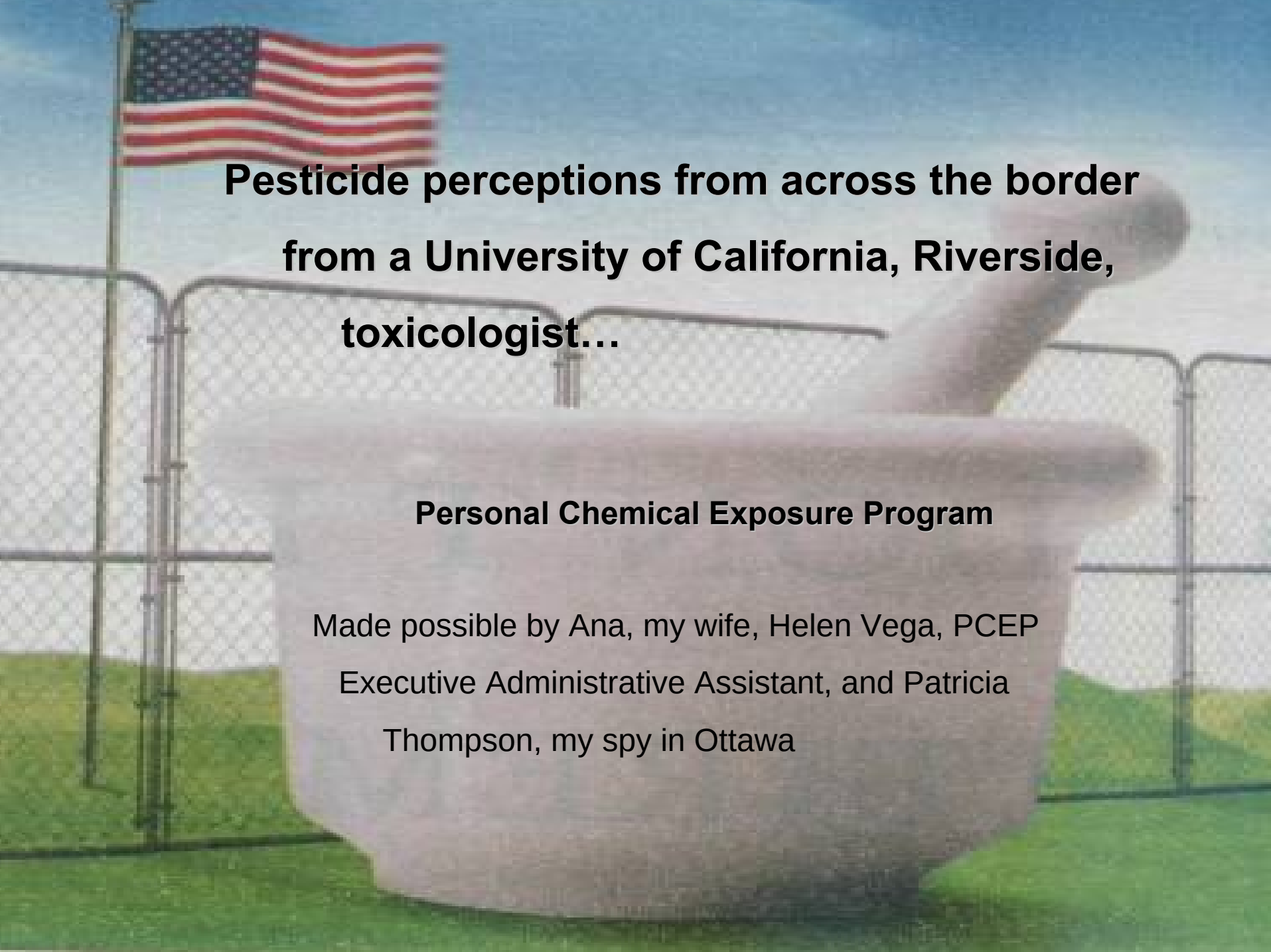


Pesticide perceptions from across the border from a University of California, Riverside, toxicologist…

Personal Chemical Exposure Program

Made possible by Ana, my wife, Helen Vega, PCEP Executive Administrative Assistant, and Patricia Thompson, my spy in Ottawa

We live in a chemical world!

