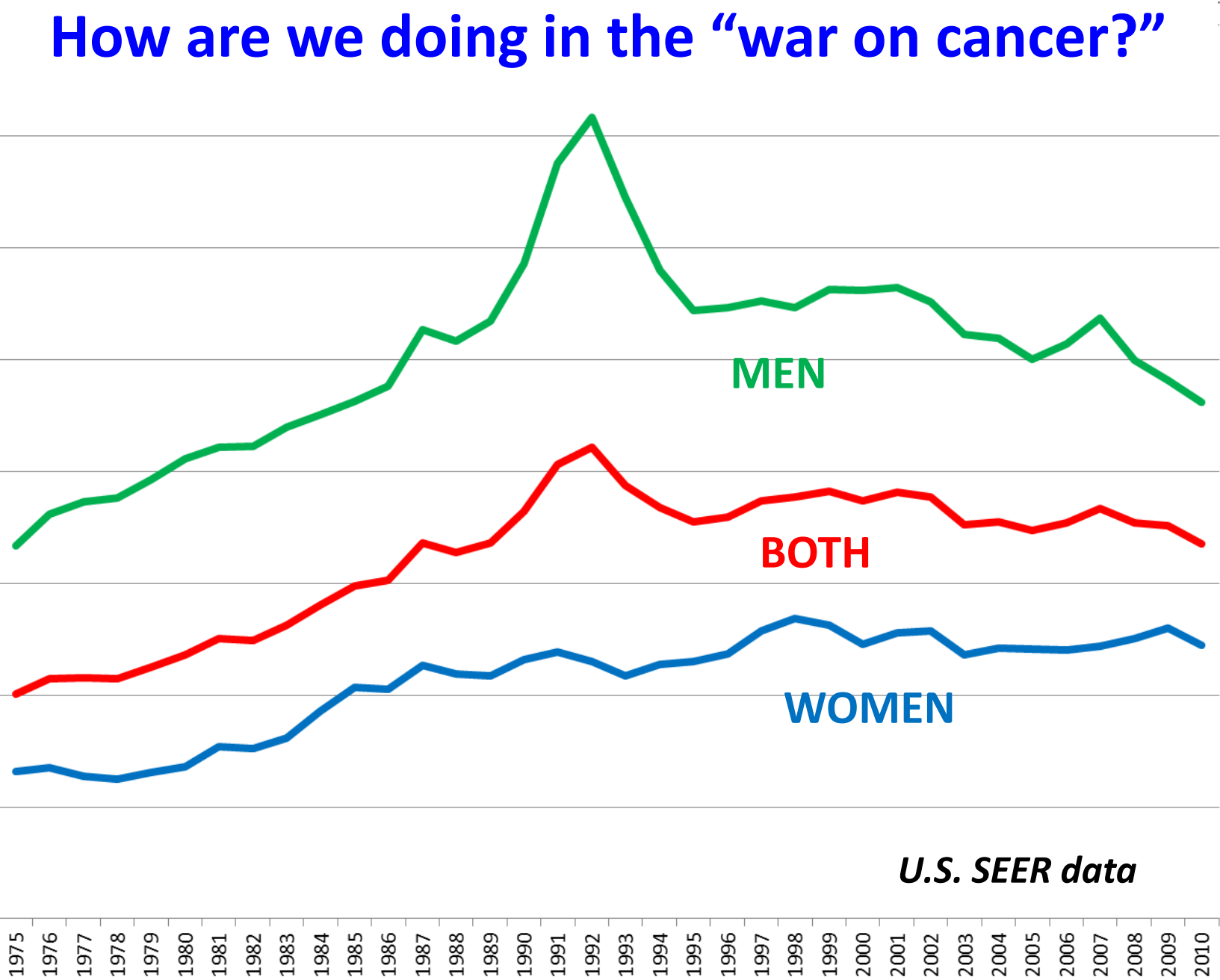


How are we doing in the “war on cancer?”

