

Some things mosquito people need to know about

# **Pesticide Toxicology**

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# Prelunch Menu

1. Pesticide Safety Evaluation
2. Responding to Concerns About Spraying
3. Be Clear About Hazard and Risk

# Safety Evaluation: Toxicology

Scientific study of harmful effects of chemicals

- **Effects** are determined by dose
- Principle made by a physician, alchemist, philosopher: Paracelsus, 1450
- *If dose determines a poison, there must be a safe level of everything!*

# Pesticide

Pesticide. Any substance which alone, in chemical combination, or in any formulation with one or more substances is defined as a pesticide in section 2(u) of the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136(u) et seq).

# Six Pack: Basic Acute **Toxicity Testing**

- Lethal oral dosage
- Lethal skin dosage
- Lethal inhalation dosage

- Eye irritation
- Skin irritation
- Sensitization (*allergy*)

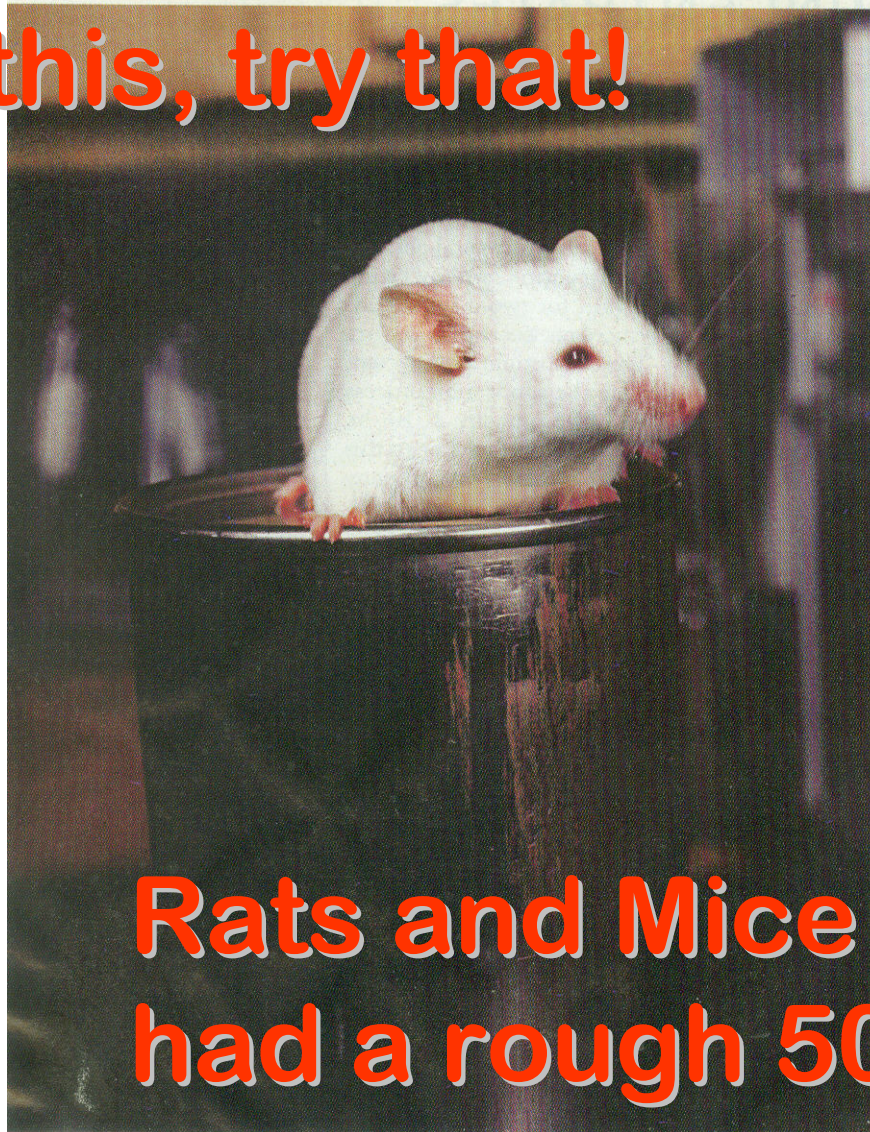
# The Pesticide Product Label

The label helps you  
get maximum benefit  
at minimum risk.