More than 31,000,000 known

- Origin

  Natural and Synthetic

- Class

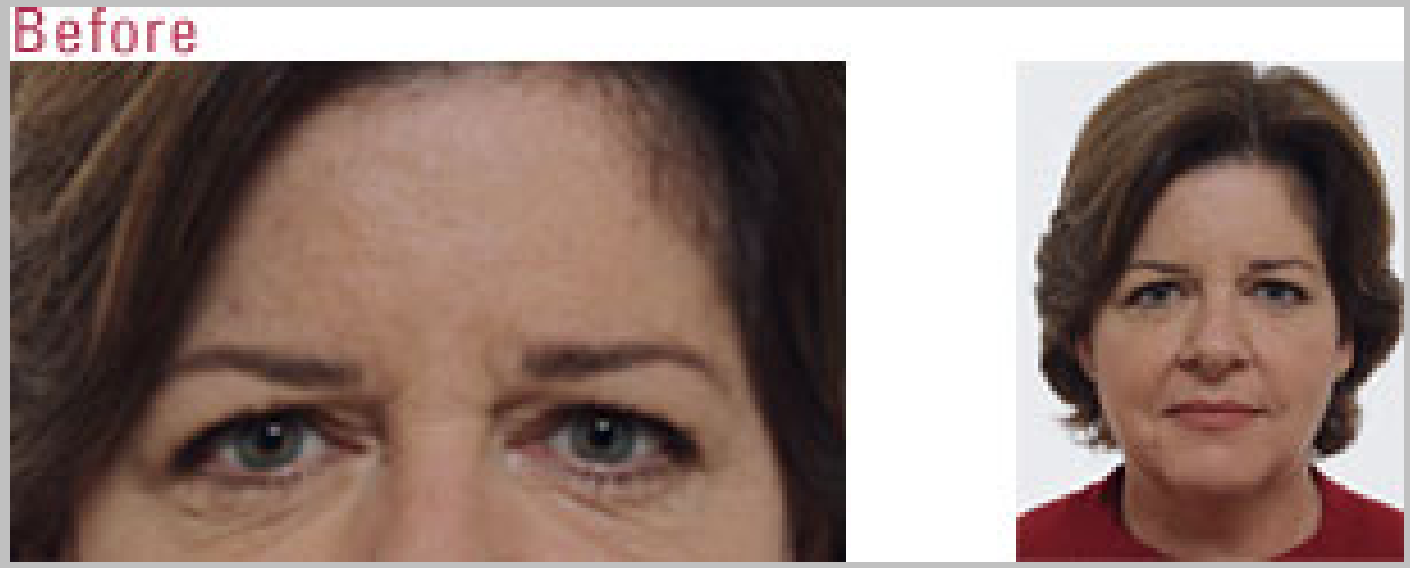
  Organic and Inorganic

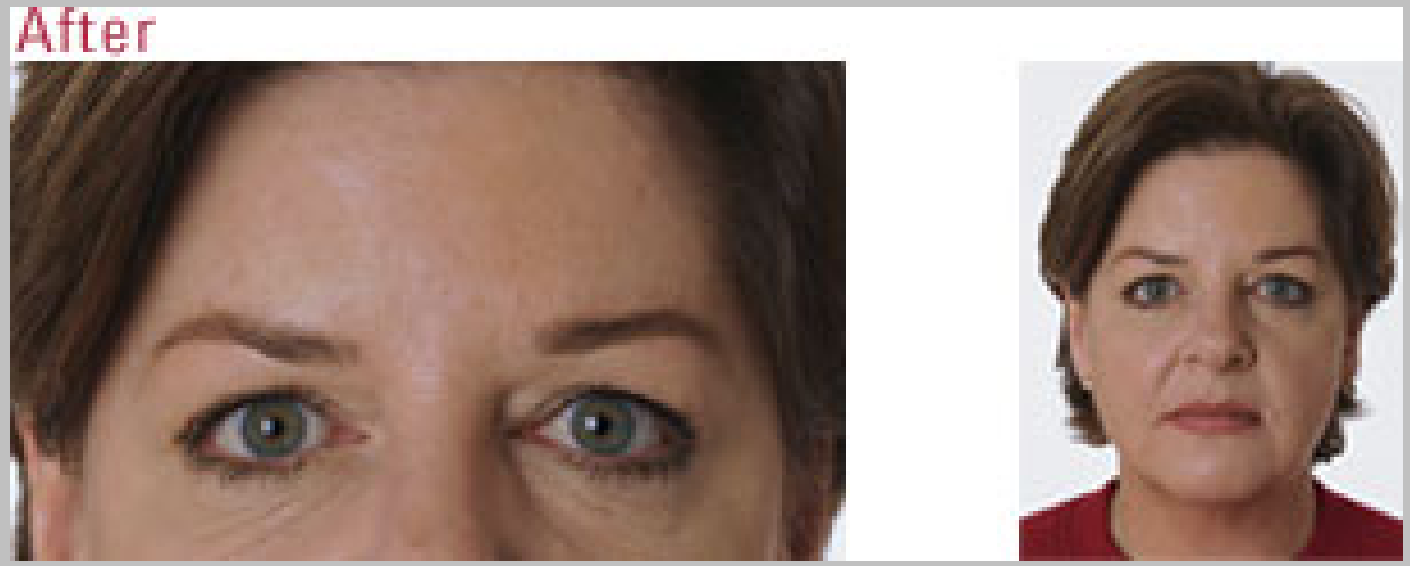
- Use

  Process •• ***Commercial Products*** •• Pollutants

Foods • Drugs • Cosmetics • Pesticides

BOTOX: *Botulinus* toxin





How much is too much? How little is OK?

Exposure

- Dose makes the poison.
- All-or-none.

Response

- Safe levels of everything.
- Anything spells harm.

Safety Evaluation

- Aware testing limitations
- Testing irrelevant.

Pesticide Perceptions in our Chemical World

Perceptions About Pesticides Jump From Food Quality Concerns

- Food Taboos
- German Beer Purity Law of 1516
- England-food adulteration (1800s)
- USA-food purity movement (1900s)
  - Meat production conditions
  - Adulteration
  - “Pesticide residues condition of production”

Food Taboos

Food is often the subject of taboo or disgust because it is internalized. ***Any revulsion we have for the food is magnified by the thought it will become part of us.***

Carole M. Counihan, 1999
Ethnographer
Millersville University, PA

Taboo Food and Drinks

- Religion
  - Forbidden consumption of meats
  - Observe vegetarianism
- Culture
  - Species standing (pets, “non-foods”)
- Health
  - Undercooked pork
  - Seafood (seasonal poisoning)
  - Scavengers and carnivores

German Beer Purity Law, 1516

Specified ingredients

Water • Malt • Hops •Yeast

Food Adulteration

today

Over 1,000 chemicals are known!

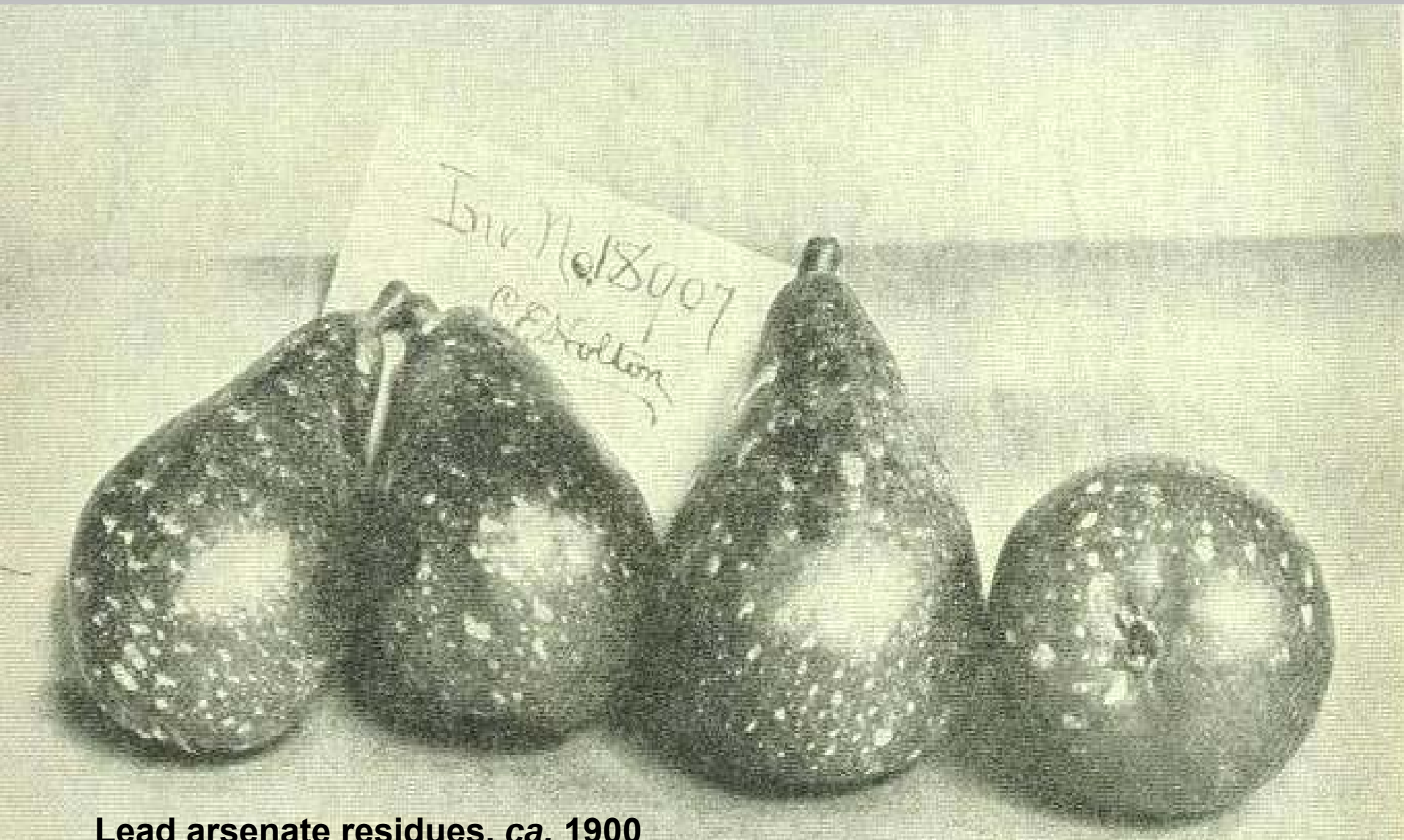
Oh we're the merriest herd of hulks that ever the world has seen;

We don't shy off from your rough on rats or even from Paris green;

