³
Avg. Radon = 90.1 Bq/m³

PRINCE EDWARD ISLAND:
1 in 5 (20.3%) ≥200 Bq/m³
Avg. Radon = 80.8 Bq/m³

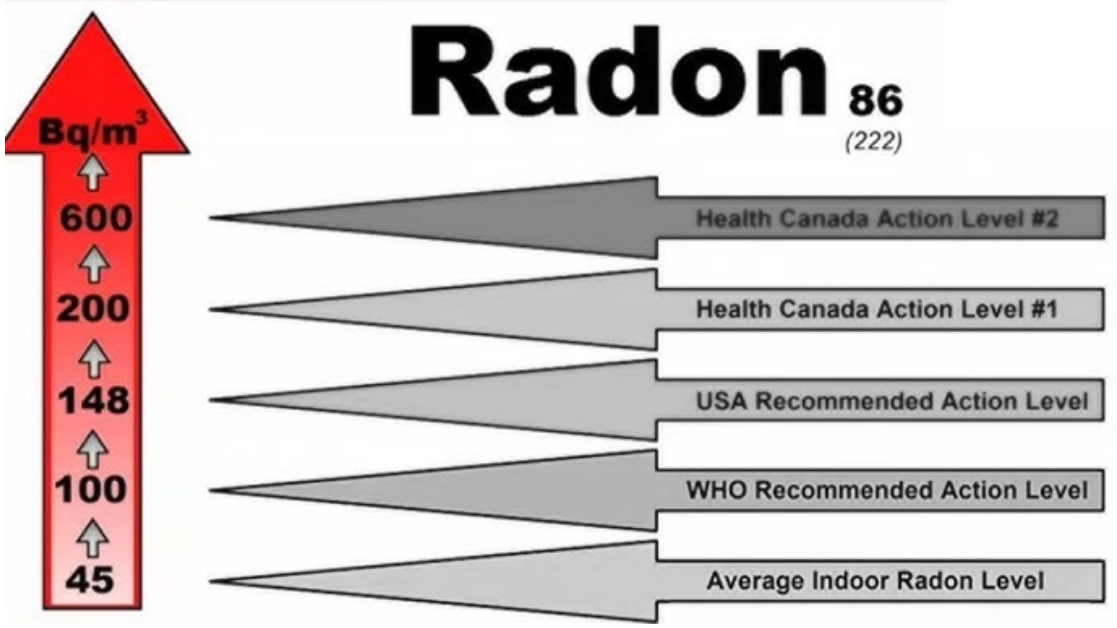
1 in 3 (33.3%) of Atlantic Region households contain radon levels at or above 200 Bq/m³, with an average radon level of 116.8 Bq/m³, the second-highest average level of household radon among all five Canadian regions. In total, 22.3% of Atlantic Canadian residential properties contained radon in the 100-199 Bq/m³ range.