*Safe use instructions*

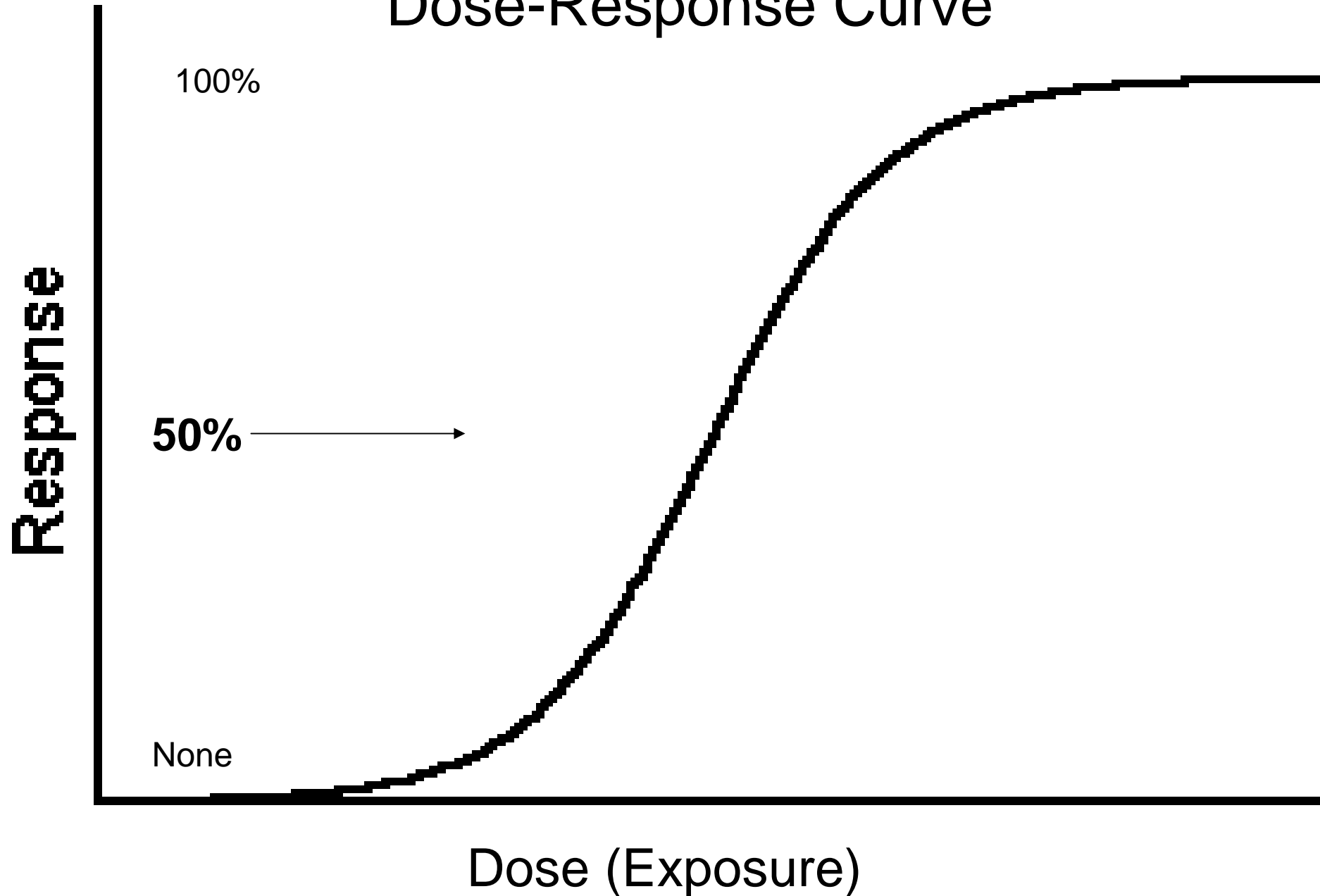
*Signal word*

**Take this, try that!