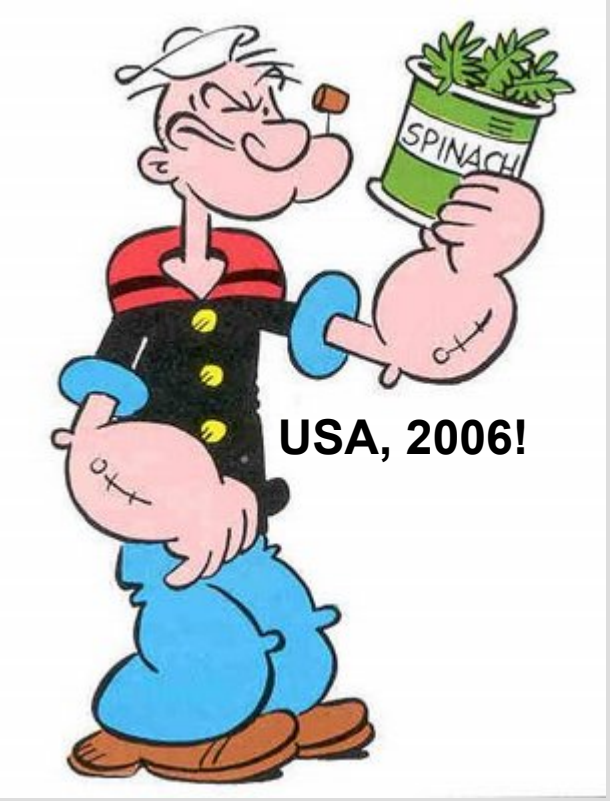
We're on the hunt for a toxic dope that's certain to kill, sans fail;

