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Introduction to occupational and environmental health [Power Point]

Linda Forst

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Introduction to Occupational and Environmental Health

Linda Forst

Monteverde, Costa Rica

July 7, 2003

The Environment

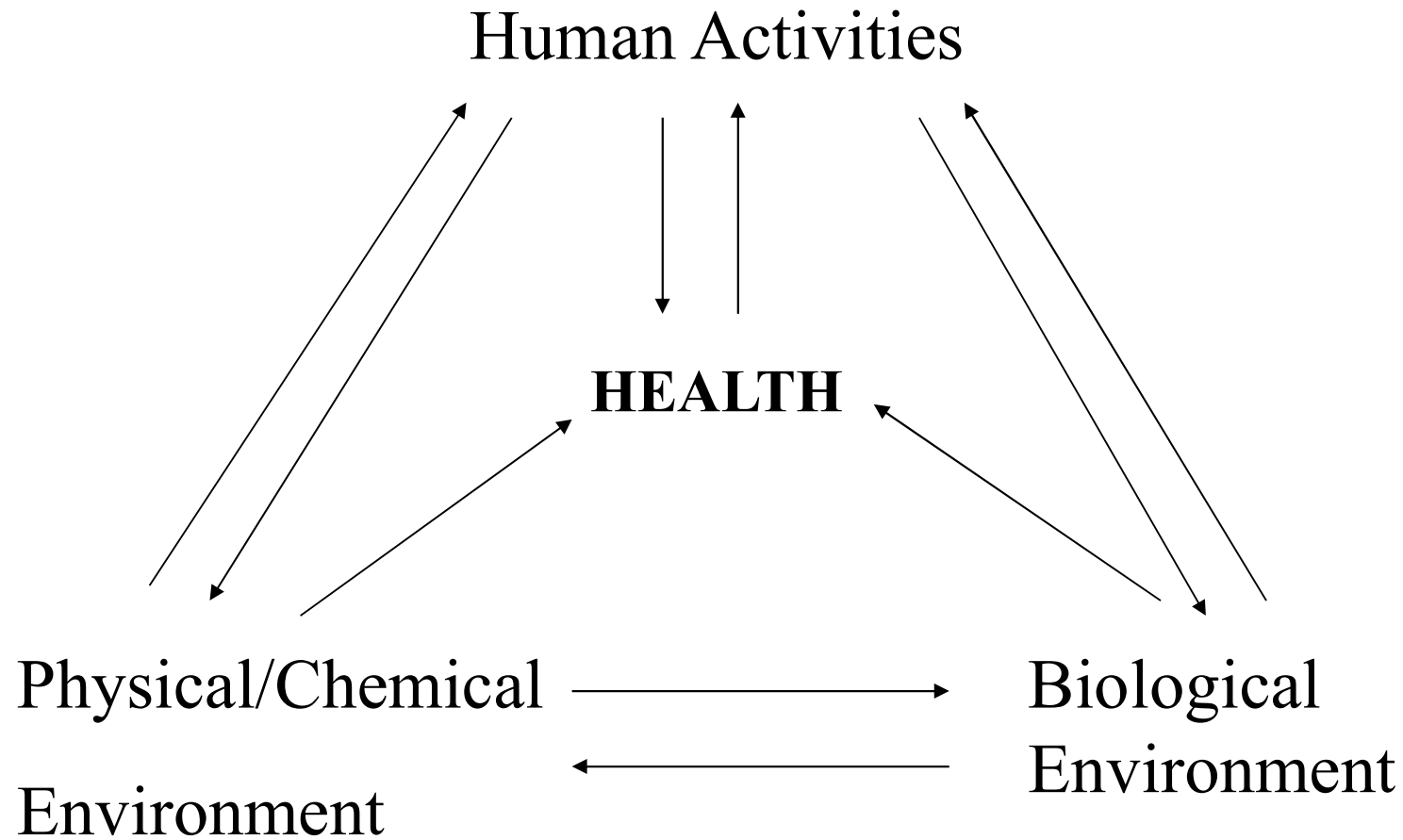
Environ Health Science is about:

- Hazards in the environment
 - Effects on health
 - Variations in sensitivity in the population
- Effective means of preventing hazards

EH draws from several disciplines:

- Ecology
- Epidemiology
- Toxicology
- Chemistry
- Public policy
- Engineering
- Physiology/biochemistry