**



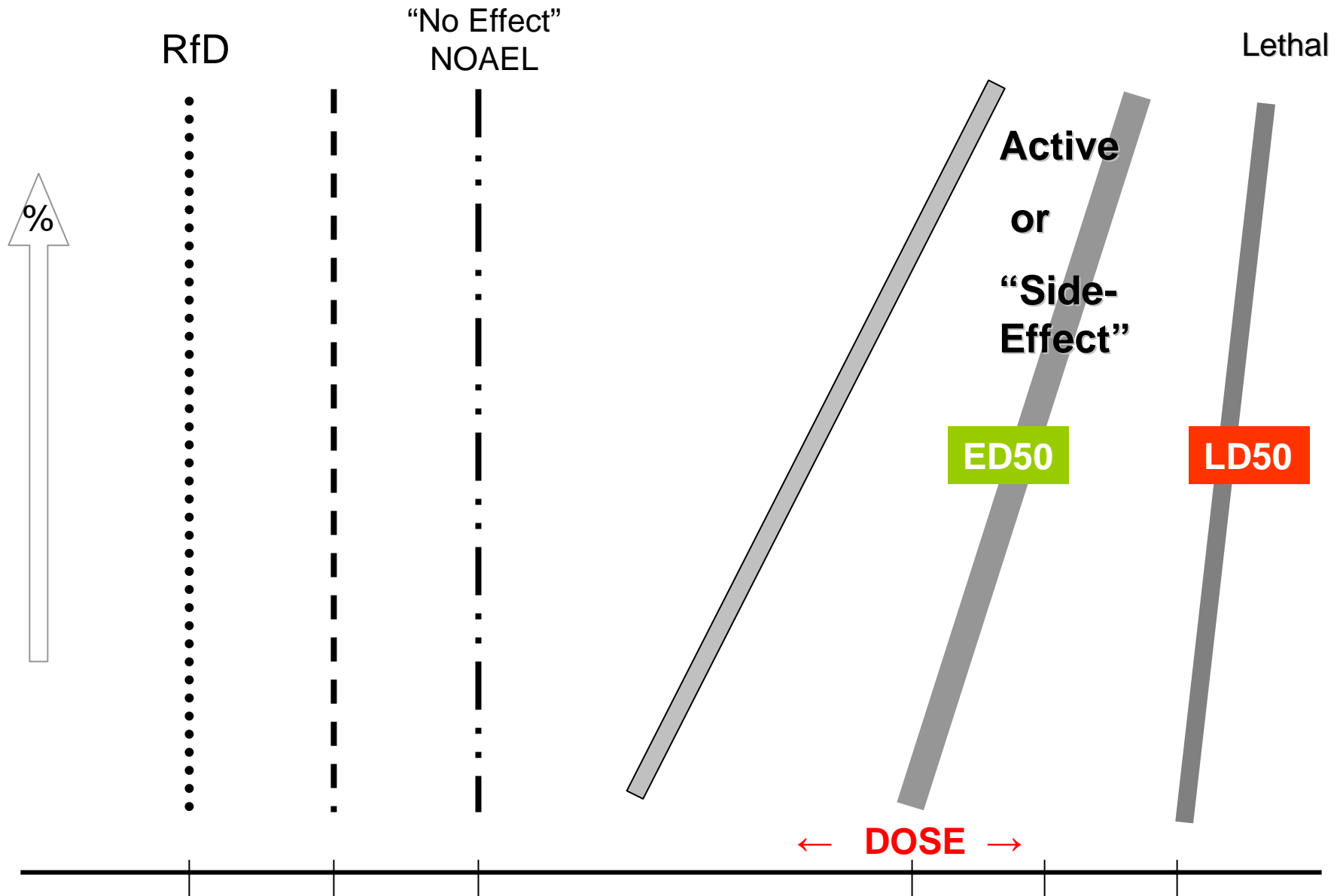
**Rats and Mice have  
had a rough 50 years!**