*copper aceto**arsenite***

“Pesticide residues are a condition of production…



Lead arsenate residues, *ca.* 1900

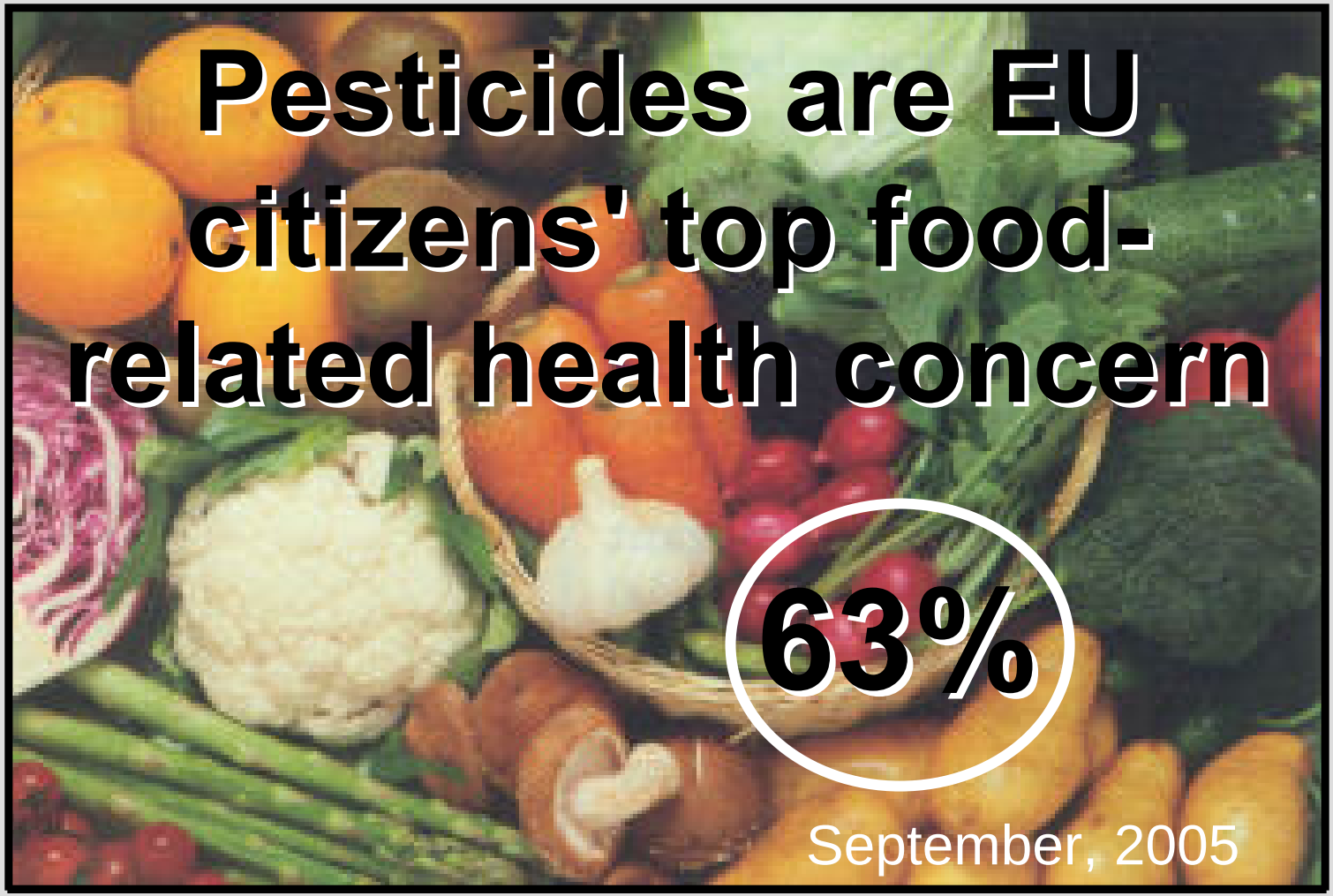


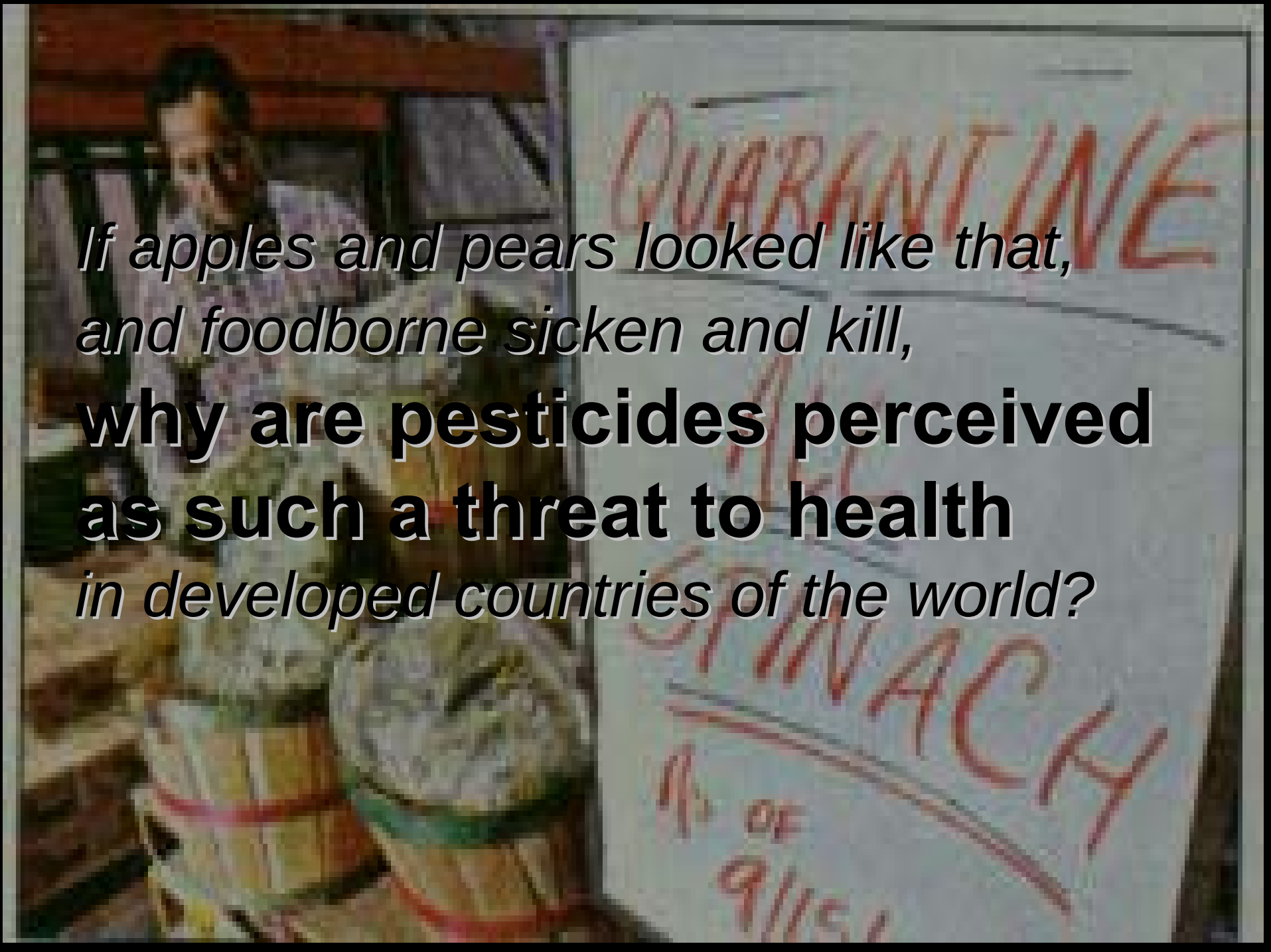
Causes of Foodborne Illness

Amnesic Shellfish Poisoning and Domoic Acid
Campylobacter jejuni
Ciguatera Poisoning
Clostridium botulinum
Clostridium perfringens
Cyclospora cayetanensis
Hemolytic Uremic Syndrome (E. coli 0157:H7)
Listeria monocytogenes
Paralytic Shellfish Poisoning
Red Tide, PSP and Safe Shellfish Harvesting
Salmonella
Scombroid Poisoning
Shigella
Toxoplasma gondii

Public health experts estimate that there are 11 to 13 million cases of foodborne illness in Canada every year. Many more in the USA...

"How many are caused by *pesticide residues*?" ***Silence***


Pesticides are EU citizens' top food-related health concern
63%
September, 2005



If apples and pears looked like that, and foodborne sicken and kill,

why are pesticides perceived as such a threat to health

in developed countries of the world?

Loss of public confidence in chemical technologies, particularly pesticides—Environmentalism!

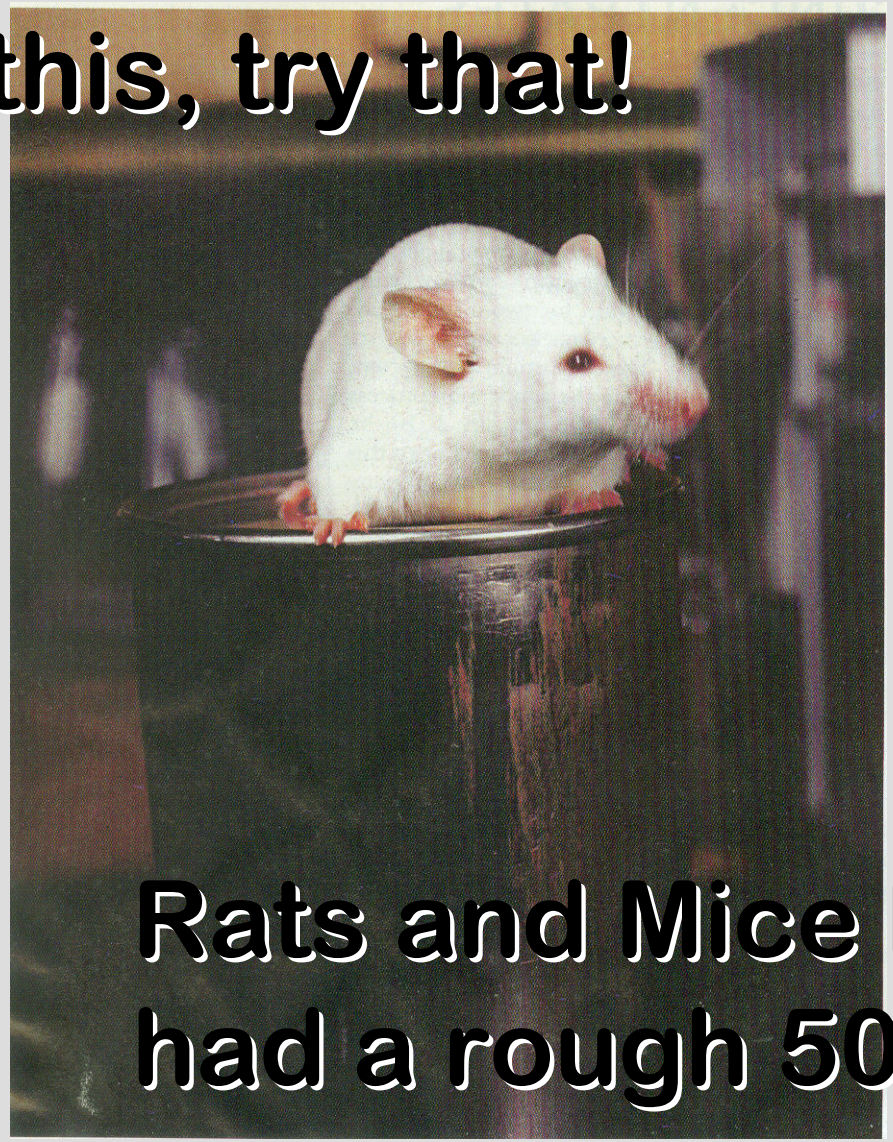
- Pure food movement
- Weapons testing
- Chemical carcinogenesis
- Minamata Disease: Mercury
- Cranberry scare
- Mississippi River fish kills
- Thin-shelled bird eggs
- Oil spills
- Thalidomide and DES
- $Cl_{many}HC$: milk, everywhere
- Water and Air pollution

- ***Silent Spring***, a 1962 novel

“My God, what have we done?”

Aug 6, 1945

Take this, try that!