Incidence rate per 100,000 people



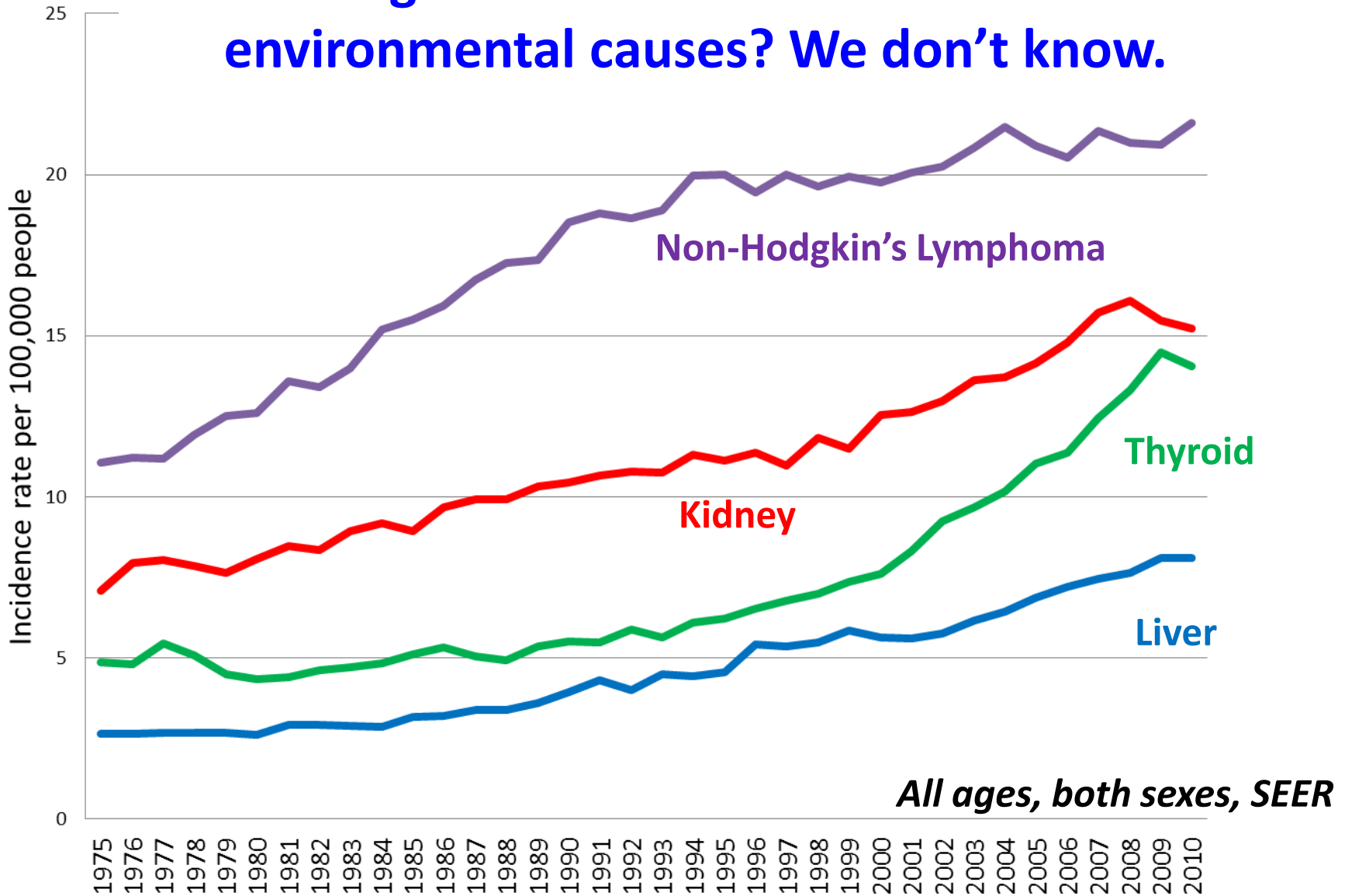
MEN

BOTH

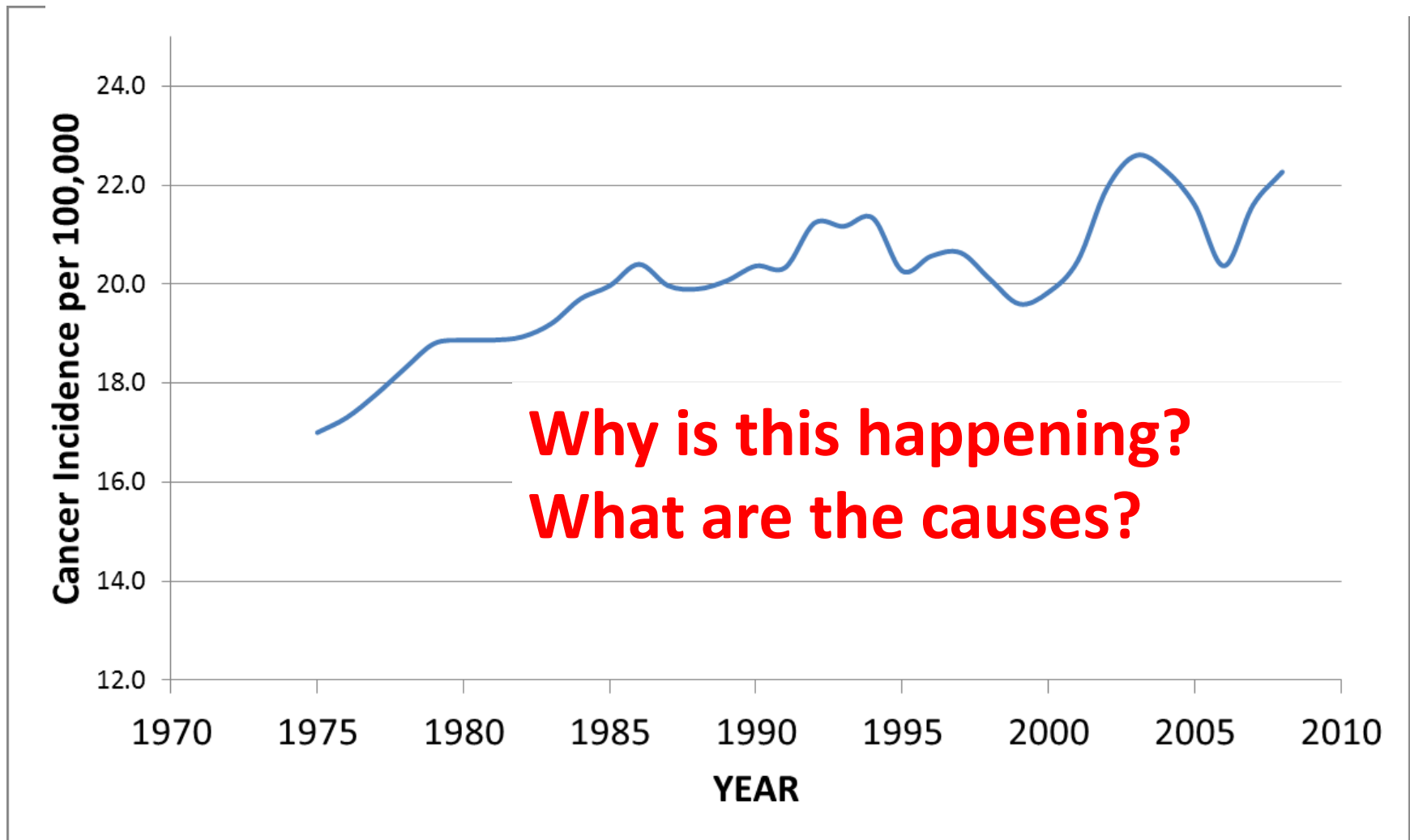
WOMEN

U.S. SEER data

Is it just a coincidence that these 4 cancers with rising trends also have well-established environmental causes? We don't know.