2024 CROSS-CANADA RADON SURVEY

1 in 3 Atlantic properties are at or above 200 Bq/m³

ÉTUDE NATIONALE EVICT RADON NATIONAL STUDY

RADON
ACTION LEVELS



200 Bq/m3 is like smoking 10 cigarettes a day

600 Bq/m3 is like smoking 30 cigarettes a day

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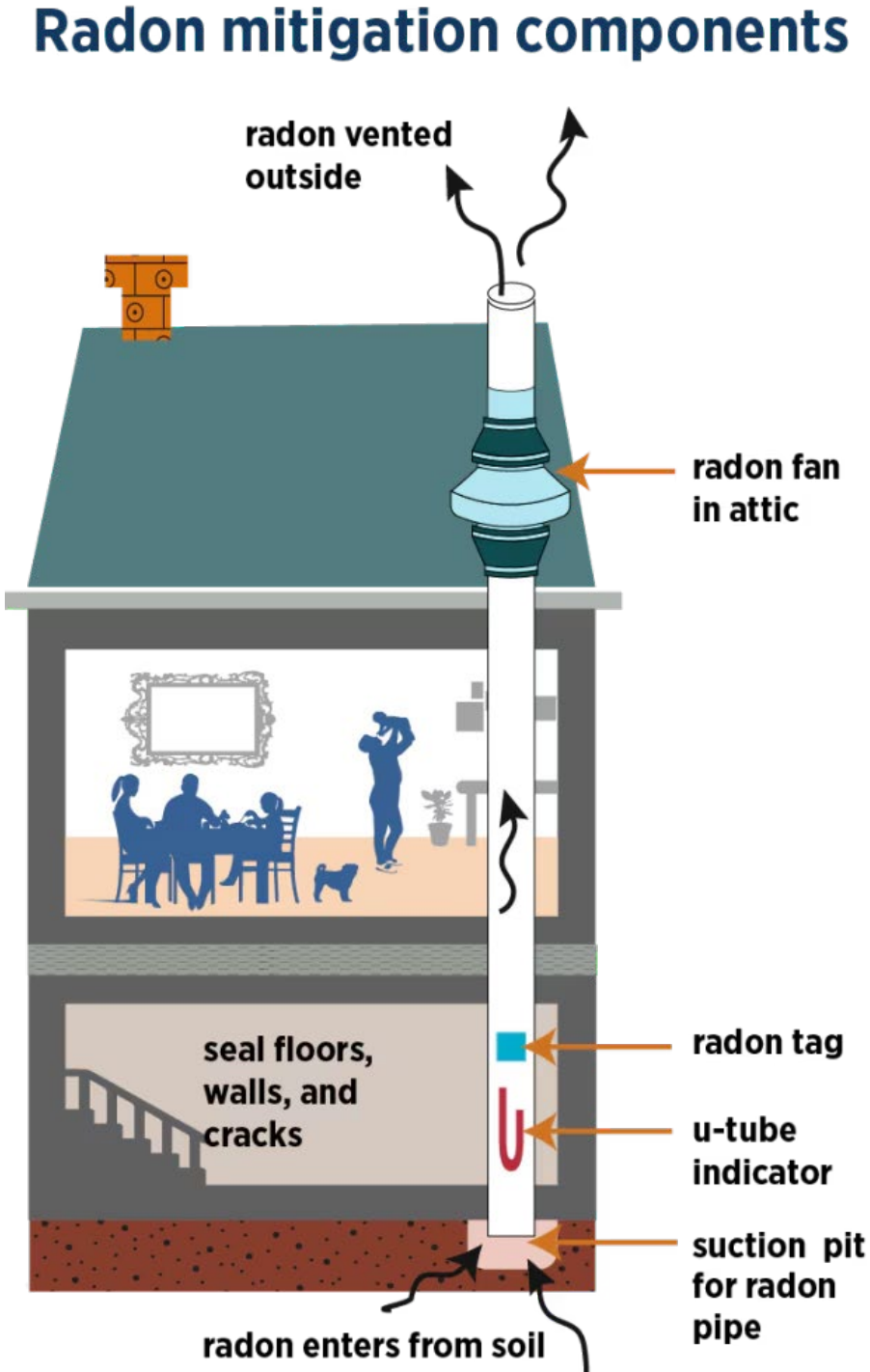
EVICT RADON
NATIONAL STUDY

CROSS-CANADA RADON SURVEY

Atlantic Canada should be considered a priority area for radon testing and mitigation

RADON DETECTOR



Which would you rather pay for?