# “Dose-Response Curve”





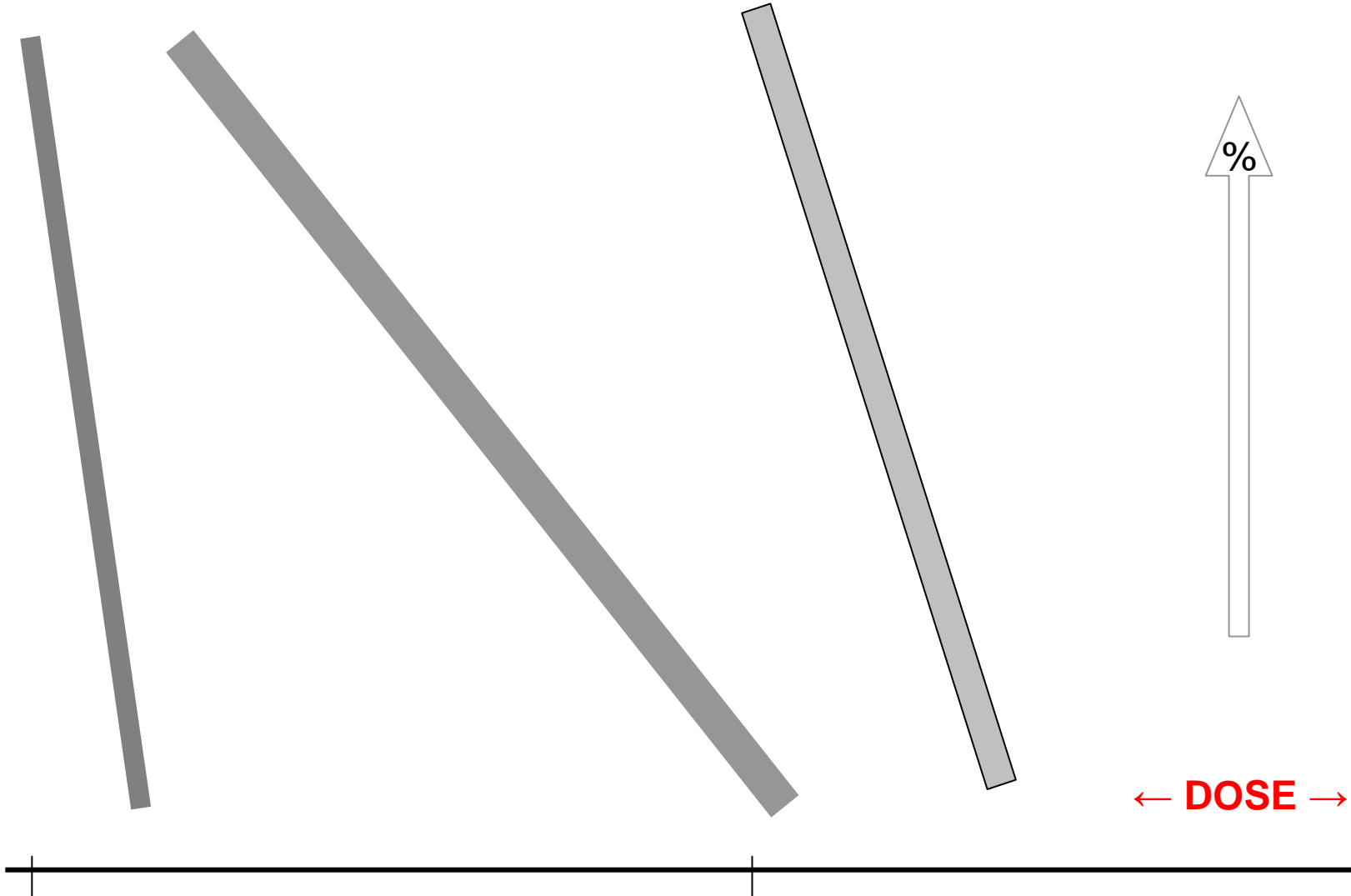
# Safety Evaluation: Exposure-Response Relationships



