

國立臺北大學自然資源與環境管理研究所

九十七學年度第二學期

『環境災害與風險管理』課程講義（六、七）

主題：環境（人體健康）風險評估

Environmental (Health) Risk Assessment

● INTRODUCTION

- Assessment vs. Analysis; Risk Assessment vs. Risk Management
- Definition of Environmental Health Risk Assessment (W-p.11): “systematic scientific characterization of potential adverse health effects resulting from human exposures to hazardous agents or situations”
- Types of Risk Concerned
 - ⇒ Human Health and Safety; Ecological Systems
 - ⇒ Social Welfare and Cultural Heritage; Financial and Investment
- Risk Assessment Steps
 - ⇒ Hazard Identification / Evaluation / Characterization
 - ⇒ Effects / Losses / Impacts Assessment
 - ⇒ Assessment of Occurrence Probability
 - ⇒ Characterization (NOT ‘Quantification’) of Risk
 - ⇒ Risk Communication and Risk Management

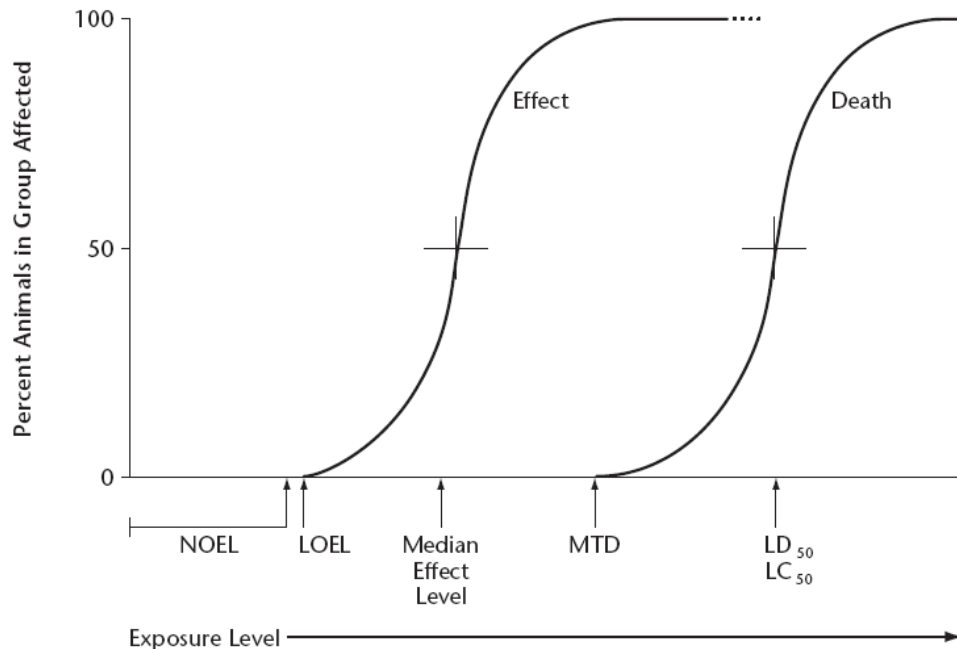
EXHIBIT 2.2. OBJECTIVES OF RISK ASSESSMENT.

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| <ol style="list-style-type: none">1. Balance risks and benefits.<ul style="list-style-type: none">• Drugs• Pesticides2. Set target levels of risk.<ul style="list-style-type: none">• Food contaminants• Water pollutants3. Set priorities for program activities.<ul style="list-style-type: none">• Regulatory agencies• Manufacturers• Environmental and consumer organizations4. Estimate residual risks and extent of risk reduction after steps are taken to reduce risks. | <h3>EXHIBIT 2.3. BIOLOGICAL END POINTS.</h3> <ul style="list-style-type: none">• Cancers• Mutations• Birth defects• Reproductive toxicity• Immunological toxicity• Neurobehavioral toxicity• Organ-specific effects• Endocrine modulation or disruption• Ecosystem effects |
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● HAZARDS TO HUMAN HEALTH

- Acute Toxicity (W-p.79)
 - ⇒ Lethal Dose (LD₅₀) and Maximum Tolerated Dose (MTD)
 - ⇒ Threshold: Lowest Observed Adverse Effect Level (LOAEL) and NOAEL

- Chronic Toxicity
 - ⇒ Mutagenic, Carcinogenic and Teratogenic Effects
 - ⇒ Threshold (?) => Cancer Potency
 - ⇒ Weight-of-Evidence Categories for Human Carcinogenicity (M-p.136)
- Sub-chronic Toxicity



- EVENTS, SITES OR SOURCES THAT CAUSE HEALTH HAZARDS
 - Work Places and Daily Living
 - Chemical Release or Spills => PRTR
 - Hazard Waste Treatment and Disposal
 - Specified Sites => 'Superfund' Sites
 - Soil and Groundwater Contamination
 - Incinerators and Power Plants
 - Mobile Source of Air Pollution => MTBE
 - Detergents => NP (Environmental Hormones or Endocrine Disruptors)
- ENVIRONMENTAL RISK ASSESSMENT OF HUMAN HEALTH ([Masters, Chapter4](#))
 - Hazard Identification 危害鑑定
 - Dose/Response Assessment 計量效應評估
 - Exposure Assessment 暴露評估
 - Risk Characterization 風險度推估
- Homework Assignment #3 (04/08, 2009 Due): Please answer the Problems 4.1 and 4.2 listed in Masters (Chapter 4).