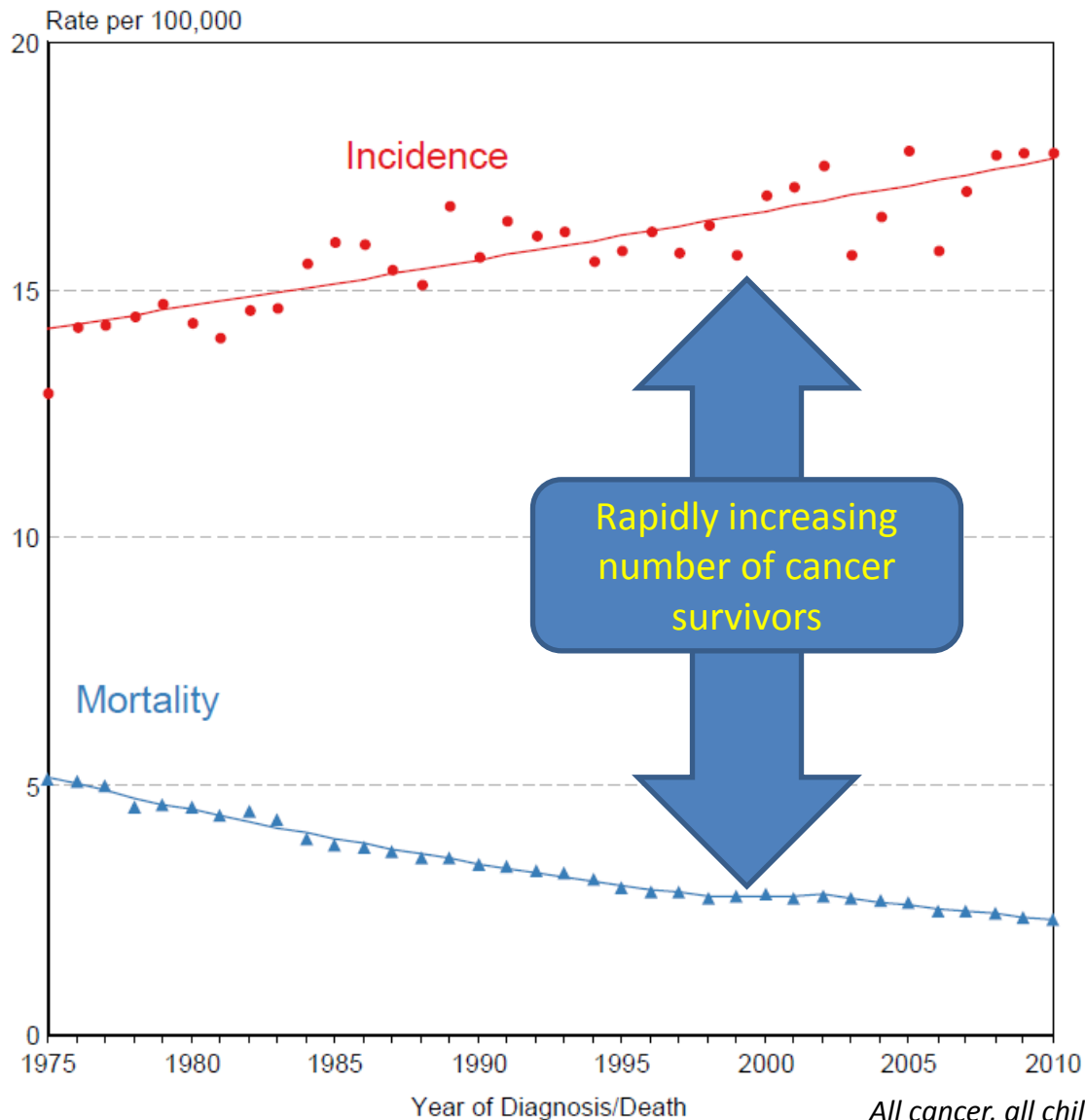
Teen Cancer Incidence has risen 30% since the 1970's



All cancers, both sexes, ages 15-19, SEER data

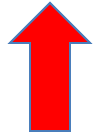
Childhood cancer deaths have been falling for 35 years...

But the numbers of kids getting the disease rises steadily

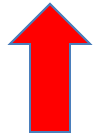


*All cancers,
<20 years old*

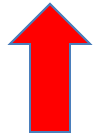
7 most common cancers in teenagers



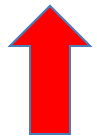
Non-Hodgkin's lymphoma (NHL)



Acute lymphoblastic leukemia (ALL)



Thyroid



Testicular



Brain & other central nervous system (CNS) tumors

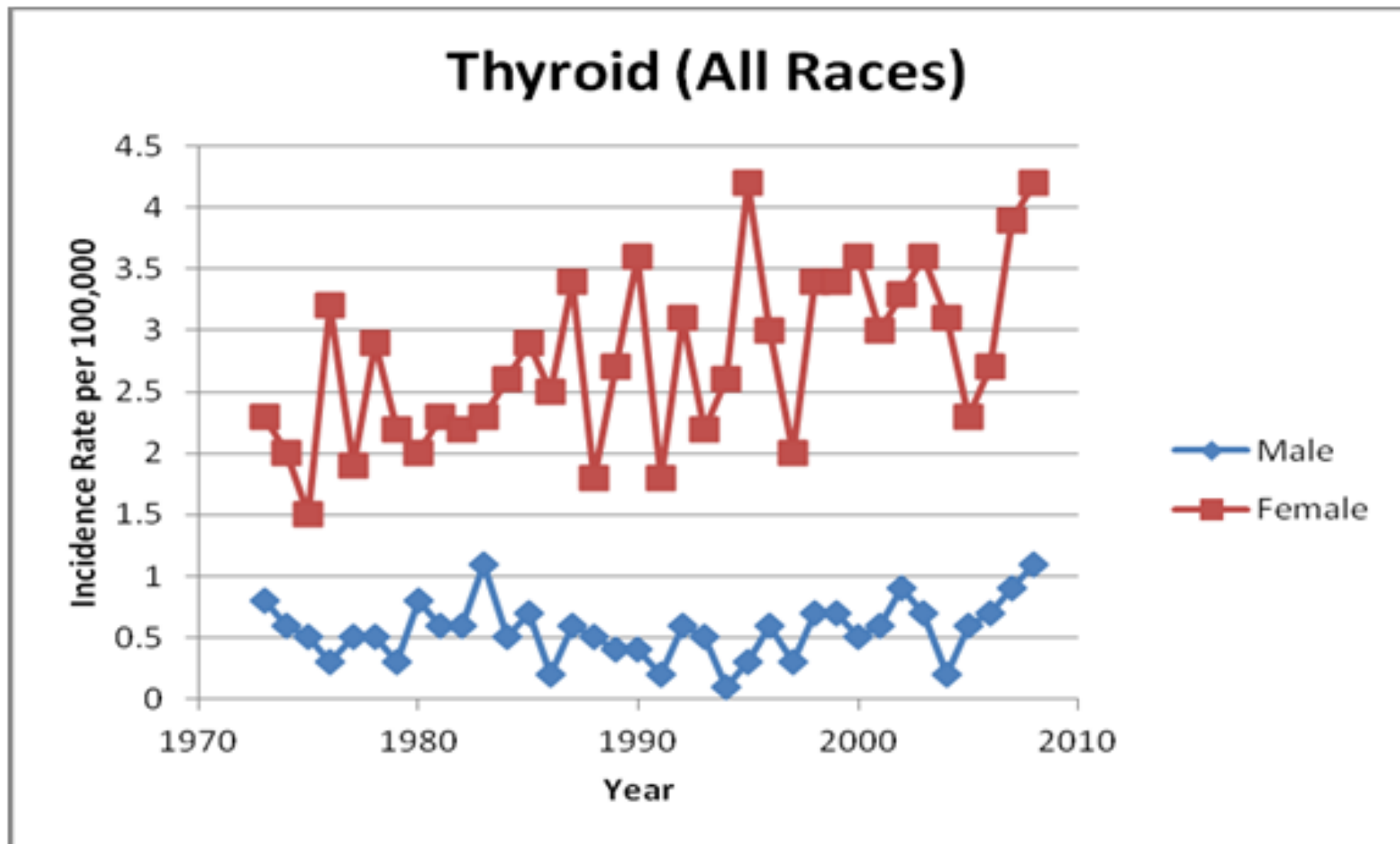


Ovarian



Hodgkin's disease (HD)

An added mystery: thyroid cancer is increasing strongly in girls, but not in boys



Source: SEER, incidence per 100,000 population/year, ages 15-19

Cancer prevention strategies

How important is reducing chemical carcinogen exposures?