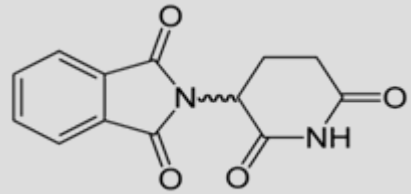


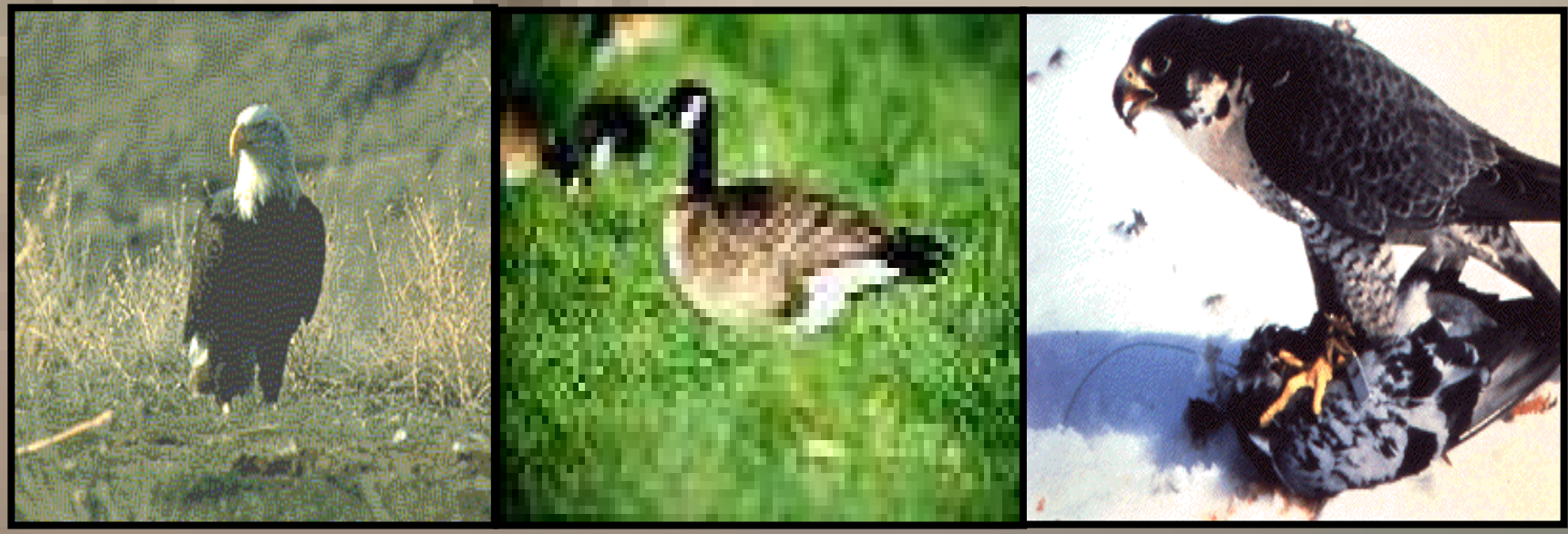
Rats and Mice have had a rough 50 years!

“…to be on the safe side, she doesn’t buy.”
1959

Failed safety evaluation….

Thalidomide was synthesized in West Germany,1953. Marketed October 1957 into 1960's. "Sample tablets" available in Canada late 1959. Prescribed for use, April 1, 1961; withdrawn, March 1962.



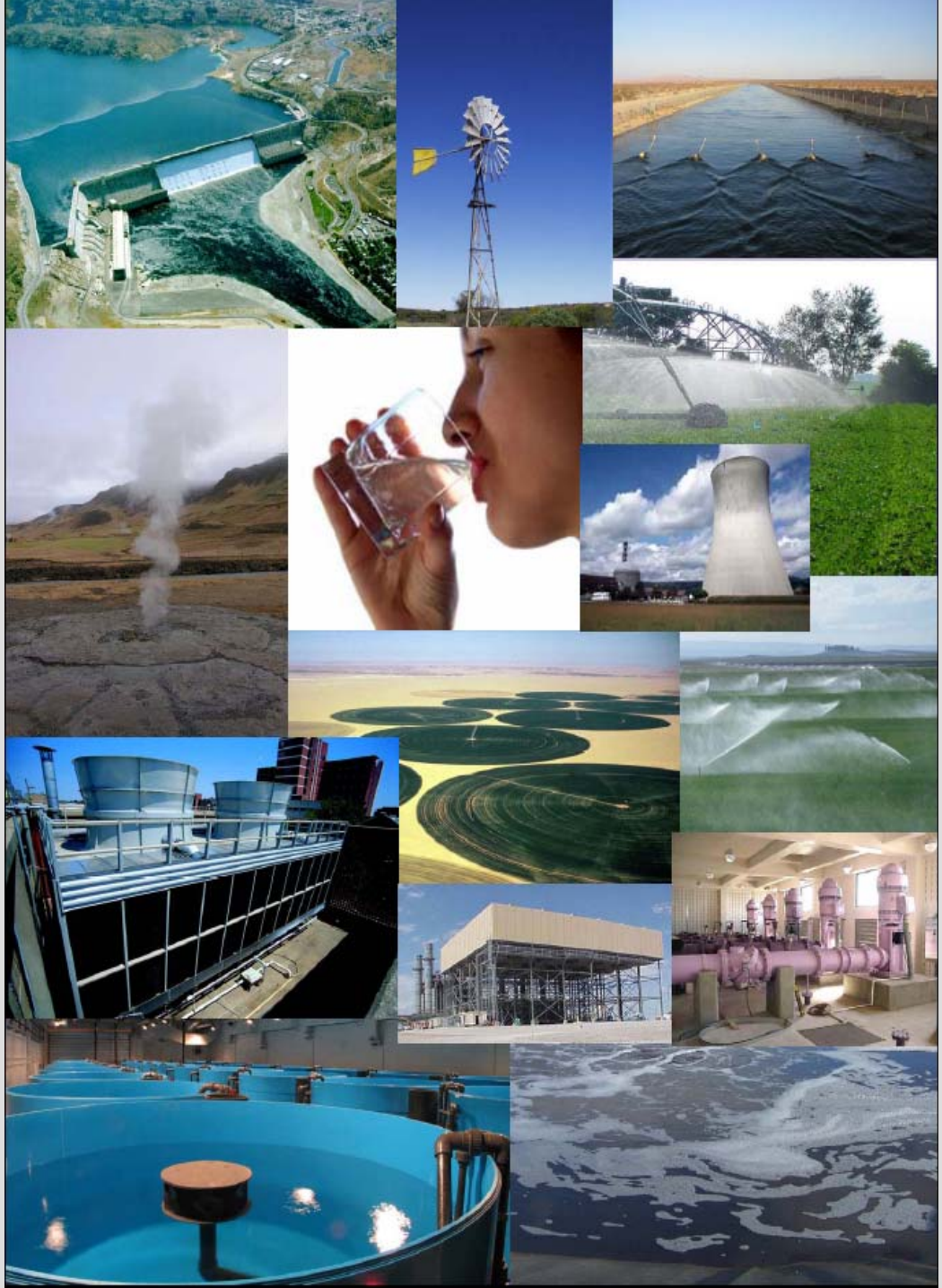


Birds have recovered much sooner than chlorinated hydrocarbons have disappeared from foods and the environment—was it really food chains and DDT biomagnification?

Modern Chemical Analysis

Confirms the

Laws of Conservation of Matter



Everything goes somewhere

that only chemical analysts can find!