Interaction--Environment & Health



“Sustainable Development”

- Development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development)
- To promote health, an adequately prosperous economy, a viable environment, and a convivial community
- Includes concept of “equity”

Basic Requirements for a Healthy Environment

- Clean air
- Safe and sufficient water
- Adequate and safe food
- Safe and peaceful settlements
- Stable global environment



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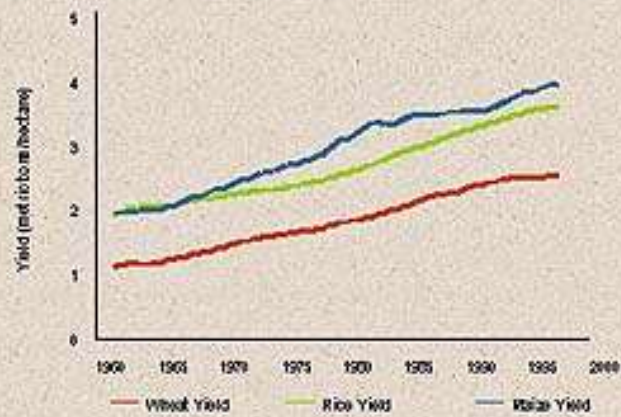
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Woman in Togo collecting water for her family

Yields Are Up, But Growth is Slowing



Yields Are Up, But Growth is Slowing

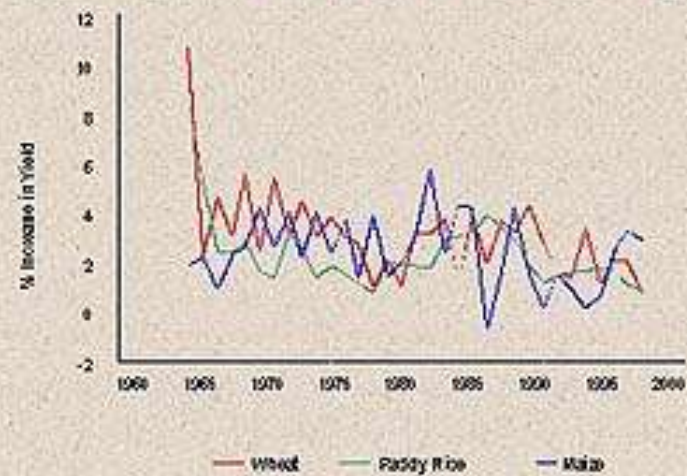
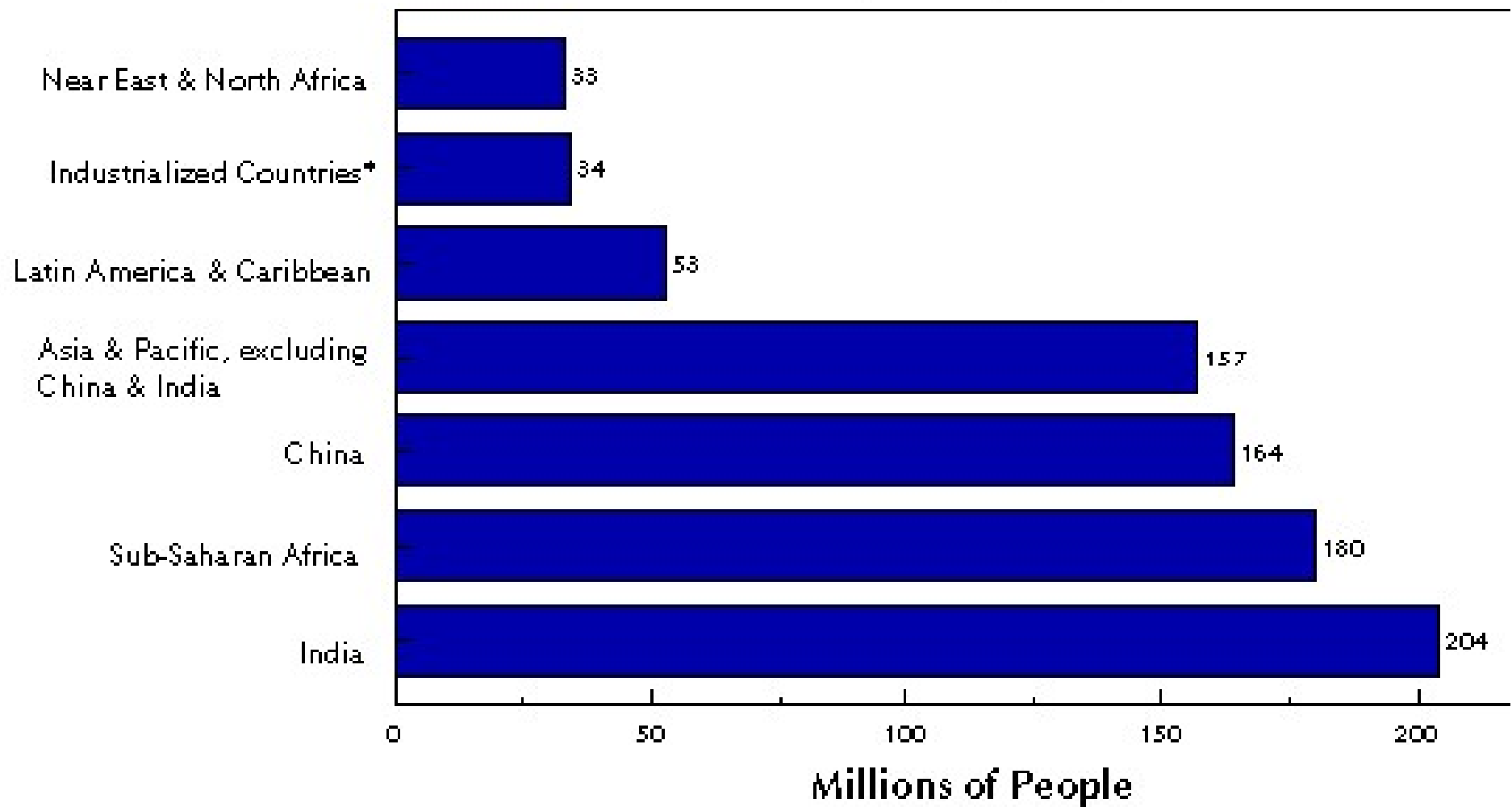