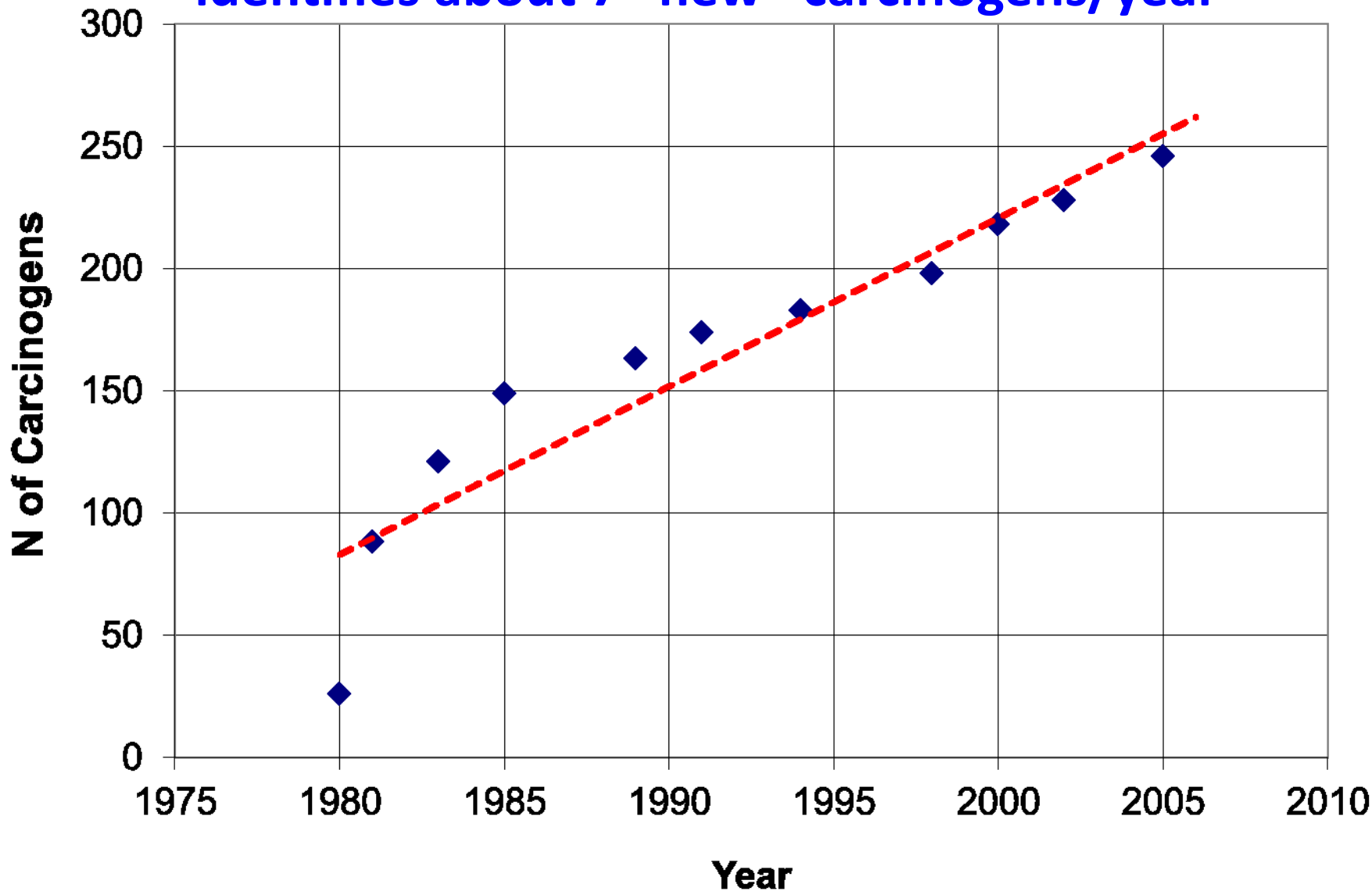
- Chemical carcinogens – known and unknown
- How large is their role in cancer?
- Toxics use reduction/safer alternatives and green chemistry/design as cancer prevention
- Challenges and opportunities

Nearly 1,000 chemicals/processes evaluated for carcinogenicity

By The International Agency for Research on Cancer (IARC)

- Carcinogenic to humans 108
- Probably carcinogenic to humans 64
- Possibly carcinogenic to humans 272
- Not classifiable
508
- **Probably not carcinogenic to humans 1**

The list is not fixed: U.S. Nat'l Toxicology Program identifies about 7 "new" carcinogens/year