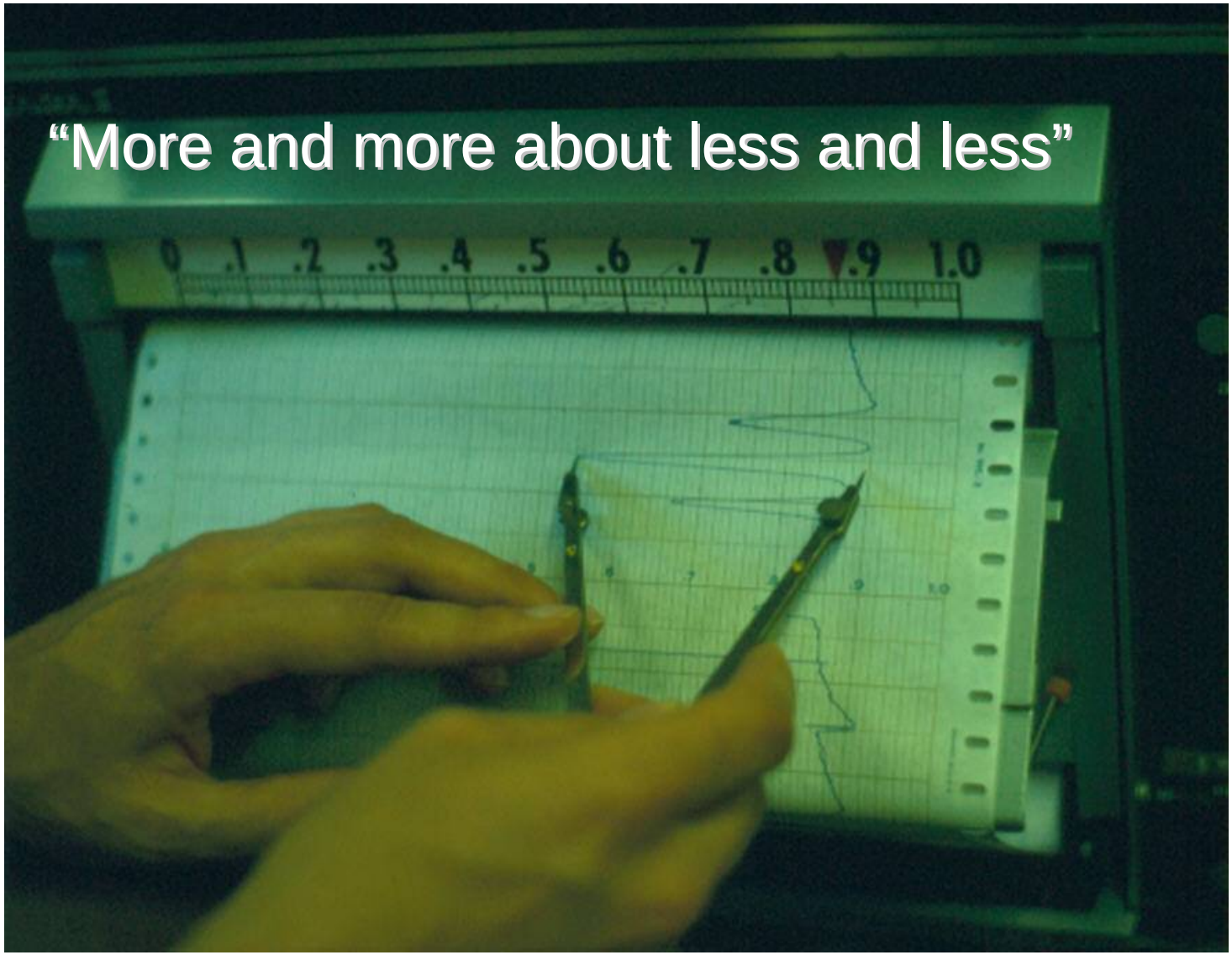
*Even **Zero** isn't none; but it is not very much!*

- 0.1 ppm is a glass in 30+ milk tankers!

