

國立臺北大學自然資源與環境管理研究所
101 學年度第一學期 『環境災害與風險管理』

課程講義（七）：環境（人體健康）風險評估
Environmental (Health) Risk Assessment

R: Robson, M. and W. Toscano (Editors), 2007, *Risk Assessment for Environmental Health*, John Wiley, Hoboken, N.J.
M: Masters, G. M. and W. P. Ela, 2008, *Introduction to Environmental Engineering and Science*, 3rd Edition, Pearson Education, Upper Saddle River, N.J.
<http://www.epa.gov.tw/FileLink/FileHandler.ashx?file=15356> 健康風險評估技術規範
<http://ivy5.epa.gov.tw/epalaw/search/LordiDispFull.aspx?ltype=03&lname=3310>

● INTRODUCTION

- Assessment vs. Analysis; Risk Assessment vs. Risk Management
- Environmental Impact Assessment => Human Health Impact => Risk Assessment
- ‘A Priori’ Health Risk vs. ‘Posterior’ Epidemiological Survey
- Health Risk Assessment => Environmental Issues or Public Health Concerns
- 中科三期七星農場環評爭議 => 《[健康風險評估技術規範](#)》
- Definition of Environmental Health Risk Assessment (**R**-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.

1. Balance risks and benefits.
 - Drugs
 - Pesticides
2. Set target levels of risk.
 - Food contaminants
 - Water pollutants
3. Set priorities for program activities.
 - Regulatory agencies
 - Manufacturers
 - Environmental and consumer organizations

EXHIBIT 2.3. BIOLOGICAL END POINTS.

- Cancers
- Mutations
- Birth defects
- Reproductive toxicity
- Immunological toxicity
- Neurobehavioral toxicity
- Organ-specific effects
- Endocrine modulation or disruption
- Ecosystem effects

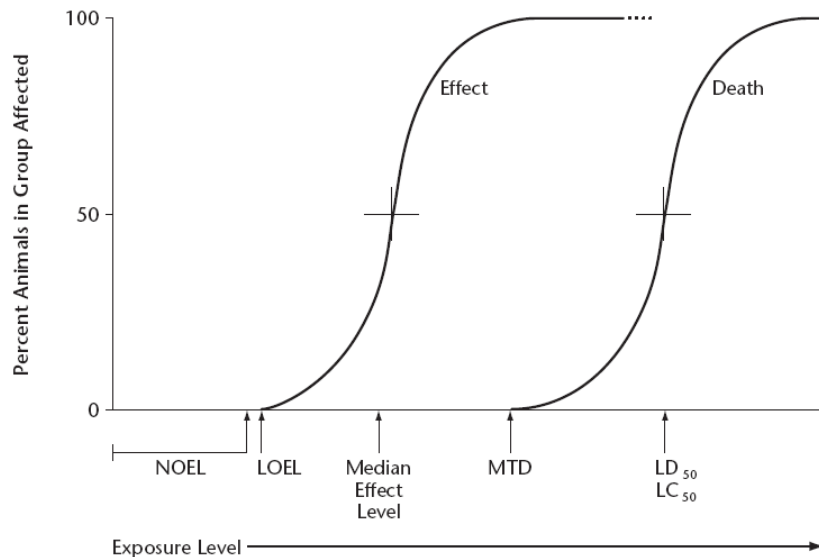
4. Estimate residual risks and extent of risk reduction after steps are taken to reduce risks.

- ENVIRONMENTAL RISK ASSESSMENT OF HUMAN HEALTH (M-chp.4)

- Hazard Identification 危害性鑑定 (危害確認)
- Dose-Response Assessment 劑量效應評估
- Exposure Assessment 暴露量評估
- Risk Characterization 風險特徵評估 (風險特徵描述)

- HAZARDS TO HUMAN HEALTH

- Acute Toxicity (R-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 (MCT 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
- Food Additives, Detergents => NP (Environmental Hormones or Endocrine Disruptors)
- Incinerators, Power Plants (including *Nuke*), Industrial Production Plants => 「開發行為」
- Events and Facilities Involved Emotion Aspects of Outrage, Suspicion, Perception, and Belief
- Specified Sites => 'Superfund' Sites
- Soil and Groundwater Contamination
- Mobile Source of Air Pollution => MTBE

- HOMEWORK ASSIGNMENT #4 (2012/11/15 Due): 請詳閱《健康風險評估技術規範》，並就評估對象 (危害性化學物質)、影響範圍、既有 (既存) 風險等項目，比較討論該技術規範之評估程序是否與一般常見之健康風險評估有所差異？