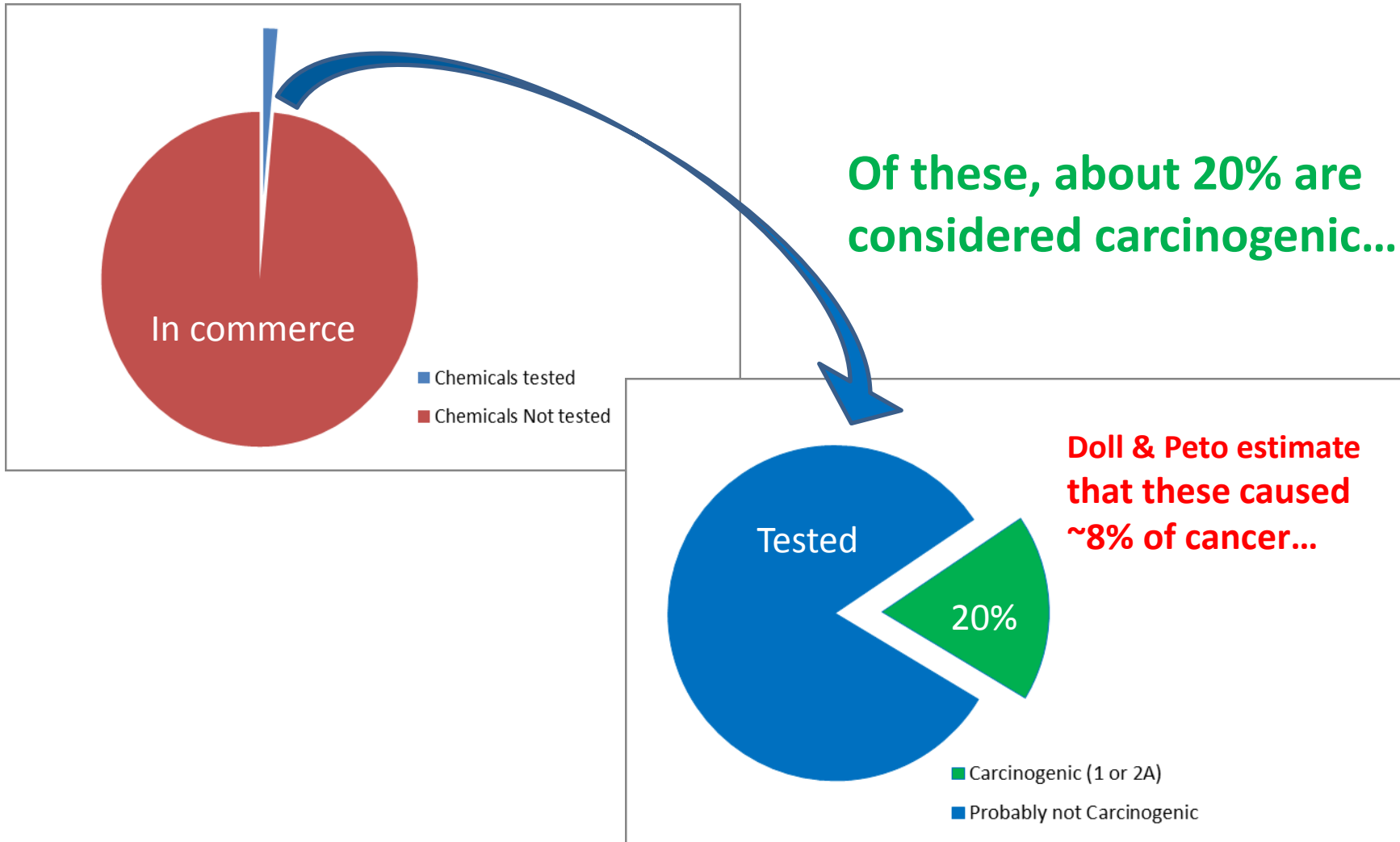


**But this is only a few percent of the
chemicals in use**

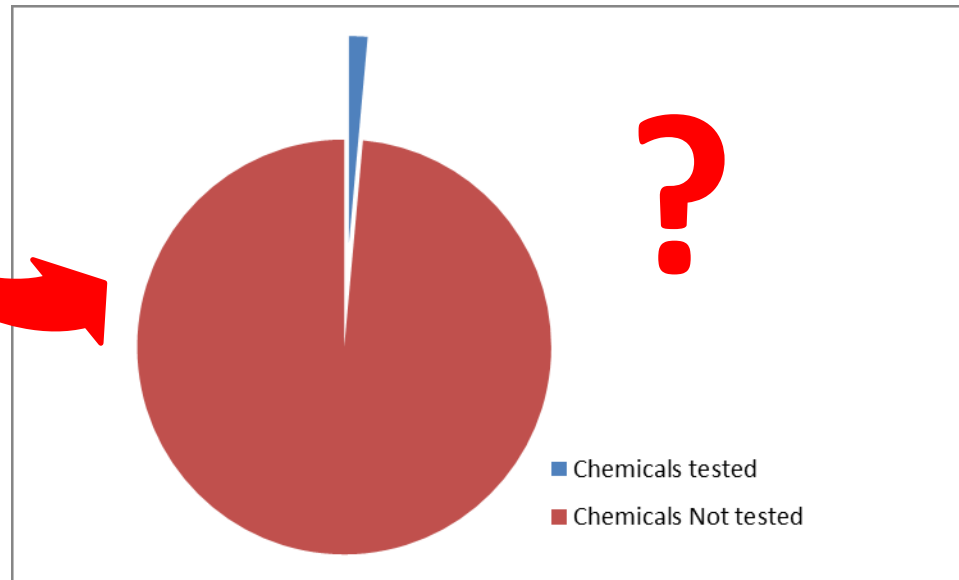
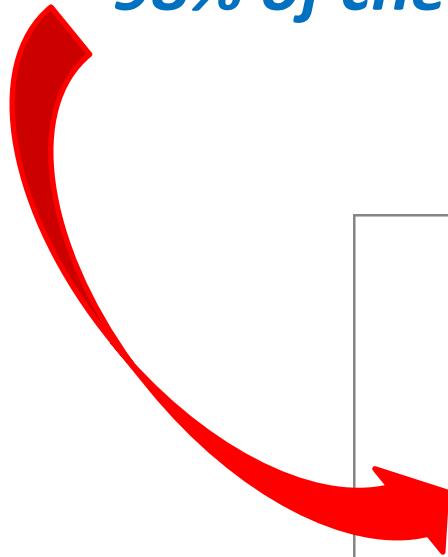
Registered chemicals on the market: ~66,000

**~2,500 high-production volume
More than 1 million pounds/year**

Perhaps 2% of chemicals in commerce have been tested for carcinogenicity...



**So, how much cancer is being caused by the
*98% of chemicals we have not yet tested?***



We don't know.

Doll & Peto, 1981

TABLE 20.—*Proportions of cancer deaths attributed to various different factors*

Text section No.	Factor or class of factors	Percent of all cancer deaths	
		Best estimate	Range of acceptable estimates
5.1	Tobacco	30	25-40
5.2	Alcohol	3	2-4
5.3	Diet	35	10-70
5.4	Food additives	<1	-5 ^a -2
5.5	Reproductive ^b and sexual behaviour	7	1-13
5.6	Occupation	4	2-8
5.7	Pollution	2	<1-5
5.8	Industrial products	<1	<1-2
5.9	Medicines and medical procedures	1	0.5-3
5.10	Geophysical factors ^c	3	2-4
5.11	Infection	10 ?	1-?
5.12	Unknown	?	?

Source: Doll R, Peto R. The causes of cancer: quantitative estimates of avoidable risks of cancer in the United States today. *Journal of the National Cancer Institute*. 1981. 66(6):1191-1308.

How important are toxic chemicals in the cancer epidemic?

- **We don't know.**
 - How could we know when thousands have never been tested?
 - We know even less about combinations of risk factors
- At least 5% of cancer in the U.K. due to workplace carcinogens (Rushton 2008)
- Air pollution? Certainly important -
 - Diesel exhaust alone may account for 5% of lung cancer

How important are toxic chemicals in the cancer epidemic?

But, why wait?

- If cancer rates are rising, and there are chemicals we know cause cancer, why not get rid of them?

President's Cancer Panel

“The true burden of environmentally induced cancers has been grossly underestimated.”