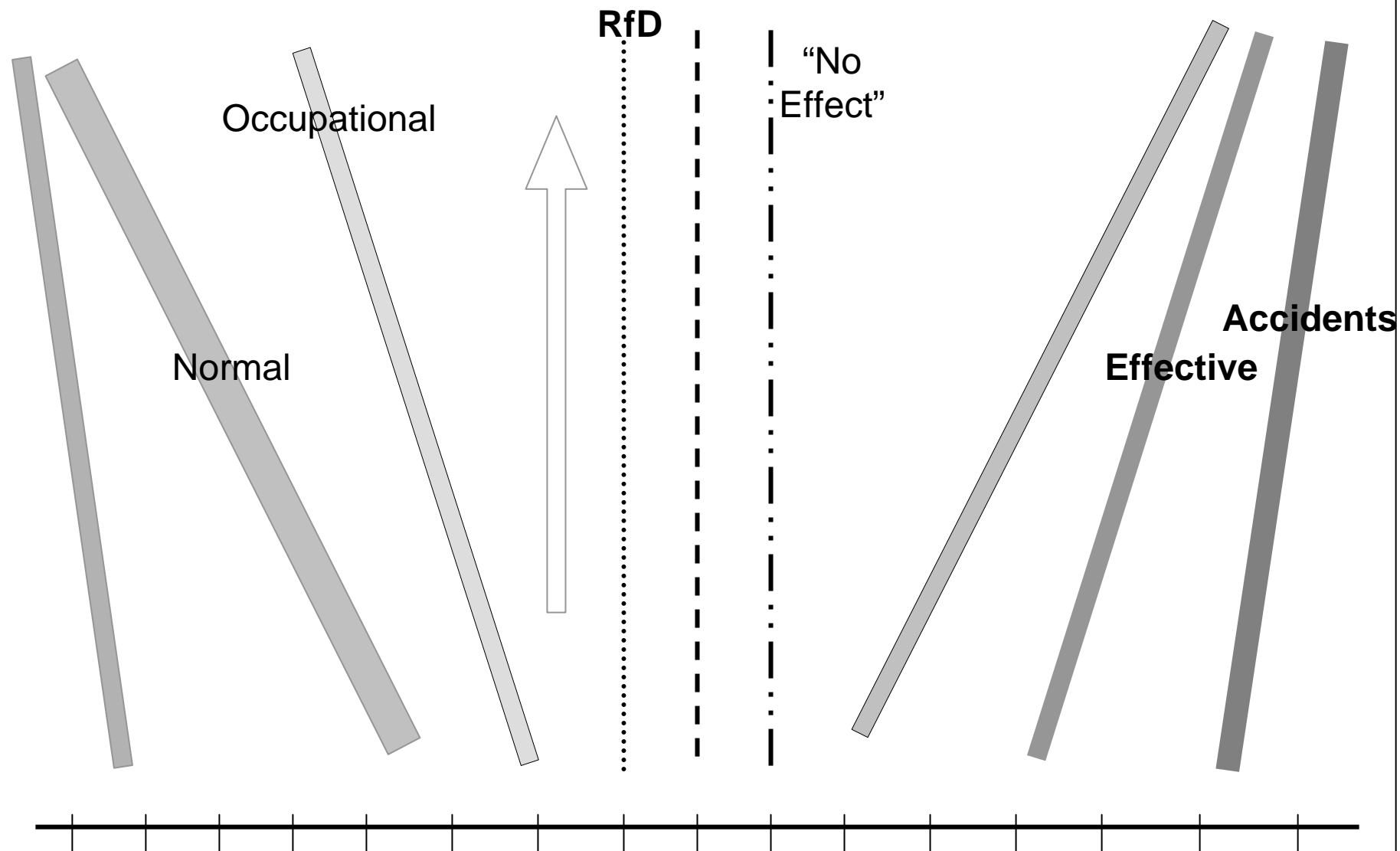
# What about everyday exposures and safety evaluation?

Normal

Occupational



**Yes, Exposure goes with use!**



Pesticide use is always linked to human exposure at some level

With increasing frequency,  
Exposure can be measured!  
Exposure is contact, not a disease!

*Dose determines a poison!*

*Paracelsus, 15<sup>th</sup> century*

*But, most importantly*

*Dosing does it!*

***Pesticide Safety is  
about use!***

# Responding to spraying

- Everyone knows!
- Everyone exposed!
- Somebody ill.
- Investigate!

# Responding to spraying

Everyone knows!

- Pesticide issues
  - Health
  - Vulnerable people
    - Children/schools
    - Aged
  - Environmental quality
  - Principle
  - Property
  - Resisting authority
  - Other

