

Attachment 1
2/3/16

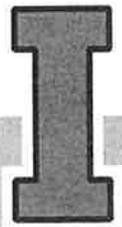


NAVIGATING
THE RISK TRIAD
OF HUMAN METEOTOXICOLOGY



University of Idaho

THE SYSTEM OF RELIABLE STRAN

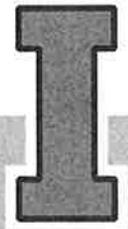


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RISK: DREAD AND FEAR

“Fear of danger is ten thousand times more terrifying than danger itself.”

- Daniel Defoe, 1660-1731
Author, Robinson Crusoe

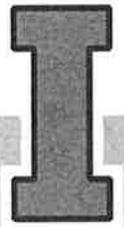
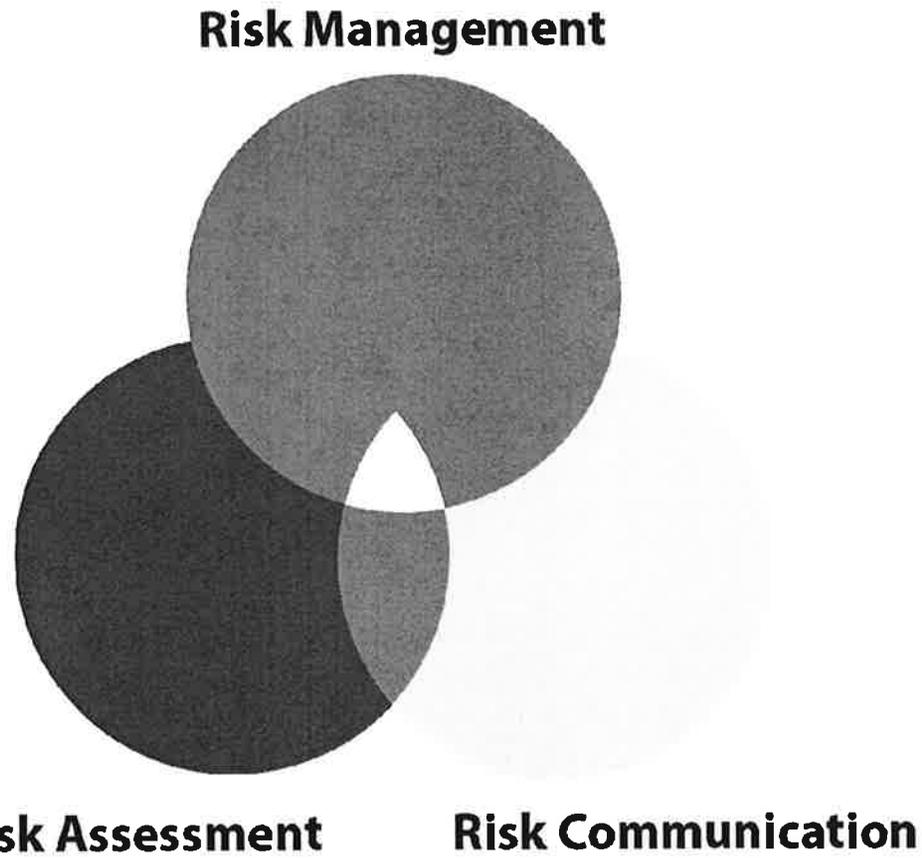


RISK: PERCEPTIONS AND PREFERENCES

- Experts and the public often disagree about risk.
- People will accept risks 1,000 greater if they are voluntary (e.g. driving a car) than if they are involuntary (e.g. a nuclear disaster) [Starr 1969].
- Risk attributes that lead to cognitive bias TOWARDS DREAD:
 - Availability- Imagining scenarios
 - Anchoring- Background knowledge
 - Gain/Loss asymmetry- Loss is value greater
 - Threshold- Adverse to uncertainty

