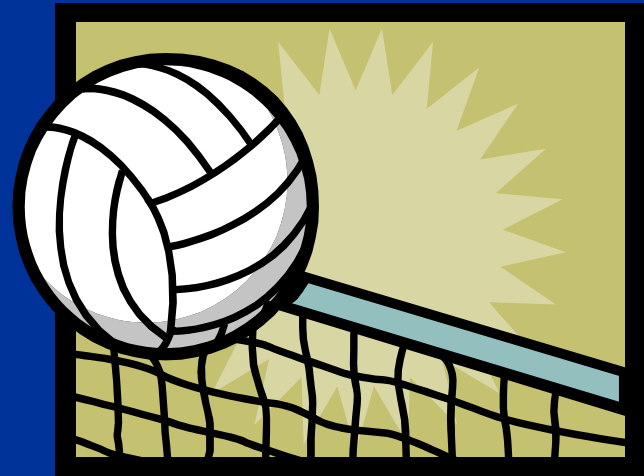


So!!

- The outcomes from last session were:



Remember

- Principles of Communicable diseases epidemiology
- Chain of Infection and its elements
- Epidemic/endemic diseases
- Types of epidemics
- Principles of epidemiological investigation for outbreaks
- Surveillance

Important fact

The environment in which we live and work strongly influences the causation of disease and injuries

What is environment?

- the air we breathe,
 - the water we drink,
 - the food we eat,
 - the climate surrounding our bodies,
 - the space available for our movements.
-
- social and cultural environment, which is of great importance for our mental and physical health

Environmental Epidemiology

- Environmental epidemiology provides a scientific basis for studying and interpreting the relationships between the environment and population health.

Occupational Epidemiology

- Occupational epidemiology deals specifically with environmental factors in the workplace

Which environmental factors?

The effect of an environmental factor

- age and sex
- genetic factors
- presence of disease
- nutrition
- personality
- physical condition.

Other Risk factors

Table 9.1. Environmental factors that may affect health

Factors	Examples
Psychological	Stress, unemployment, shiftwork, human relationships
Biological	Bacteria, viruses, parasites
Physical	Climate, noise, radiation, ergonomics
Accidental	Hazardous situations, speed, influence of alcohol, drugs
Chemical	Tobacco, chemicals, dust, skin irritants, food additives

Box 9.1. Hierarchy of causes in environmental and occupational health¹

Driving forces behind current health-environment trends

- Population dynamics
- Urbanization
- Poverty and equity
- Science and technology
- Consumption and production patterns
- Economic development

Major human activities affecting environmental quality

- Household wastes
- Fresh water
- Land use and agricultural development
- Industrialization
- Energy

Poor environmental quality: exposures and risks

- Air pollution
- Food
- Soil
- Housing
- The workplace
- The global environment

Burden of Diseases

- The major health problems are associated with unsafe drinking water and sanitation, indoor air pollution due to biomass energy use for cooking and heating, and urban air pollution from motor vehicles and electric power generation

The environmental disease burden

- is much higher in low income countries
- Children bear the highest death toll, with more than 4 million environmentally caused deaths yearly, mostly in developing countries.
- The infant death rate from environmental causes is 12 times higher in low-income than in high-income countries, reflecting the human health gain that could be achieved by supporting healthy environments