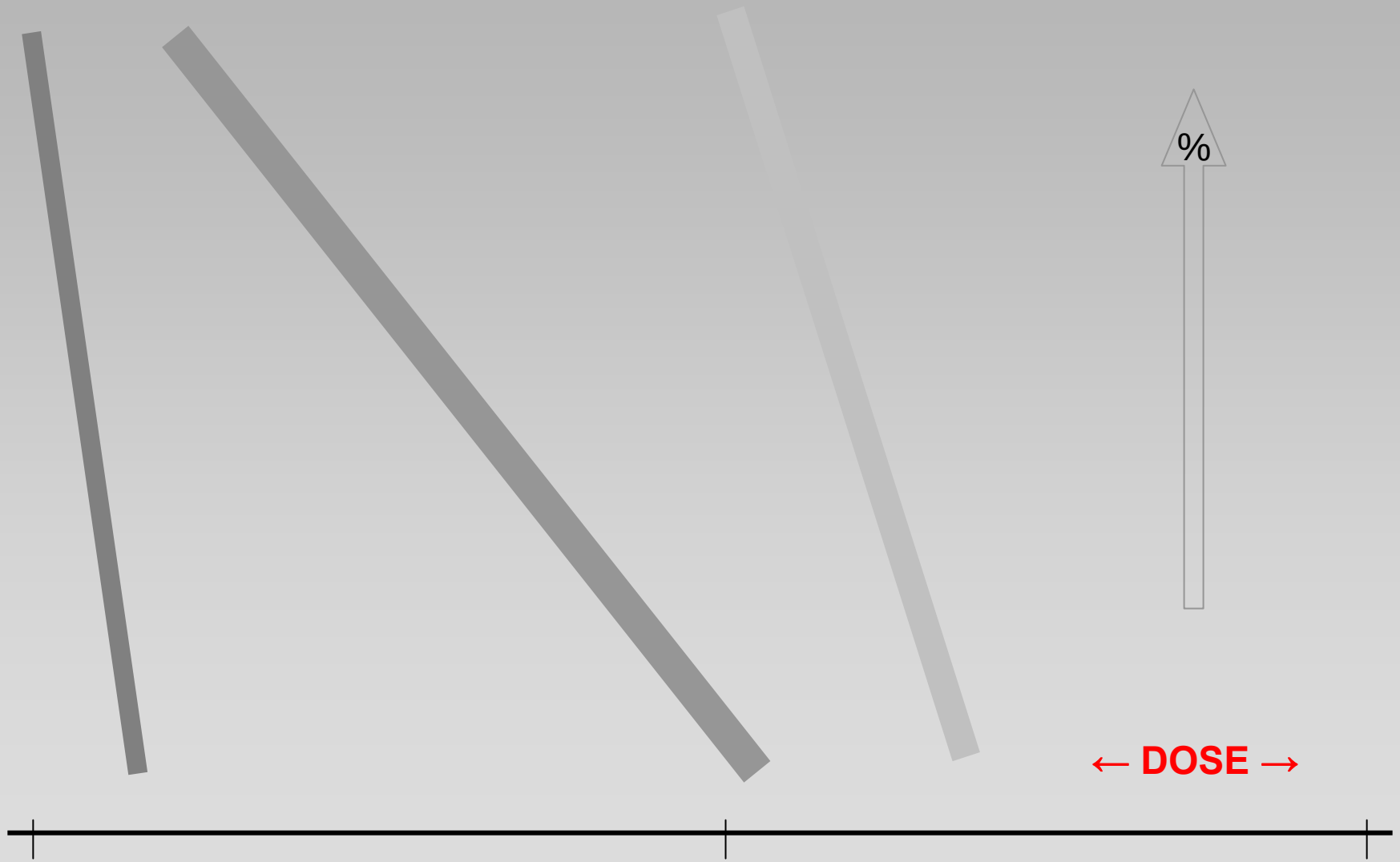
or

- 1 grain of table salt in 20 pounds

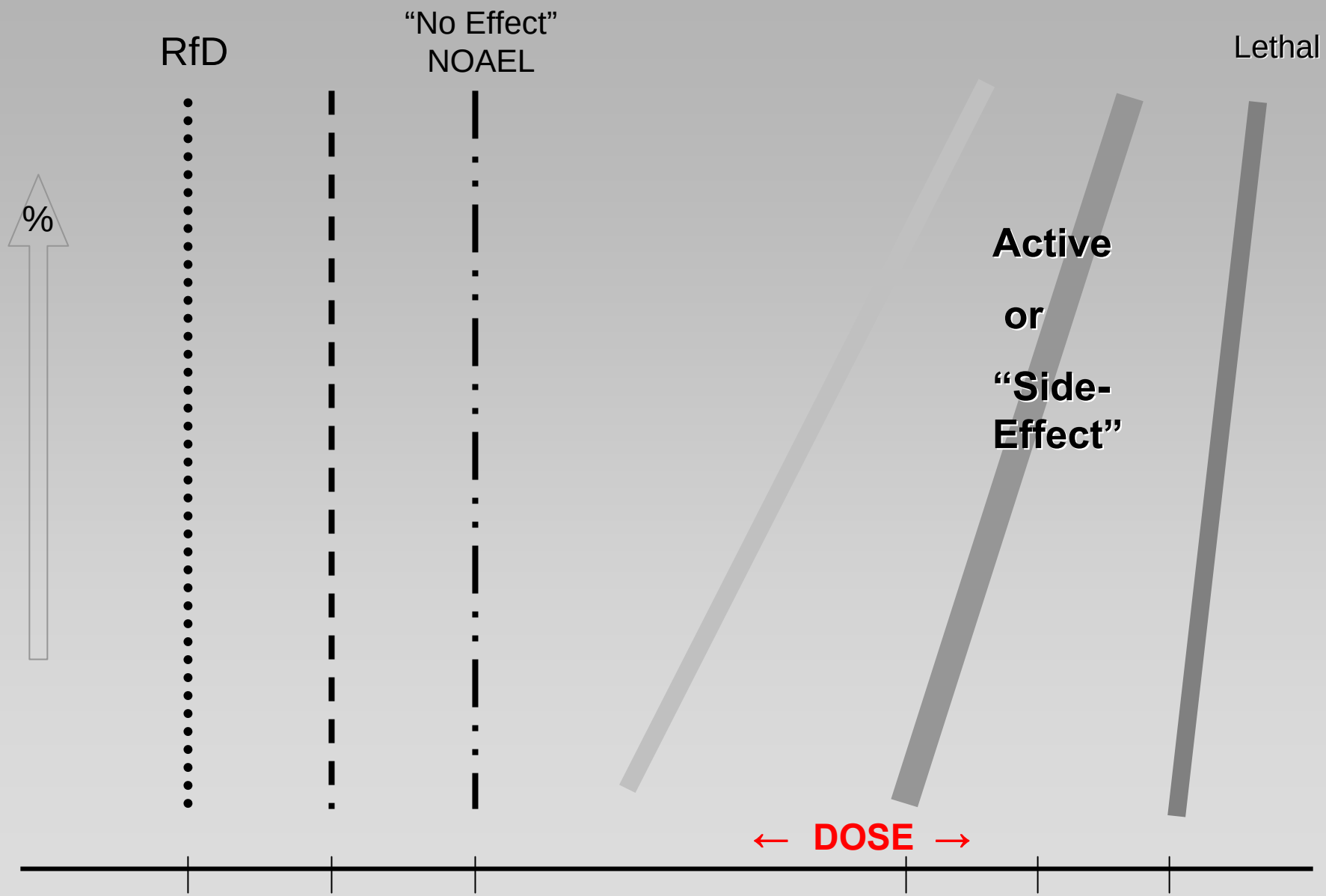
- Measurable levels are invariably below harmful amounts! ***Exposure isn't an effect!*** Residues are about marketing, Good Ag Practices, and trade!


“More and more about less and less”
0 .1 .2 .3 .4 .5 .6 .7 .8 .9 1.0

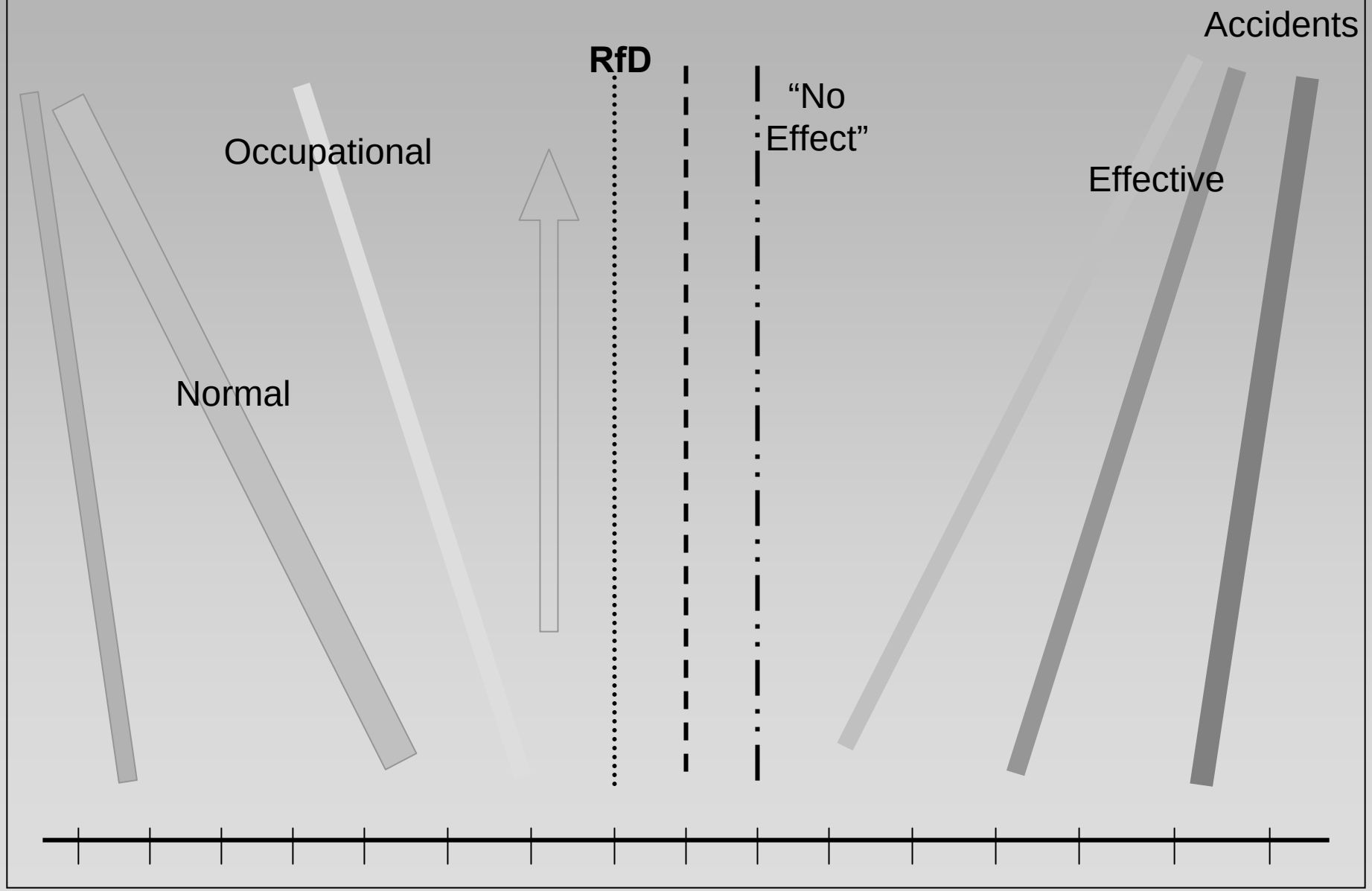
What about everyday exposures?



Safety Evaluation: Exposure-Response Relationships



Yes, Exposure goes with use!



What are the consequences?
Google Alert for: **pesticide illness**

- *Media reports classified 151, 01-03 & 09-12,2006*
- **Illnesses** **3%**
- Suicides <1%

- Symptoms like… 15%
- Food and diet 17%
- Community/mosquito 24%
- Campaigners 13%
- Others (each <5%)

PCEP: Respond to fears and anxiety about community pesticide spray programs!

- **FREE** analysis of urine specimens submitted by a physician
- **FREE** analysis of at least 10 sets of urine specimens submitted by public health or campaigner organization
- **FREE** analysis of sets of urine submitted by an individual with a specific request

Why **FREE**? There must be support for efforts to improve chemical literacy

- **There have been no takers so far!**

- Davis (UCD) and Woodland, CA
- Sacramento, CA
- British Columbia, Canada

- PCEP Hypothesis: It is more rewarding to raise hell than to raise understanding!

How Perceptions About Chemicals Are Being Shaped!

Environmental Justice

Or

Advocacy Blackmail?