# Responding to spraying

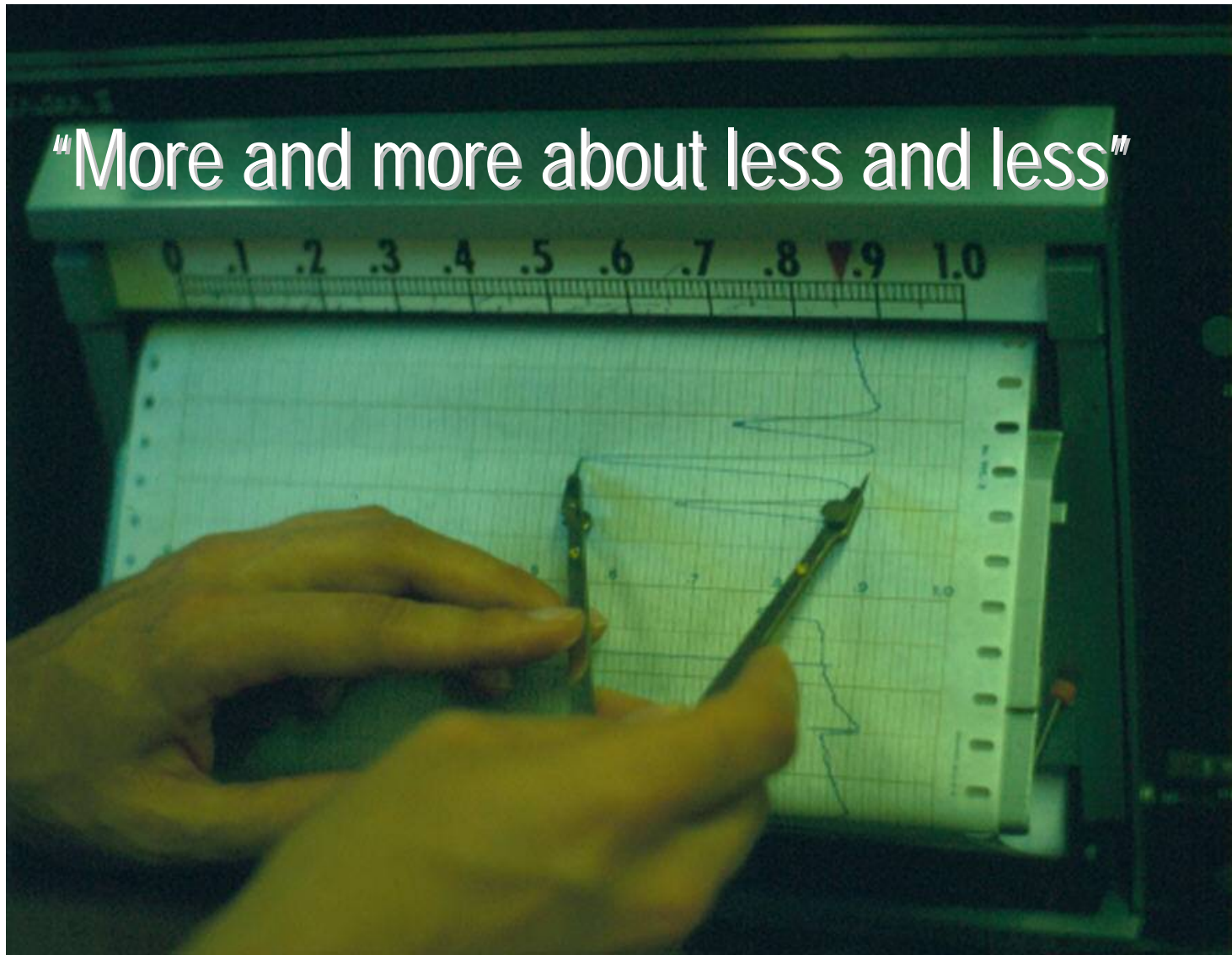
Everyone exposed!

- Clarify issues
- How much exposure!
  - Not a disease
  - <Reference Dose, RfD
  - <**NO Effect Level**
  - <Toxic threshold
  - <LD50

*More and more, about  
less and less!*



"More and more about less and less"



# Responding to spraying

*Somebody ill!*

- Illness is a human condition
  - It exists if it exists!
  - Description of feelings
  - Signs and symptoms
  - Physicians diagnose disease

*Exposure is not an illness*

# Responding to spraying

## Investigate

keep  
good  
records

- How much is too much?
- How little is OK?
- Revisit the issues!

# Pesticide Mosquito Spraying

- Investigate!
- Everyone exposed!
- Somebody ill.
- Everyone knows!

***Check it out!***

***Safe***

***Predictable***

***Specific use.***

# Spraying Near School

- Everyone knows!
- Everyone exposed!
- Somebody ill.
- Investigate!

Pesticides sprayed

“really strong smell”

Sickened students; 10  
to ER for treatment

No more spraying  
during investigation!

# Sources of “really bad smell”

- Stinkweed plowed under (January 2008)
- Malathion use by school custodian
- Herbicide drift turfgrass farm (May 2007)
- Esfenvalerate (Warrior) spray on corn seed plot by Syngenta (January 2008)

*“The sickening sound of the spray vehicle and vipers hiss of pesticide dispersal were carried on the wind over our campus.”*

# Hazard and Risk are not the same!

- **Hazard**

- Kinds of harm a chemical can have.
- Usually from animal testing
- Laboratory testing

- **Risk**

- Likelihood a harmful effect will happen.
- First concern is people
- Conditions of use