Cost issues

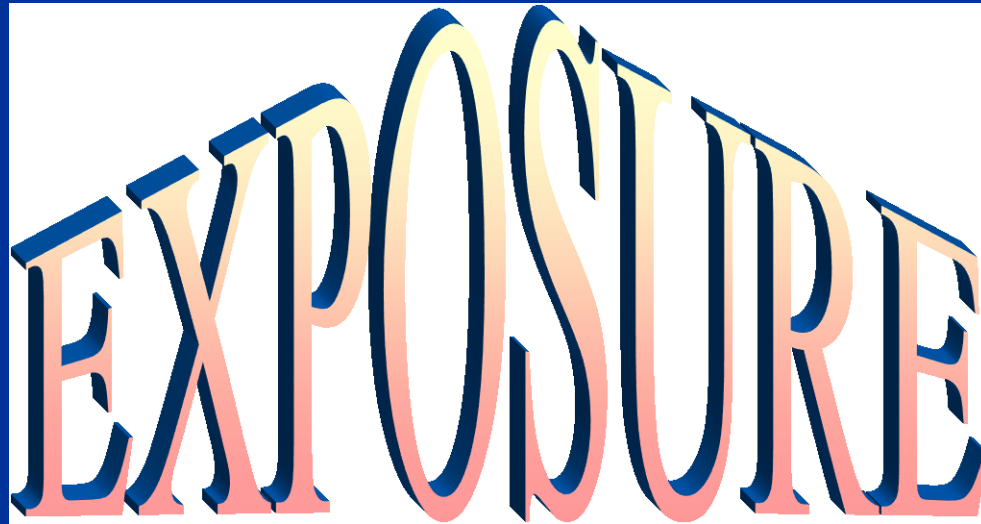
- Environmental pollution is often costly in itself and may damage agricultural land or industrial property as well as people's health.

Tools

- Epidemiological analyses
- health impact assessments
- Cost-effectiveness analyses

Value of prevention

The concept of :