The panel recommended “removing carcinogens and other toxins from our food, water, and air that needlessly increase healthcare costs, cripple our nation’s productivity and devastate American lives.”



The Canadian Cancer Society agrees

“Substances that cause cancer should be replaced with safer alternatives. If it isn’t possible to get rid of the cancer-causing substance or find a safer option, then exposure to it should be reduced as much as possible.”

Encouraging words from U.S. gov't panel

“A precautionary prevention oriented approach should replace current reactionary approaches to environmental contaminants in which human harm must be proven before action is taken to reduce or eliminate exposure”

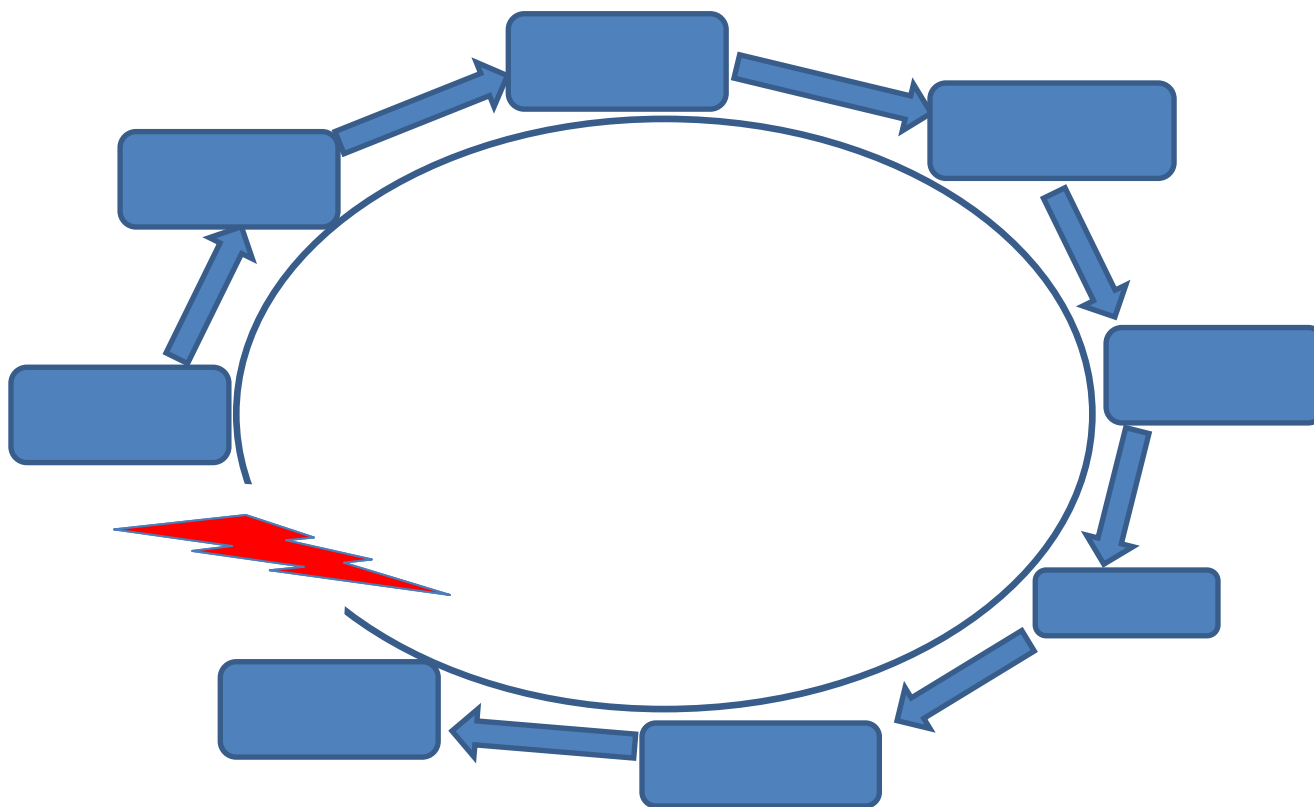


We need a *systems approach* to eliminating carcinogens

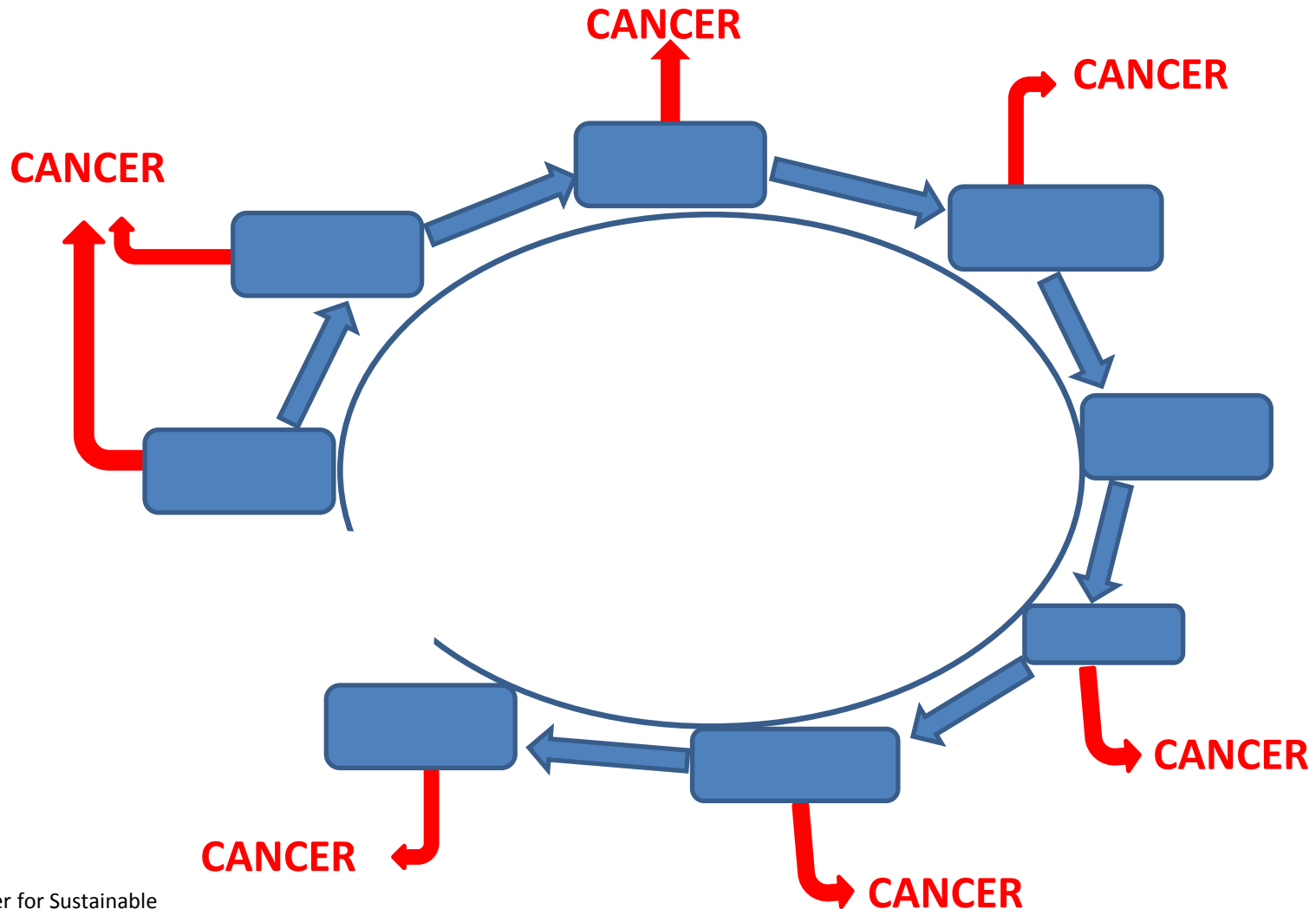
There are many opportunities to reduce carcinogen exposures