Figure 1. Hunger Around the World

Number of Undernourished People, by Region, 1995–1997



Source: Food and Agriculture Organization of the United Nations (FAO), 1999 (78)

*Includes countries in transition.

The 25 Biodiversity Hotspots



1. Tropical Andes
2. Mesoamerica
3. Caribbean
4. Atlantic Forest Region
5. Chocó-Darién-Western Ecuador
6. Brazilian Cerrado
7. Central Chile
8. California Floristic Province
9. Madagascar and Indian Ocean Islands

10. Eastern Arc Mts. & Coastal Forests
11. Guinean Forests of West Africa
12. Cape Floristic Province
13. Succulent Karoo
14. Mediterranean Basin
15. Caucasus
16. Sundaland
17. Wallacea

18. Philippines
19. Indo-Burma
20. Mountains of South-Central China
21. Western Ghats and Sri Lanka
22. Southwest Australia
23. New Caledonia
24. New Zealand
25. Polynesia/Micronesia



Vulnerable Populations: Children



- Detox systems not developed: brain, liver, kidney
- Metabolic rate high (faster respiration)
- Hand-mouth behavior
- On the floor
- Live long enough to experience effects (e.g., cancer)

Vulnerable Populations: Women

- Pregnancy
- Inadequate nutrition
- Lack of education
- Heavy work loads
- Discrimination in occupations



Vulnerable Populations: Elderly

- Decreased immune function
- Slowed metabolism
- Chronic disease
- Long history of exposure/latency
- Malnutrition



Vulnerable Populations: Disabled

- 500 mil disabled in world
- 80% in developing countries
- Impoverished, susceptible
- Chronic illnesses



Vulnerable Populations: Indigenous Peoples



- Health disparities
 - Poor access to health care
 - High prevalence of chronic diseases
 - Located in environments that are “undesirable”

Three Principles re: EH Problems

- They arise within a system of physical, social, economic interactions
- They are characterized by uncertainties
 - in data describing the problem
 - in their potential health impact
 - in the effectiveness of interventions to prevent them
- Solutions require tradeoffs: cost control versus public health, one form of risk against another

Links: Occupation & Environment

- Importance of the workforce
- Hazards the same
- Common approaches to addressing health hazards
- **Workplace as a “sentinel” for environmental hazards**
- Total exposure concept
- Consistency in standard setting
- Incentives for prevention