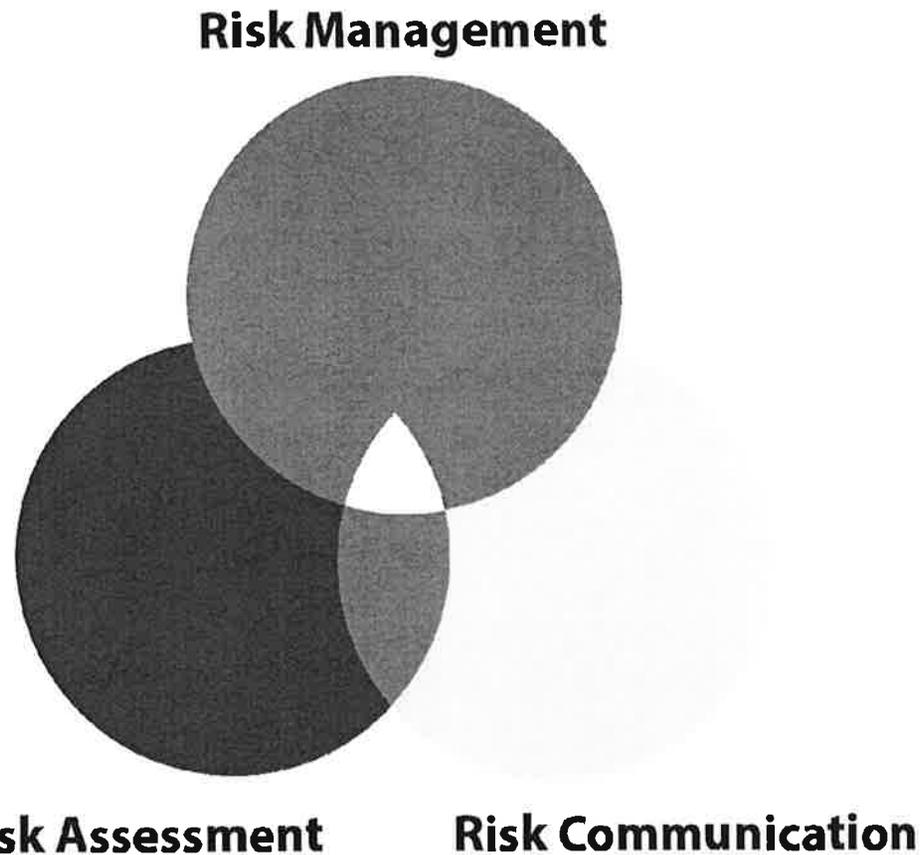


**RISK
TRIAD**

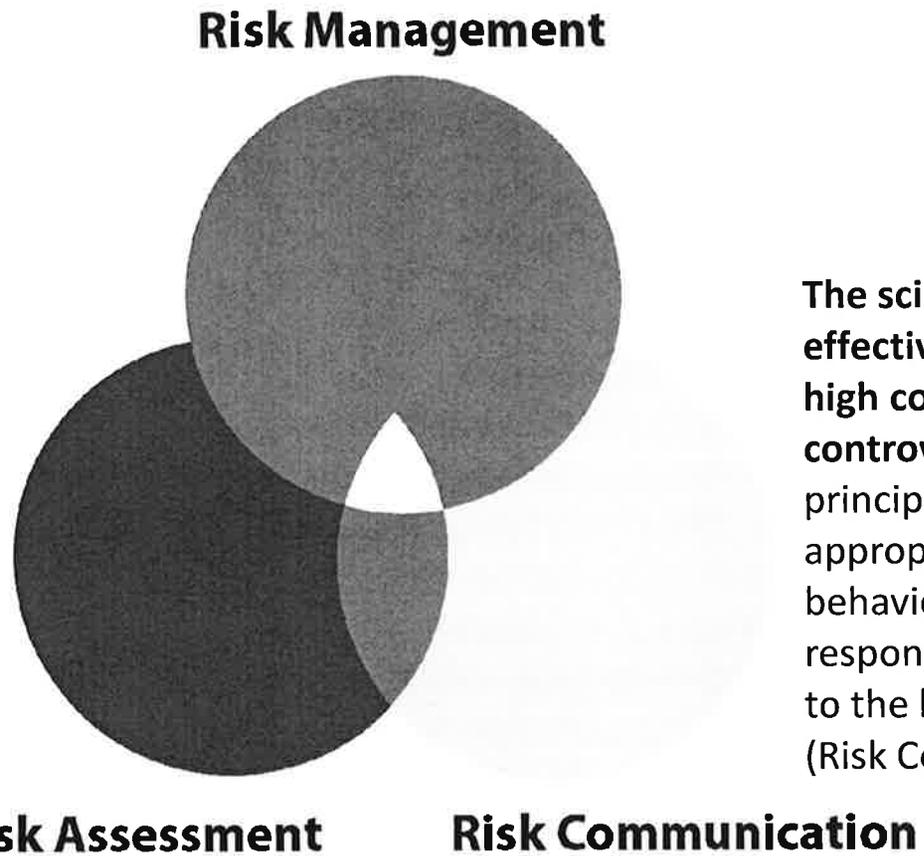


RISK TRIAD

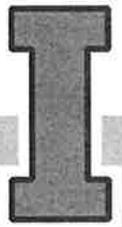
Scientific evaluation of the **probability of harm resulting from exposure to toxic substances.** (EPA)



RISK TRIAD

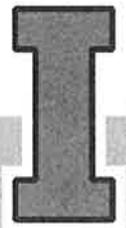
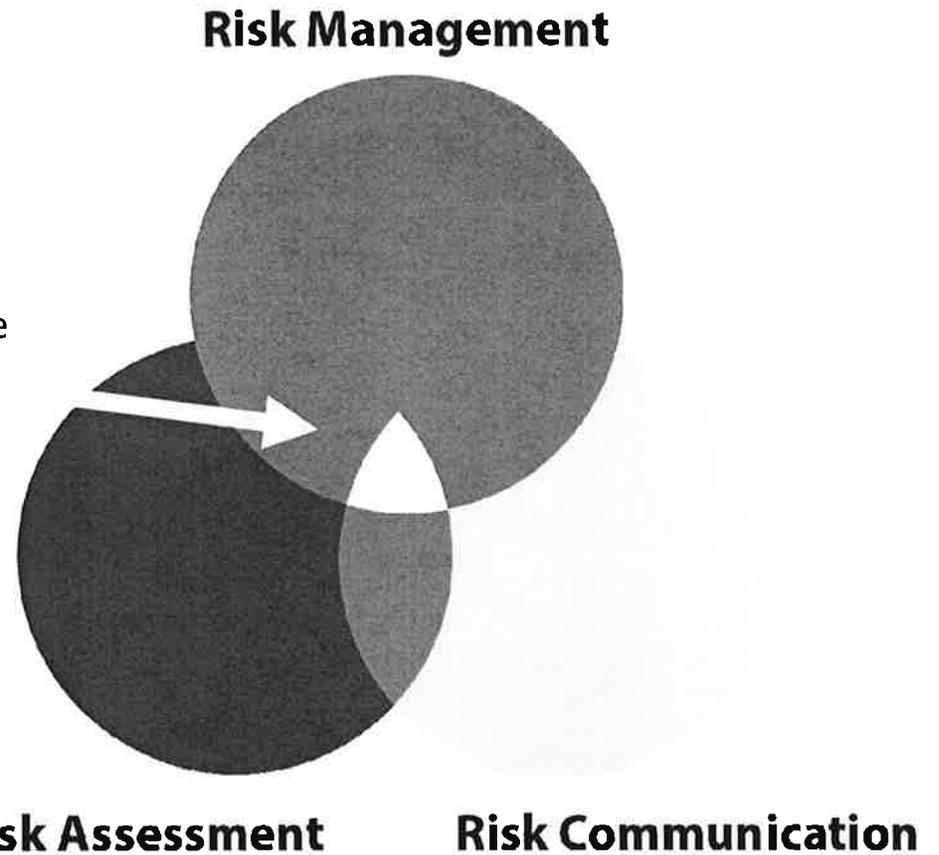


The science of communicating effectively in situations that are of high concern, sensitive, or controversial. Risk communication principles serve to create an appropriate level of outrage, behavior modification, or mitigating response, that is in direct proportion to the level of risk or hazard.
(Risk Communication Network)