- ❑ Begin by identifying where known or suspected carcinogens occur, and why
- ❑ Sometimes there are alternative chemicals that are not more expensive
- ❑ Sometimes there are other reasons to eliminate them: environmental regulations, fire hazards, public concern

The problem and the solution begin here: The (broken) production cycle of the chemicals economy



Carcinogens are released at every step:
air, water, soil, food contamination.



Let's get carcinogens out of the economy

We know it can be done because there are already many great examples

- ✓ State laws
- ✓ Science innovations
- ✓ Private industry actions
- ✓ Environmental advocate/industry partnerships

U.S. states often lead the way

- In 1990, Massachusetts passed the Toxics Use Reduction Act
- Manufacturers who use toxics must register, pay a fee (that maintains the program) and most importantly:
- Prepare a plan for eliminating all chemicals on the MA TURA list
 - Plan does not have to be followed!
 - Plan must be prepared by a certified TUR planner

TUR - successful state initiative to reduce toxic chemicals in industry



The user fees support the Toxics Use Reduction Institute (TURI) at UMass Lowell

- Provides technical assistance to firms
- Trains and certifies planners who become strong internal advocates for change in their firms
- www.turi.org

Toxics use reduction is cancer prevention

OPPORTUNITIES FOR
CANCER PREVENTION:

Trends in the Use and Release of Carcinogens in Massachusetts



- Since 1990, use of carcinogens by Massachusetts industries declined 32%
- Releases to the environment declined 93%

Trends in Massachusetts industrial uses of carcinogens

Known & Suspected Carcinogens with over 90% Declines in Environmental Releases

Cadmium & Cmpds	94%
DEHP	96%
Formaldehyde	91%
TDI	96%
PCE	95%

An encouraging development:

state laws affecting broad chemicals management processes,
rather than narrowly attacking specific toxic chemicals

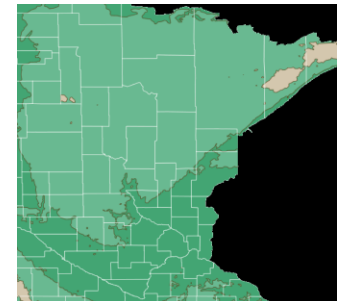
2008 **Washington**-- *Children's Safe Products Act*



2009 **Maine**-- *Act to Protect Children's Health and the Environment from Toxic Chemicals in Toys and Children Products*



2010 **Minnesota**-- *Toxics Free Kids Act*



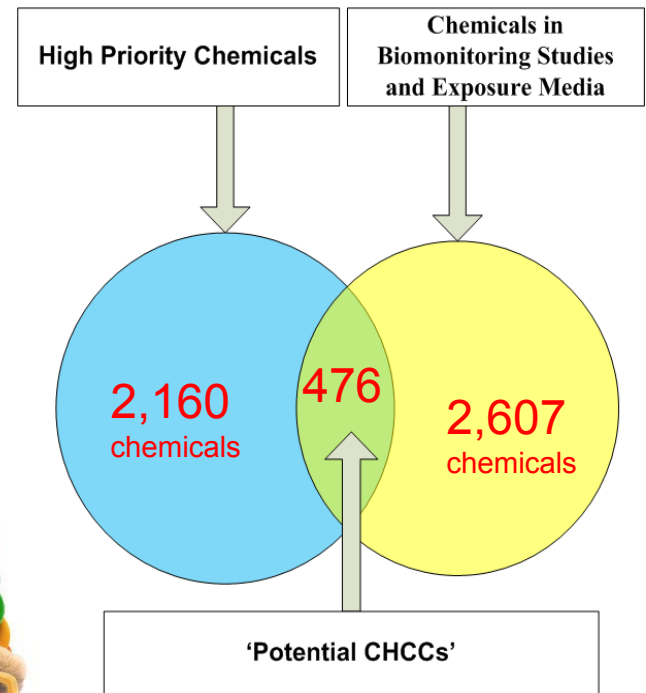
Washington's Children's Safe Product Act

Requires the Department of Ecology to Prioritize Chemicals of High Concern to Children

Step 1: Identify 'High Priority Chemicals' (HPCs)

Step 2: Identify chemicals of high concern to children

Step 3: Potential Chemicals of High Concern to Children



Interstate Chemicals Clearinghouse created by states to support these efforts

Alternatives
Assessment is being
promoted by the IC₂
to accelerate
transitions to less
toxic chemicals

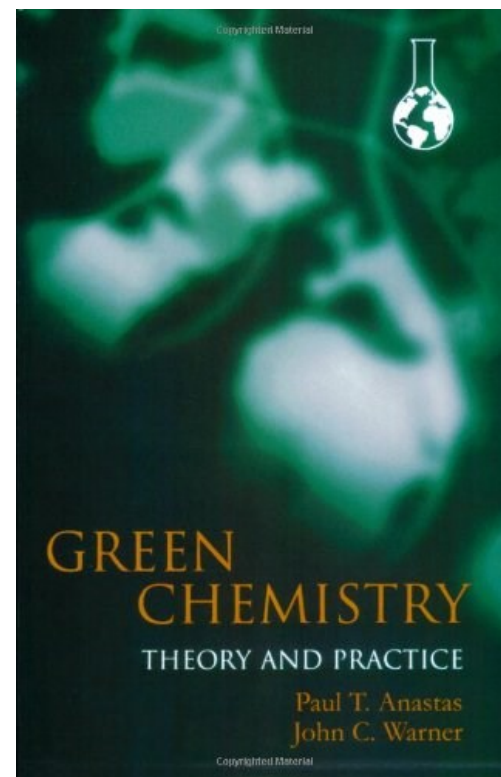


The goal of a cancer free economy can drive innovation

Green Chemistry

“Green chemistry is the utilization of a set of principles that reduces or eliminates the use or generation of hazardous substances in the design, manufacture and application of chemical products.”