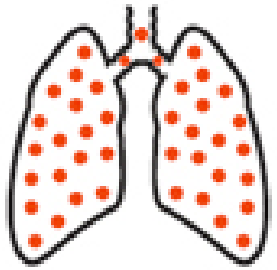
RADON
MITIGATION COST
$1,000 - $2,000

COST TO TREAT
LUNG CANCER
>$70,000

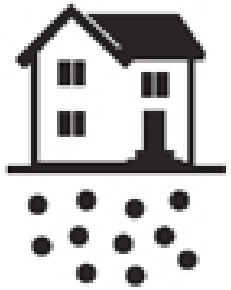
Radon & Lung Cancer

SUMMARY

Radon is a colourless, odourless and tasteless gas



Radon is the leading cause of lung cancer in non-smokers

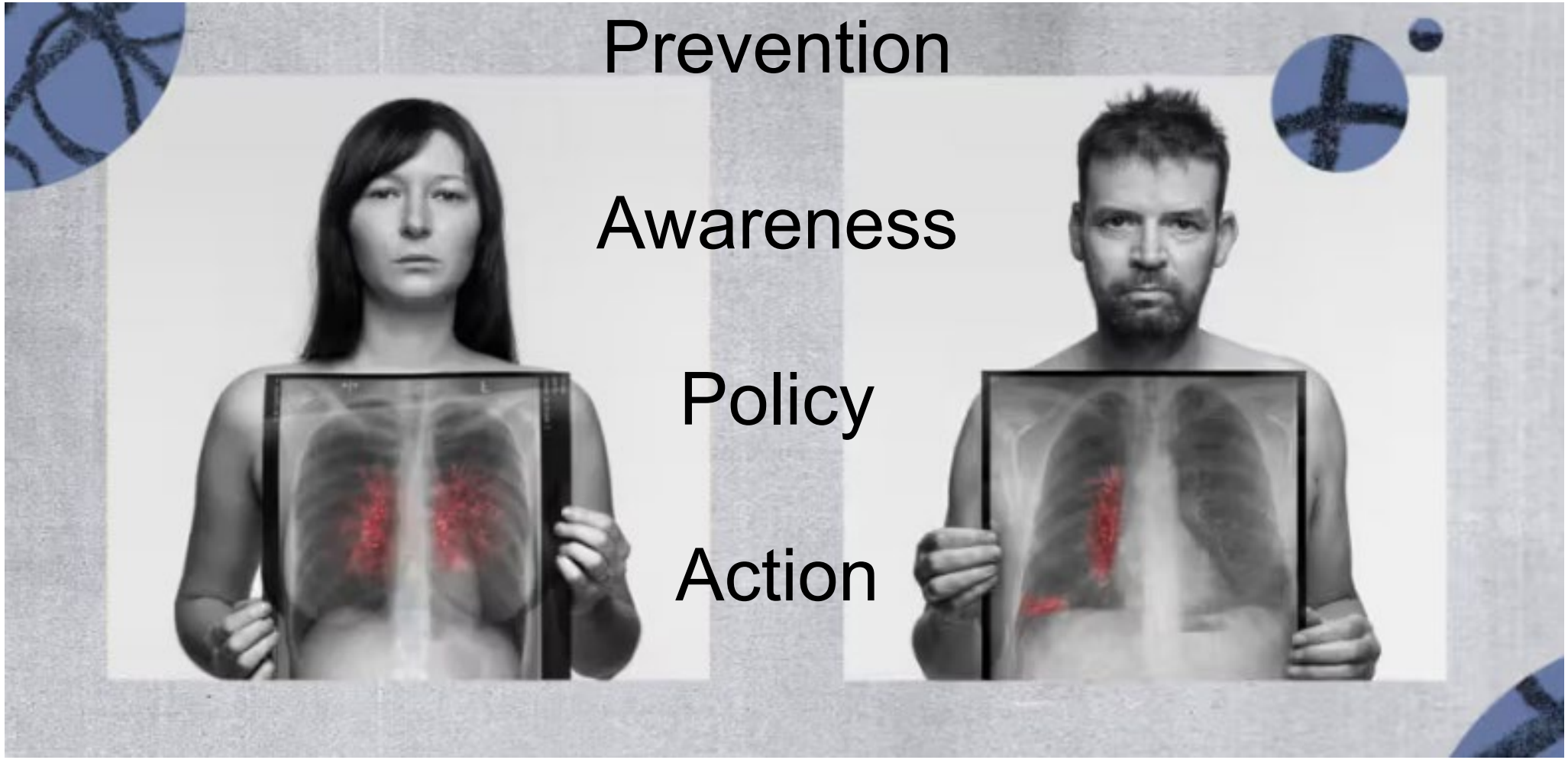


18% of Canadian homes have high radon levels

The only way to know if your home has a problem is to test for it

Radon is a silent killer but a *PREVENTABLE* one

A PATIENT STORY



Radon is invisible. But our response to it shouldn’t be.

Let’s make it visible. Let’s make it urgent. And let’s make it matter.