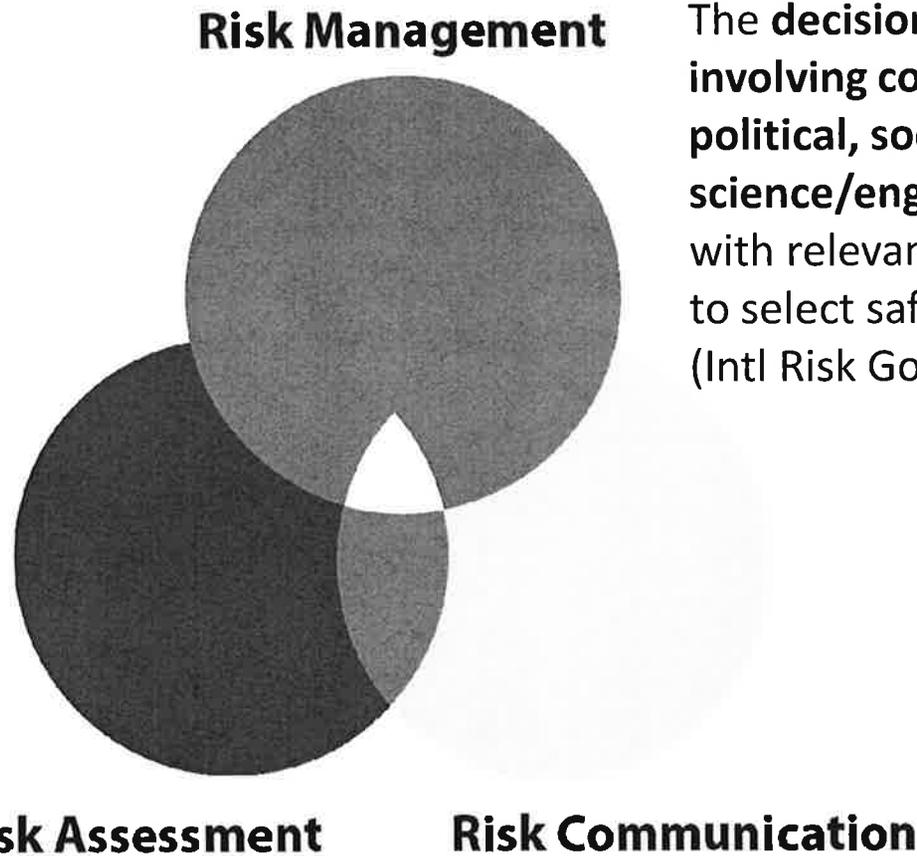


RISK TRIAD

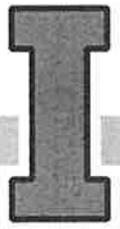
Risk Characterization – A description of the nature and magnitude of health risk that combines results of exposure assessment and hazard identification and describes the uncertainty associated with each step. (NAS)



RISK TRIAD



The decision-making process involving considerations of political, social, economic and science/engineering factors with relevant risk assessments to select safety options.
(Intl Risk Governing Council)