Occupational Health

Global Burden of Disease

- Expression of the impact of ill health on a population
- Uses “Disability Adjusted Life Years”
 - Categorizes diseases
 - Uses life expectancy, degree of disability, age at mortality for demographics/gender/age to arrive at a single measure of disease impact

Global Burden of Occupational Illness and Injury

- 1.1 Million people killed, worldwide
- Equal to number of deaths from malaria
- 250 “accidents” in the workplace lead to 300,000 deaths
- 160 million new cases of work-related diseases occur worldwide

Global Burden of Occupational Injury and Disease/Year

	Injuries	Diseases	Total
Fatal	100,000	700,000	800,000
Non-Fatal	99,000,000	10,300,000	109,300,000
	100,000,000	11,000,000	111,000,000

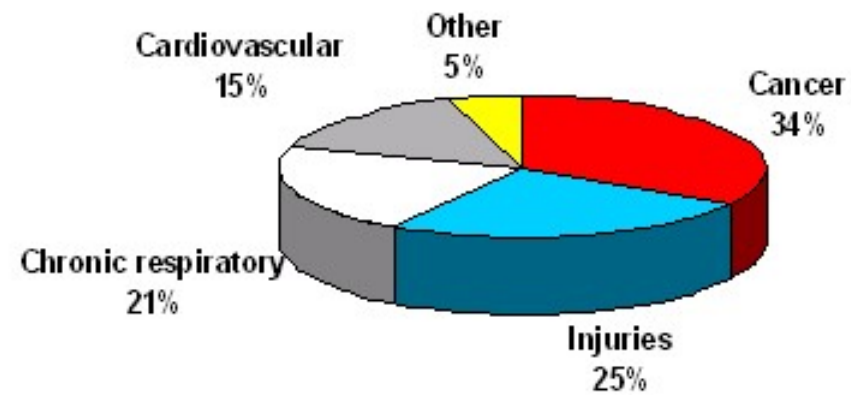
*From Leigh, et al., Epidemiology 10(5):626-31, September 1999

*Estimated Annual Incidence of Occ Injury & Disease Worldwide

	# New Cases/year
Injuries	100,688,000
Diseases	
Pesticide poisoning	109,000
Other poisoning	122,000
Cancer	191,000
Mental disorders	318,000
Pneumoconioses	453,000
Noise-induced hearing loss	1,628,000
Skin disorders	1,895,000
Chronic respiratory disease	2,631,000
Musculoskeletal disorders	3,337,000

Estimated Global Work-related Mortality

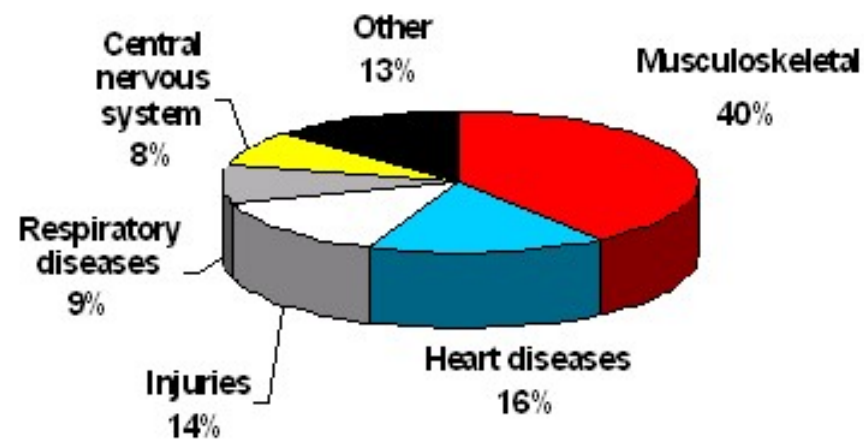
1.1 million per year (based on 1990-95 data)



Other diseases include pneumoconioses, nervous system and renal disorders

Source: ILO, 1999.