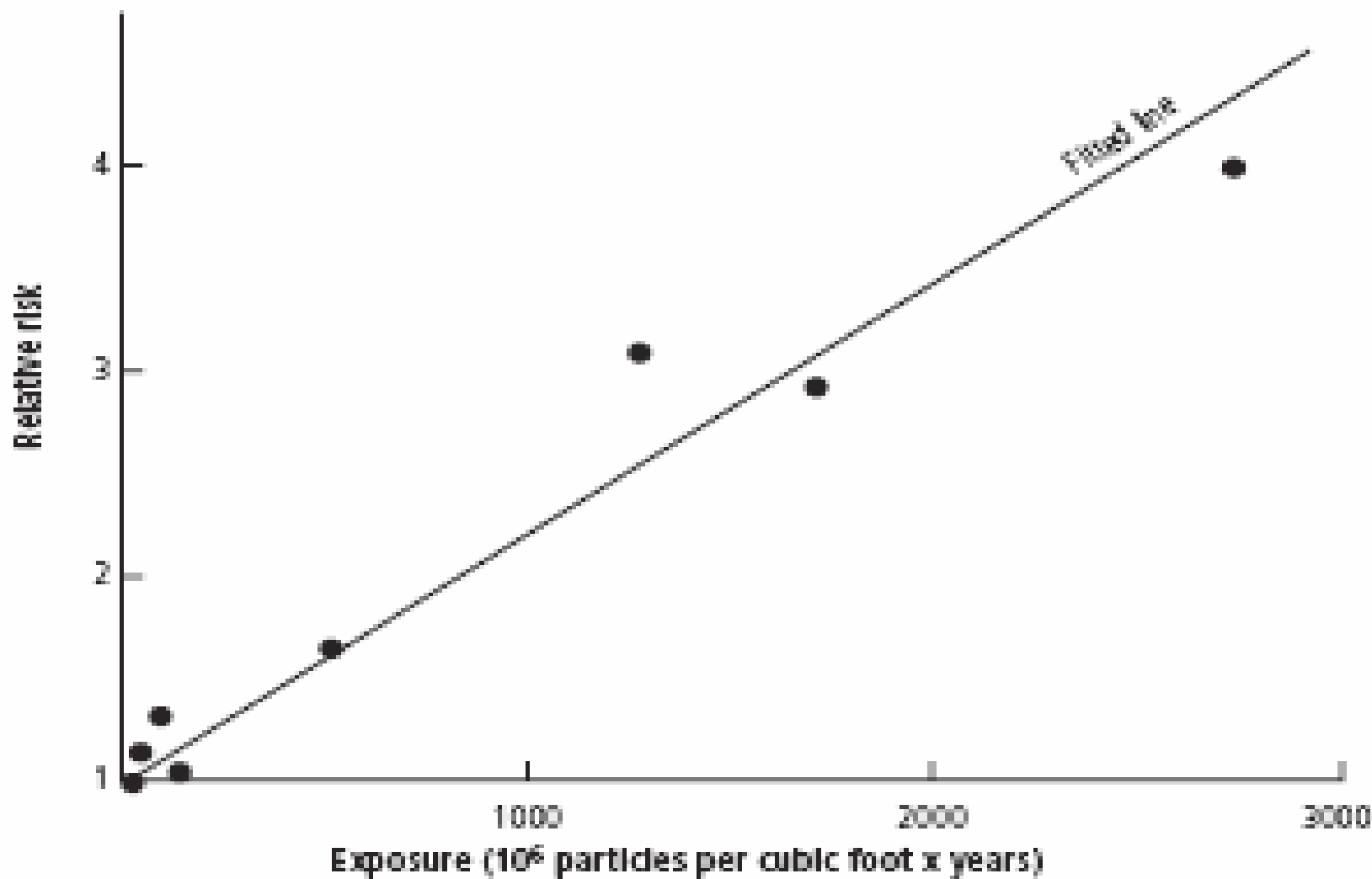


EXPOSURE

Exposure

- Level
- Duration

Figure 9.3. Relationship between asbestos exposure (particle-years) and relative risk of lung cancer¹⁴



Biological Monitoring

- If the environmental factor under study is a chemical, the exposure level and dose can sometimes be estimated by measuring the concentration in body fluids or tissues.