-Anastas and Warner, *Green Chemistry: Theory and Practice*, 1998



Principles of Green Chemistry

(5 of 12)

1. Design chemicals and products to be effective w/ little or no toxicity
2. Prevent waste that requires treatment or clean-up
3. Develop less hazardous ways to synthesize chemicals
4. Use renewable raw materials
5. Design chemicals to break down after use

NGO-Business Alliances are active in “greening” supply chains

Green Chemistry and Commerce Council

Association of 70 firms organized by the
Lowell Center for Sustainable Production



American Sustainable Business Council

Some 1600 businesses and business associations



Green Chemistry Pharmaceutical Roundtable

Sponsored by the ACS Green Chemistry Institute



Business/NGO Working Group on Safer Chemicals and Products

Organized by Clean Production Action

What is the GC3?



A cross-sector network of more than 70 companies and other organizations formed in 2005 with a mission to promote green chemistry and design for environment (DfE), nationally and internationally.



GC3 Members, By Sector

Chemical/Specialty Chemicals

BASF Corporation
Bayer MaterialScience LLC
The Dow Chemical Company
The HallStar Company
ACS Green Chemistry Institute
DuPont
ecoSolv Technologies, Inc.
Segetis, Inc.
NatureWorks LLC
Teknor Apex Company

Apparel & Footwear

New Balance
Nike, Inc.
Timberland
VF Corporation

Outdoor Industry

REI

Consumer Products

Avon Products, Inc.
Johnson & Johnson
Method Products, Inc.
Seventh Generation, Inc.

Office Furniture

Steelcase
Herman Miller
DesignTex

Building Products

Construction Specialties
Interface Global
Shaw Industries
Valspar Corporation

Electronics

Bose Corporation
HP
Dell
EMC Corporation

Auto

Hyundai-Kia

Retail

Staples
Target
Green Depot

There are a growing number of hazard screening tools being developed

Tools to help companies choose safer alternatives

- **GreenWERCS Chemical Screening Tool**
 - A visual ranking system for composition of individual products allowing companies to evaluate their supply chains
 - <http://www.thewercs.com>
- **SubsPort**
 - EU tool for identifying substitutes for toxics
 - <http://www.subsport.eu/>

More tools to help companies choose safer alternatives

- **Green Screen**
 - Method for comparative hazard assessment
 - <http://www.greenscreenchemicals.org/>
- **PHAROS**
 - Helps construction industry choose safer building materials
 - www.pharosproject.net

It's time to build on these developments

**with a more conscious goal of preventing
cancer and other chronic diseases**

It's time to build a collaborative network

for a cancer free economy

The Networks' launch organizations

GARFIELD FOUNDATION

PASSPORT CAPITAL



PREVENTION STARTS HERE.



BLUEGREEN ALLIANCE

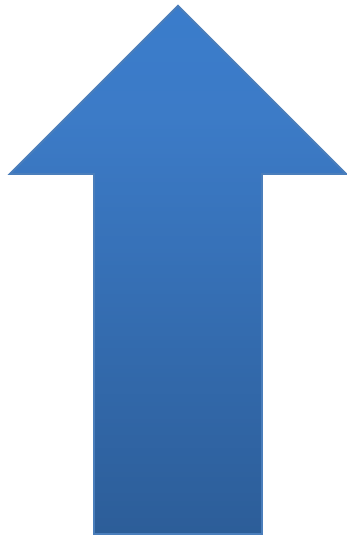
Public Welfare FOUNDATION

THE JENIFER ALTMAN FOUNDATION

THE NEW YORK
COMMUNITY TRUST
NYCT

Goal #1

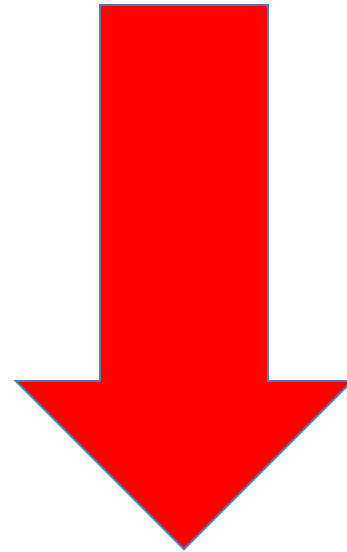
Increase public knowledge and demand for safe products





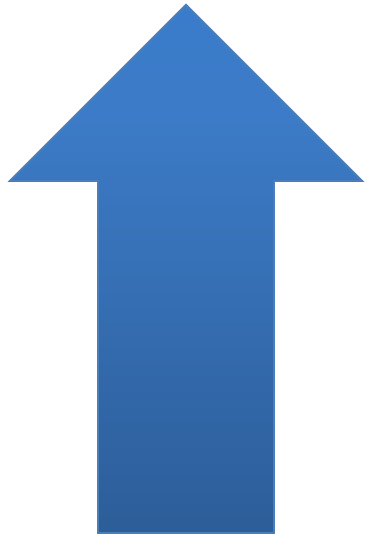
Goal #2

Reduce
exposure to
toxic materials



Goal 3#

Increase supply of safe products



Join us!

There is great potential to prevent cancer through programs which reduce or eliminate carcinogens

A diverse array of actors can participate:

- Governments – national, state, local
- Corporations – retailers, manufacturers
- Scientists & engineers
- Citizens' organizations

end

The American Cancer Society is not quite so clear:

- “Carcinogens do not cause cancer at all times, under all circumstances. Some may only be carcinogenic if a person is exposed in a certain way... Some may only cause cancer in people who have a certain genetic makeup....Even if a substance or exposure is known or suspected to cause cancer, this does not necessarily mean that it can or should be avoided at all costs”.

The Canadian Cancer Society agrees:

- “Reducing your risk
 - Both individual action (taking steps to reduce your exposure) and public policies can help prevent or reduce exposure to cancer-causing substances in the environment. Whenever possible, exposure to cancer-causing substances should be identified and stopped by using safer alternatives. When it is not possible to stop exposure completely, exposure should be reduced to the lowest possible levels.
 - Some general actions you can take...include:
 - Avoid cancer-causing substances.
 - Eliminate or limit exposure to potentially harmful and cancer-causing substances by using non-toxic materials...”