The Breakdown of Costs for Work-related Injuries and Diseases



Other diseases include cancer, skin diseases and mental disorders

Source: ILO, 1999

Principles of Occ/Env Diseases-1

- Disease is the same for environmentally and non-environmentally caused disease

Principles of Occ/Env Diseases-2

- Many diseases are multifactorial—they have environmental and non-environmental causes

Principles of Occ/Env Diseases-3

- One environmental hazard may potentiate the effect of other hazards

Principles of Occ/Env Diseases-4

- The latency period between toxin exposure and disease development is predictable

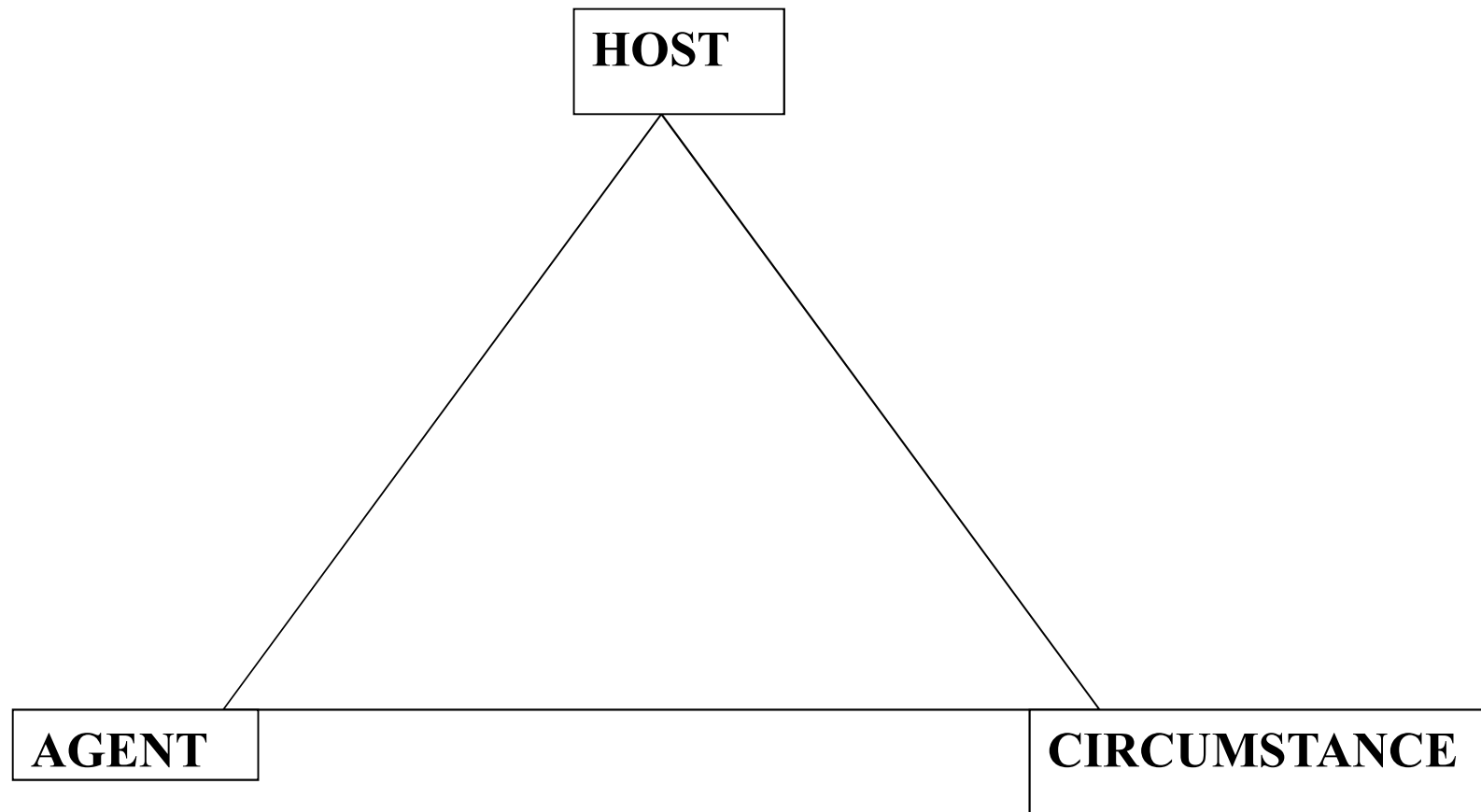
Principles of Occ/Env Diseases-5

- The dose of the exposure is a good predictor of the likelihood and type of effect

Principles of Occ/Env Diseases-6

- People (hosts) differ in their response to toxic exposures

Triangle of O/E Diseases



Framework for Addressing O/E Health Issues