# Risk None/Big numbers! ? Just a minute...

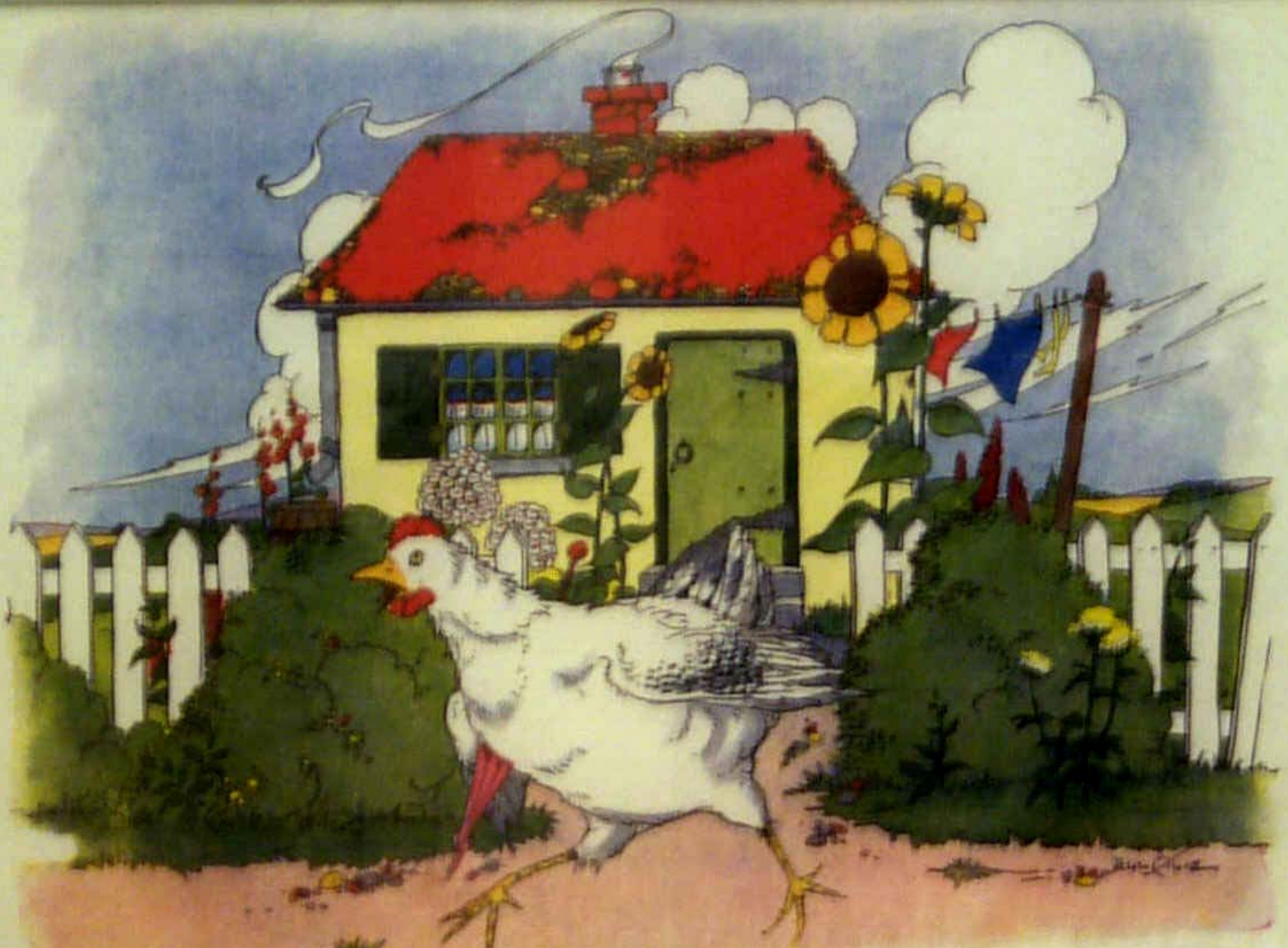
*Chemicals, including pesticides, are not associated with risk unless a vulnerable group of people are exposed and show a harmful response.*

**1. Chemical**

**2. Exposure**

***3. Harm***





**Chicken Little**

# Demonstrating safe pest management...

- Everything goes someplace.
- 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*? Heed the label.

# Including the fine print...

- Dose is *just* the chemical part of risk—dosing is what *you do* on the job!
- Safe pest management...risk reduction must be an ongoing educational process
- Know your stuff!

# Enjoy your lunch!

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