Alison.Wallace@nshealth.ca

Cross-Canada Survey of Radon Exposure in the Residential Buildings of Urban and Rural Communities

2024 REPORT

Version 1.1 (CCSR.24.1.1), released October, 2024

crosscanadaradon.ca

ÉTUDE NATIONALE EVICT RADON NATIONAL STUDY

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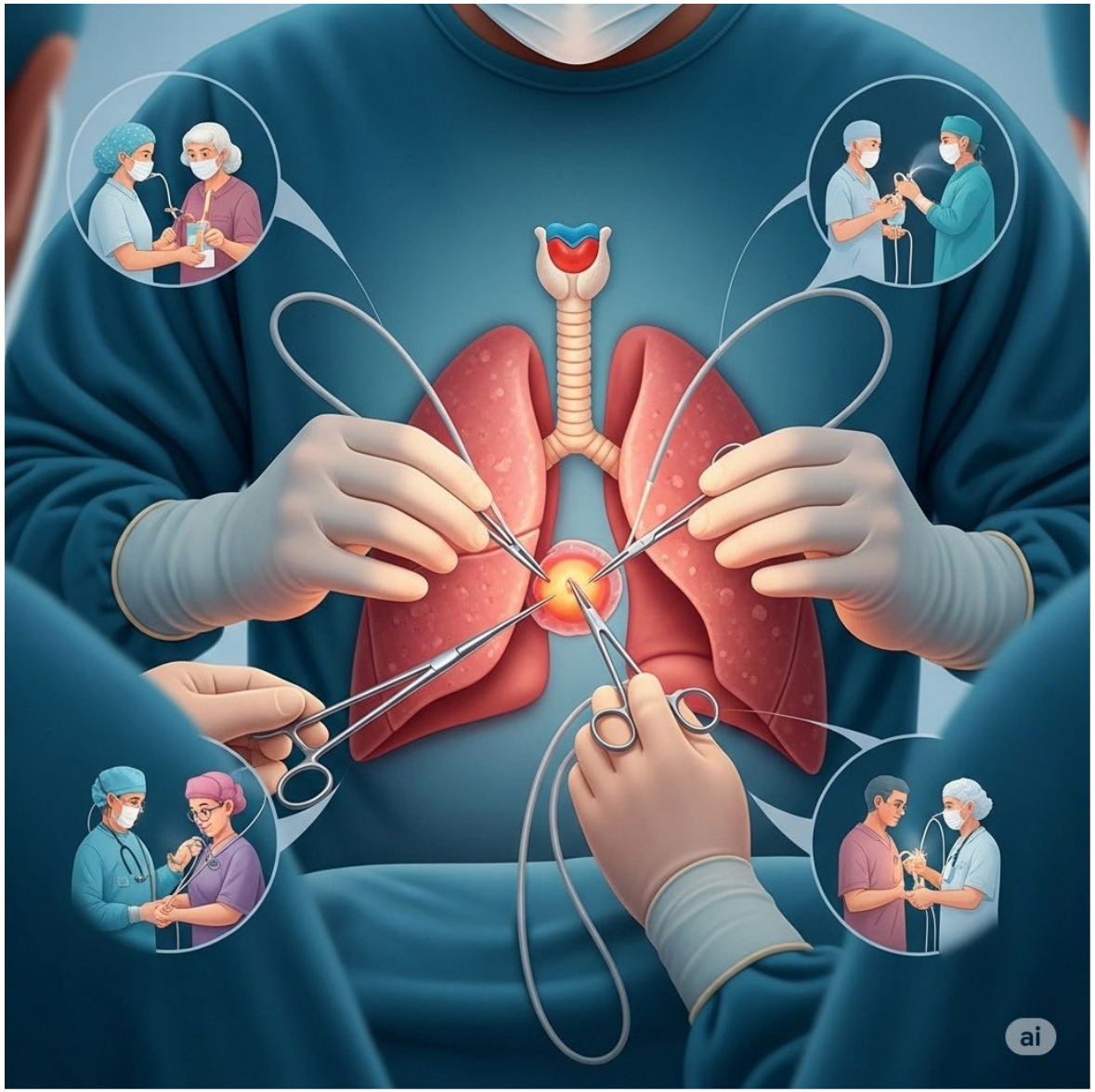
Report prepared and published by the: Evict Radon National Study team (including researchers at the British Columbia Cancer Agency, the Arnie Charbonneau Cancer Institute at the University of Calgary, University of Saskatchewan, and Dalhousie University) in collaboration with the staff and researchers at Health Canada, CAREX Canada, and the British Columbia Centre for Disease Control.

https://crosscanadaradon.ca/survey/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