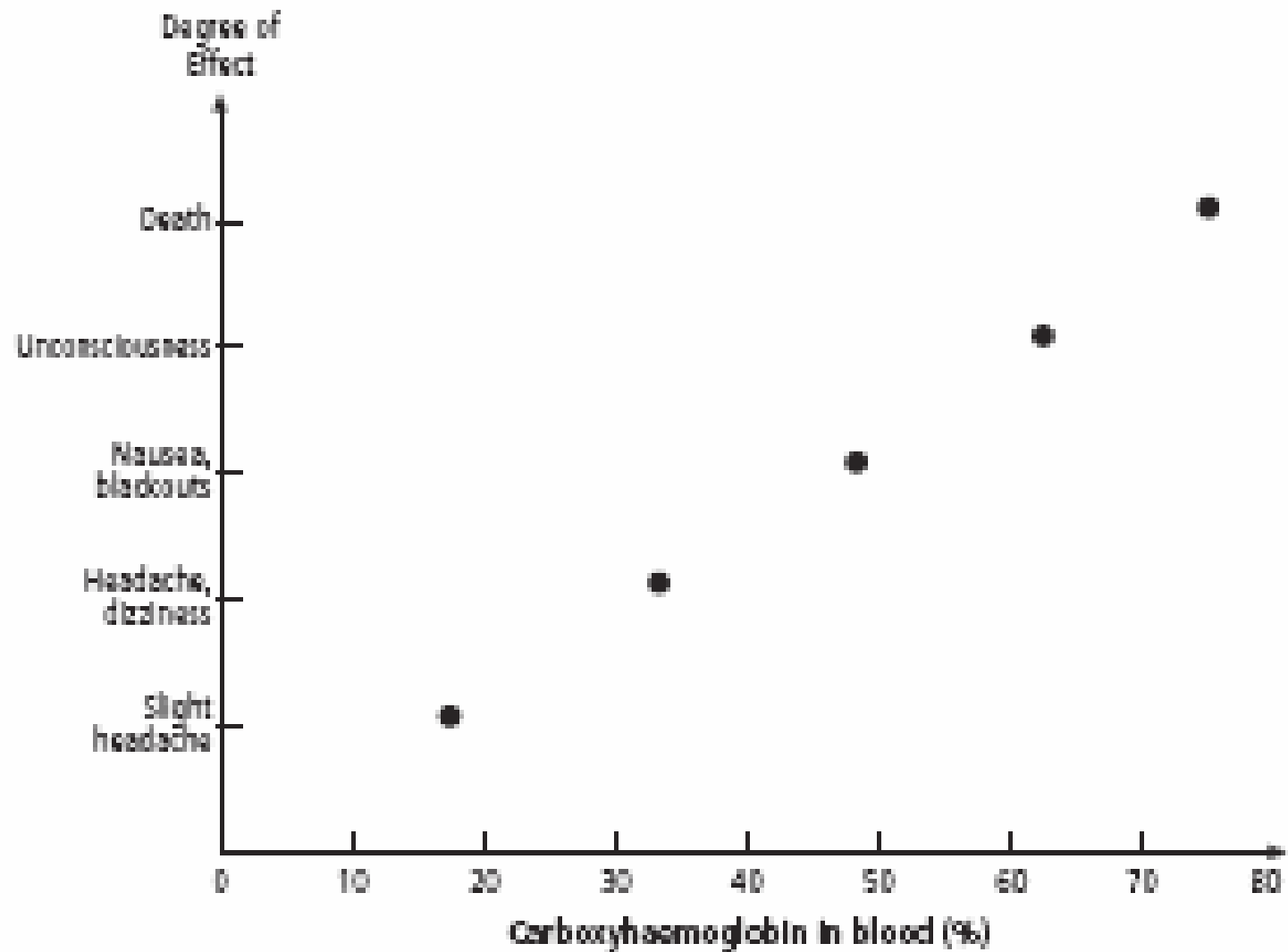
Samples for Biological Monitoring

- Blood
- Urine
- Hair
- Body tissues

Dose-effect relationships

- Effects range from subtle physiological or biochemical changes to severe illness or death.