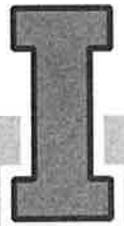




Toxicology

HUMAN HEALTH RISK ASSESSMENT

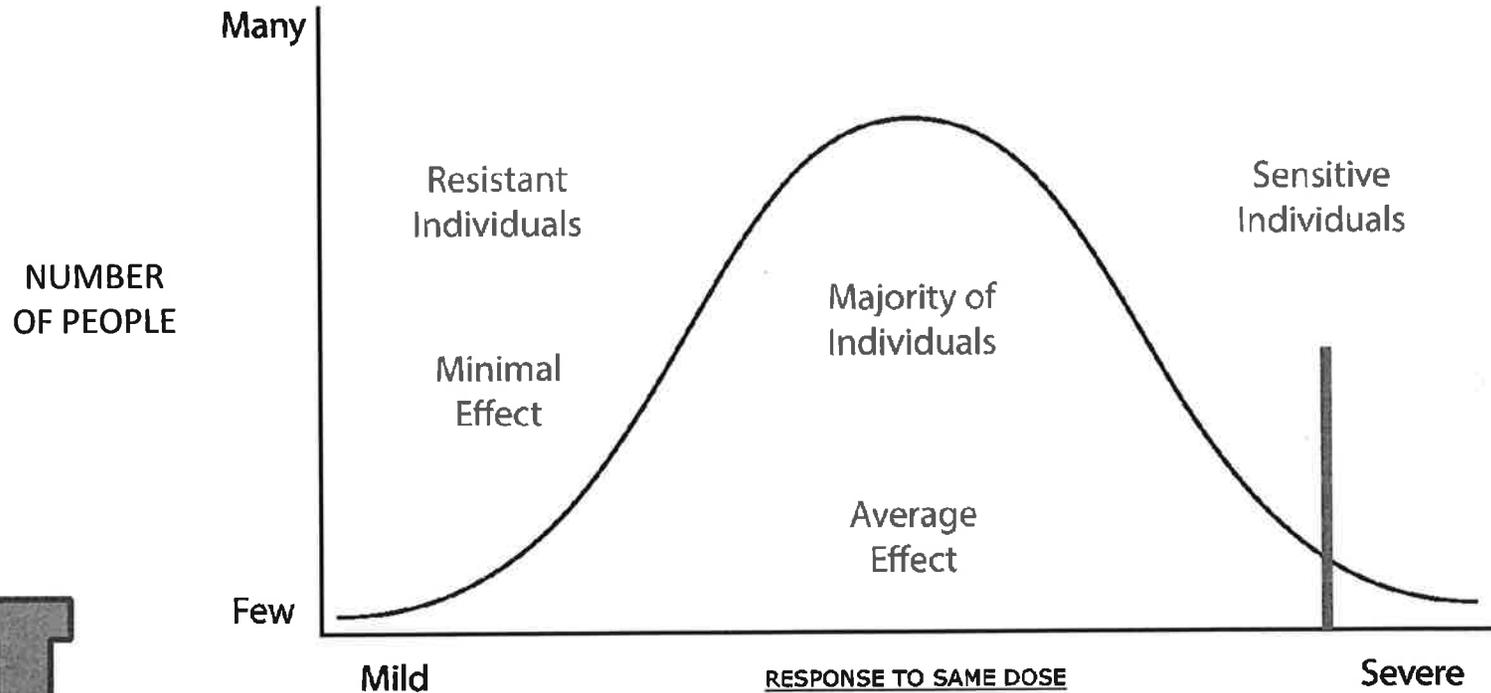
Predictive **modeling** of the threat to human health posed by the exposure to toxicants.



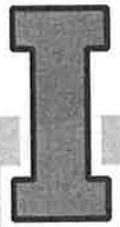
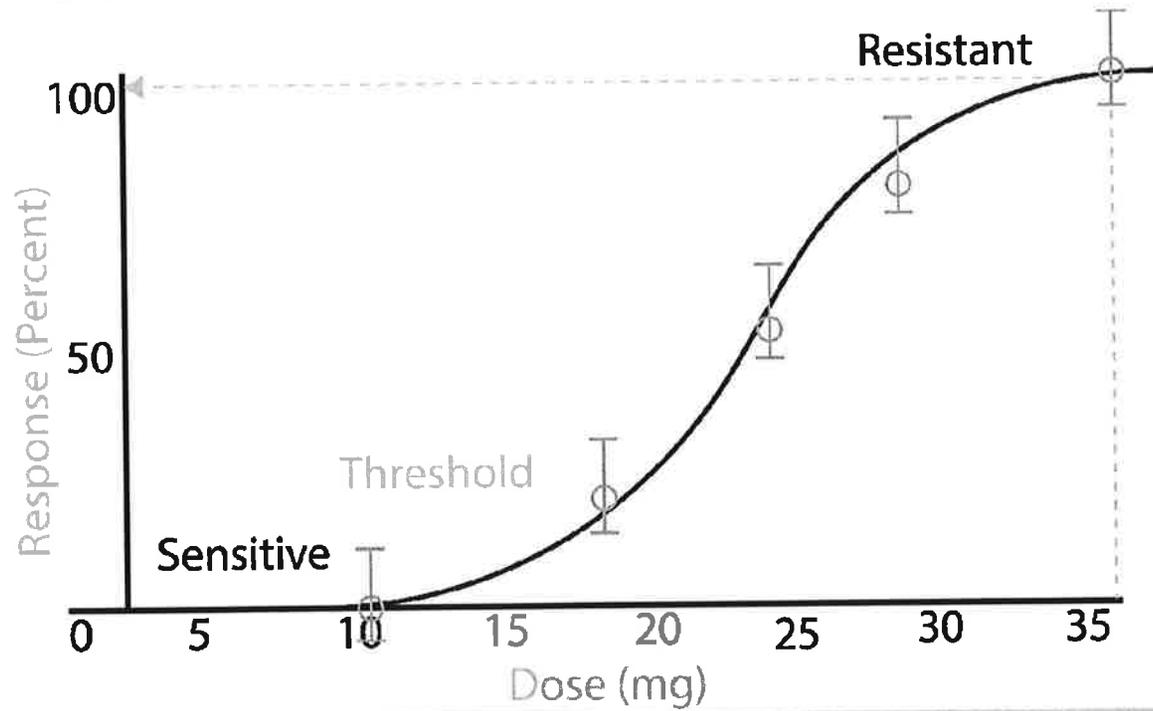
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Dose - Response

