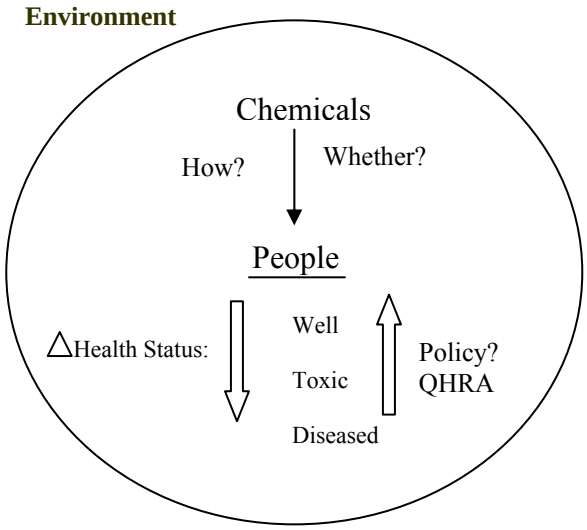
BE.104- Spring 05
Lecture 1

Introduction

I. Introduce lecturers, and TA
Review course schedule, syllabus, policies

II. Overview of course - Sherley



Source
1) **Natural**
2) **Extraterrestrial**
3) **Anthropogenic, Iatrogenic**
4) **Endogenous**

1) How do chemicals cause toxicity and disease?

2) How do you evaluate whether an environmental chemical has a health effect on human populations?

3) What is the quality of studies and information regarding chemicals and public health effects?

4) What are the principles for establishing public health and safety regulations for potentially harmful or known harmful agents?

5) What are the social and political forces that affect how these questions are addressed?

II. Examples for consideration

1) Why do we get sick?
   Bad genes (Inborn errors of metabolism)
   Bad environment (Chemicals, infectious agents)
   "Bad Luck" e.g. Accident ⟶ Condition ⟶ Disease

   Pancreas ⟶ Diabetes

   Biological Instabilities- Aging

2) How do we know that a chemical is responsible for a change in health status?

   Consider familiar: "disease" ⟶ well

   Headache ⟶ Tylenol ⟶ well

   How do we know that the Tylenol is the <u>cause</u> of someone getting better?

   a) Intervention effect- APPARENT
   b) Historical considerations- less headaches since introduction of pain killers-PK
   c) Population studies- PK vs placebo (?)

   Common Feature?- All are <u>Associations</u>
   Can't <u>prove</u> cause-effect by association.

   So we <u>quantify our degree of uncertainty</u> that the association is due to a cause-effect relationship. Small uncertainty for Tylenol.

   E.g. of <u>being wrong</u>?

   a) Bacterial pneumonia ⟶ Abx ⟶ Better
   ⟶ w/o Abx ⟶ Usually worse

   b) Viral pneumonia ⟶ Abx ⟶ Better
   BUT
   c) Viral pneumonia ⟶ w/o Abx ⟶ Better

   How do we discriminate against such a situation?
   We consider mechanism: We ask *"Is a cause-effect relationship plausible, given what we know about how the agent in question can act?"*

	<u>Bacteria</u>	**vs**	**<u>Virus</u>**
Bac. Test	Detected		Not Detected
	Abx success/Abx failure >>1		Abx success/Abx failure ≈1
	Supports C-E		*C-E Not supported*

3) Consider more difficult

Well ⟶ Agent ⟶ Chronic disease

Does cigarette smoke cause lung cancer?

	Cancers
100 smokers ⟶	10
100 non-smokers ⟶	1

Why do 90 smokers not get cancer?
- Genes?
- Environment? ⟶ Dose, exposure, other
- Lucky? (Don't live long enough?)

Why does 1 non-smoker get cancer?
- Genes?
- Environment (ETS) ←
- Unlucky?

The goal of the course is to gain proficiency in:

Evaluating whether identified environmental agents are responsible for associated health effects in populations

Discovering unidentified agents in the environment that are responsible for adverse public health effects

Knowledge of mechanisms by which environmental agents cause toxicity and disease

Methodologies for use of epidemiological and toxicological data to develop sound public health policies