Figure 9.5. Dose-effect relationship

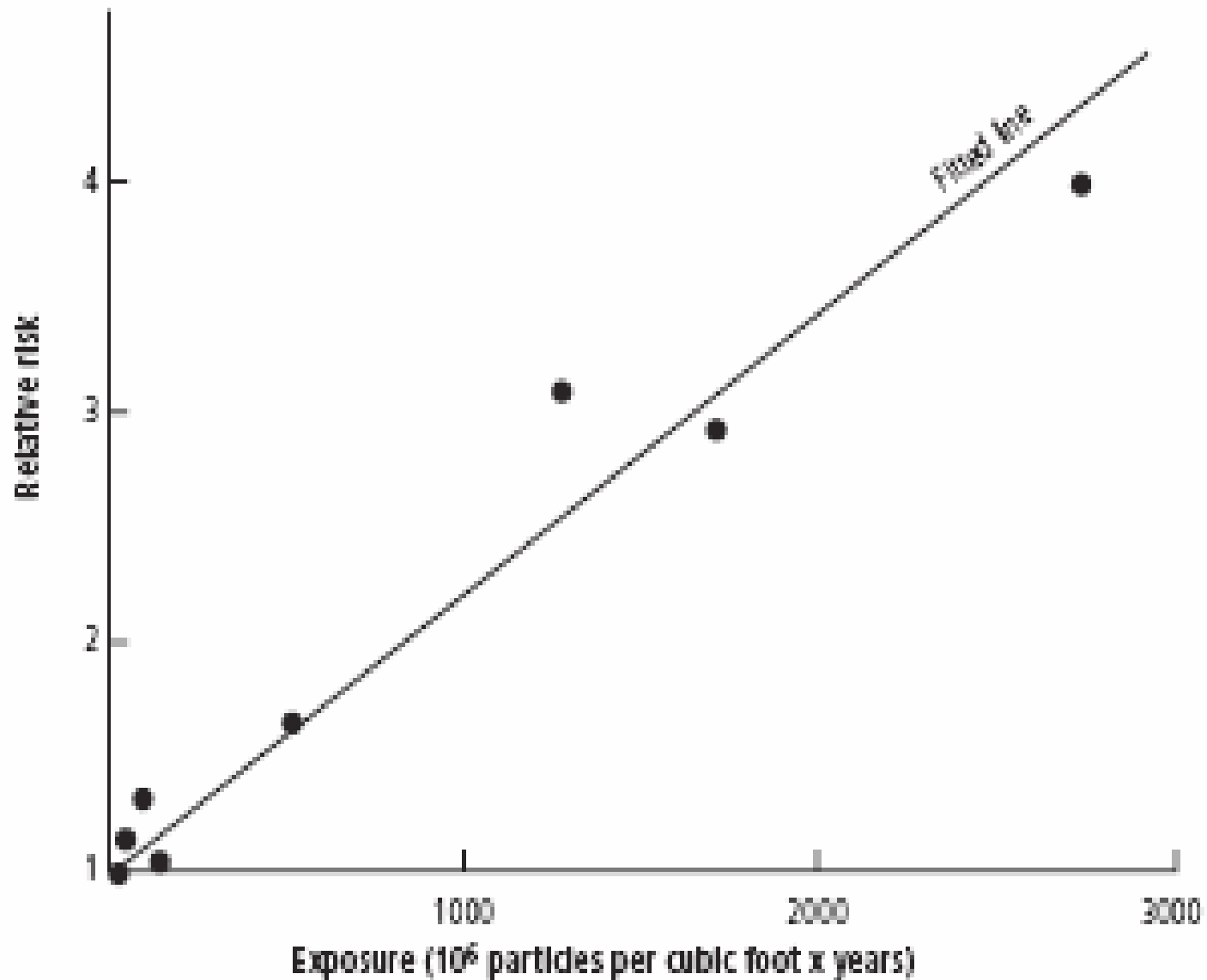


- In the process of establishing safety standards, the dose-effect relationship also gives useful information on effects that must be prevented and on those that may be used for screening purposes.

Dose—response relationships

- Response is defined in epidemiology as the proportion of an exposed group that develops a specific effect

Figure 9.3. Relationship between asbestos exposure (particle-years) and relative risk of lung cancer¹⁴



Risk Assessment

- Some form of assessment of the health risk of a defined policy, action or intervention

Health Impact Assessment

- A risk assessment focused on a specific population or exposure situation, while risk assessment has a more general application.

Risk management

- Applied to the planning and implementation of actions to reduce or eliminate health risks.

Box 9.3. Example: health impact assessment

One example of a health impact assessment that has had major impact on environmental health policy is the assessment of the impact of traffic-related air pollution in Europe.¹⁹ Based on air monitoring data, estimates of the number of people exposed and dose-response relationships from epidemiological studies, investigators calculated the likely number of deaths due to this type of air pollution (Table 9.5). It was striking that the number of deaths from pollution far exceeded the number of deaths from traffic accidents. This study inspired a series of policies to control traffic-related air pollution in Europe.

A similar analysis was done for New Zealand²⁰ with a lower ratio for air pollution deaths to traffic accident deaths (Table 9.5). This lower ratio is expected, as the air pollution levels in general are lower than in Europe and the traffic accident risks are higher.

Table 9.5. Air pollution mortality (for adults \geq 30 years) and road death tolls (1996)

Country	Population (million)	Traffic accident deaths (A)	Mortality due to traffic air pollution (B)	Ratio B/A
France	59.3	8 919	17 629	2.0
Austria	8.1	963	2 411	2.5
Switzerland	7.1	597	1 762	3.0
New Zealand	3.7	502	399	0.8

Setting Safety standards

- Dose–effect and dose–response relationships are of particular importance in environmental and occupational epidemiology because they provide the foundation for setting safety standards.

Your Questions!!