Everyone *knows* how bad *they* are!

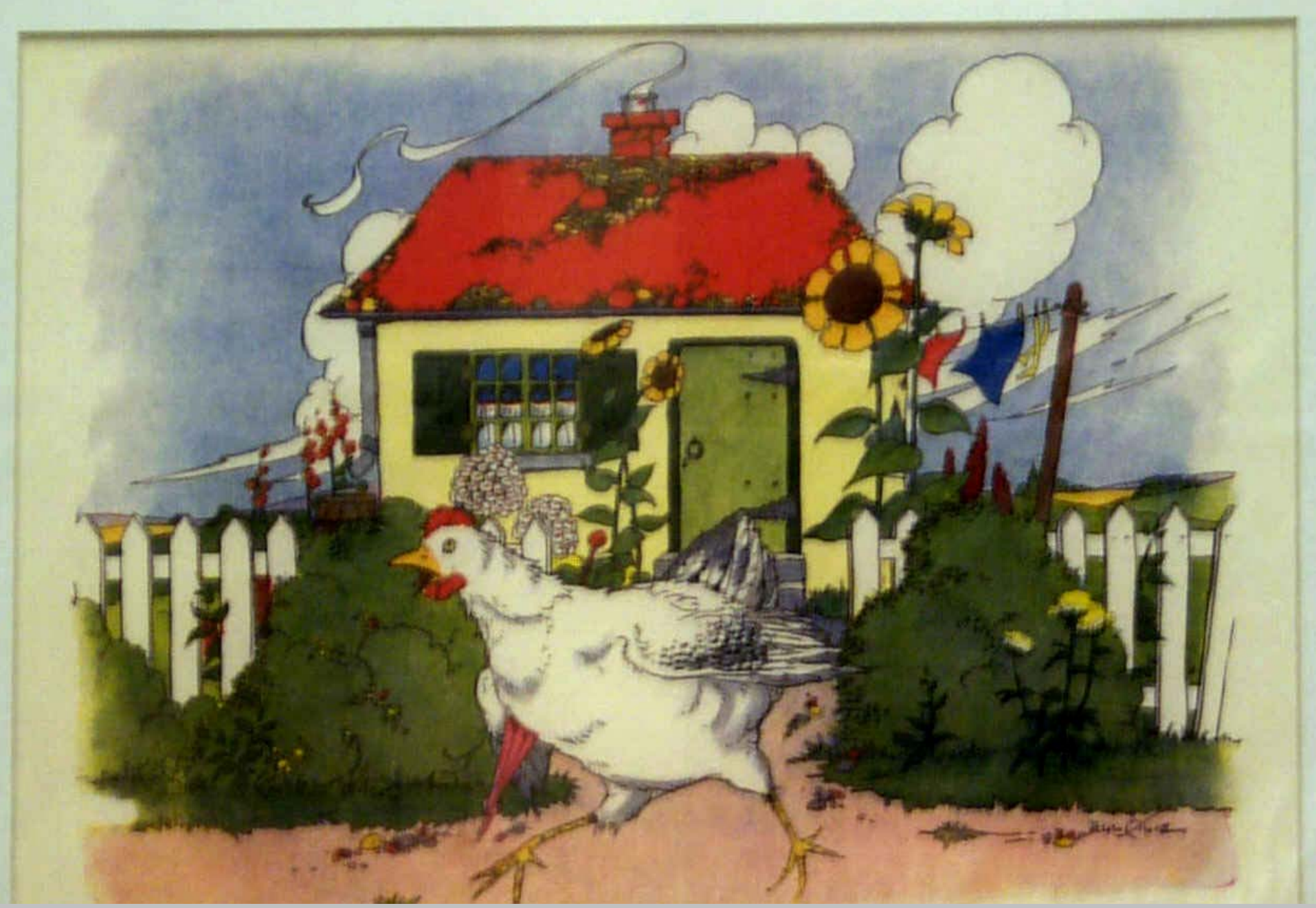
Rachel Carson (1962) and media like Calgary Herald, Ottawa Citizen, NY Times, Windsor Star, Dose, EDF, NRDC, PAN, Landrigan, Seymour, Sheen, *CTV, CNN, etc.*

New findings from Institute Analysts: *mg·ug·ng·pg·fg·at*

They can now find *a flea* in a line of full-grown, circus elephants!

What to do with this new insight?
Regulate!

- An alarmed, chemically naïve public
- Extremely low exposures
- RfDs become illness thresholds!



Chicken Little Regulation--"…the sky is falling!"

Risk Reduction: Exposures for a 70 kg rat with 1000x safety factor

√ **Decaf coffee**

- Non-Alcohol beer
- Tooth brightner
- Potatoes

- Caffeine
- Ethanol
- Peroxide
- Solanine

Just how crazy is this?

Risk$_{\text{None/Big numbers!}}$? Just a minute…

Chemicals, including pesticides, are not associated with *risk* unless they cause a *harmful* response in a vulnerable group of *exposed* people.

1. **Chemical**
2. **Exposure**
3. **Toxicity**

Demonstrate safe pest management…

- Everything goes somewhere.
- Exposure is inevitable at some level.
- Even *zero* isn't none!
- Exposure is not an effect.
- *How little is OK?* Usual amounts.
- What is *usual*? Follow the label.

Chemicals *are* the Environment

Use your imagination…there is lots to do!

- Exposure is ***only*** the chemical part of risk
- Pest management safety…is ***mostly*** a continuing education process

New perspective…

The revulsion for ~~food~~ **pesticides** is magnified by the thought it will become part of us.

B. Krieger@Calgary, 2007

Safe pest management?

Yes, it is yours to do!

We have a good animal model!

Bob Krieger, UC Riverside

Calgary, Canada 2007

Look at Safety
Record

Unintentional Injuries On-the-Job

Injury Division	Workers x 10^3	Deaths 2003	Deaths per 10^5 Workers
Agriculture	3,340	710	20.9
Mining	539	120	22.3
Construction	9,268	1,060	11.4
Manufacturing	17,708	490	2.8
All industries	138,988	4,500	3.2

US National Safety Council, 2004

Causes of Death, 2004

Cause	Number	Deaths per 10^5 Deaths
All unintentional injuries	101,537	35.6
Motor-vehicle	43,788	15.4
Falls	15,019	5.3
Poisoning	14,078	4.9
Pesticide	7	0.0025
Choking	4,185	1.5
Drowning	3,281	1.2
All other	21,186	7.4

National Safety Council, 2004

California Illness and Injury Data Classified by Definite, Probable, and Possible Exposures[1]

Year	Total cases	Relationship of Illness or Injury to Pesticide Exposure					
		Definitely or Probably			Possible		
		Cases	Hospitalized	Lost work time	Cases	Hospitalized	Lost work time
1999	1,629	830	32	126	371	2	51
2000	1,144	637	33	144	256	3	51
2001	979	430	27	78	186	2	25
2002	1,859	924	19	106	291	6	42
2003	1,232	614	8	70	188	1	42

[1]Definite: Signs and symptoms would be expected from exposure described. Probable: Close correspondence. Possible: Some correspondence.

Substances Most Frequently Involved Children Under 6

Substance	Number x 10^5	Per Cent
Cosmetics & personal products	1.7	13.4
Cleaning substances	1.2	9.7
Analgesics	1.0	7.8
Foreign bodies	0.92	7.4
Topicals	0.92	7.4
Cough and cold preparations	0.68	5.5
Plants	0.58	4.6
Pesticides	0.51	4.1
Vitamins	0.45	3.6
Antimicrobials	0.35	2.8
All other	1.5	11.2
Total	12.5	--

American Association of Poison Control Centers, 2003