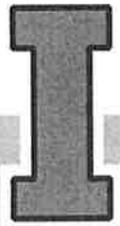
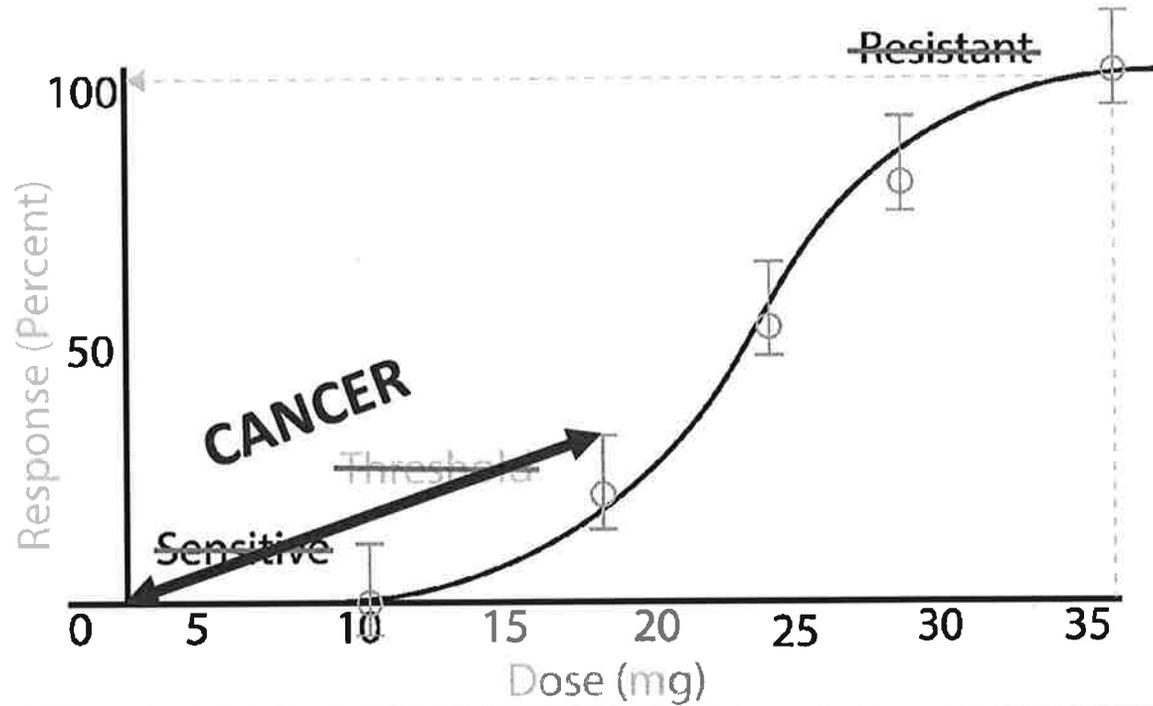
POPULATION DISTRIBUTIONS



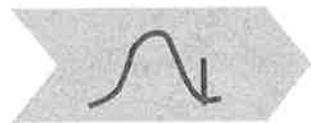
DOSE – RESPONSE CURVES



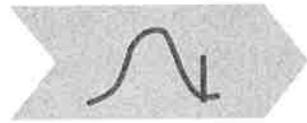
DOSE – RESPONSE CURVES



USE OF UNCERTAINTY FACTORS



**Animal Dose
Response Data**
NOAEL (No
Observed
Adverse Effect
Level) or LOAEL



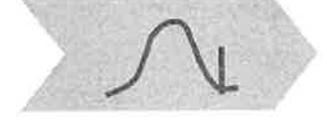
Divide by 10
(Account for
inadequate
animal data)



Divide by 10
(Animal to
Human
Extrapolation)



Divide by 10
(Human
Variability or
Individual
Sensitivity)

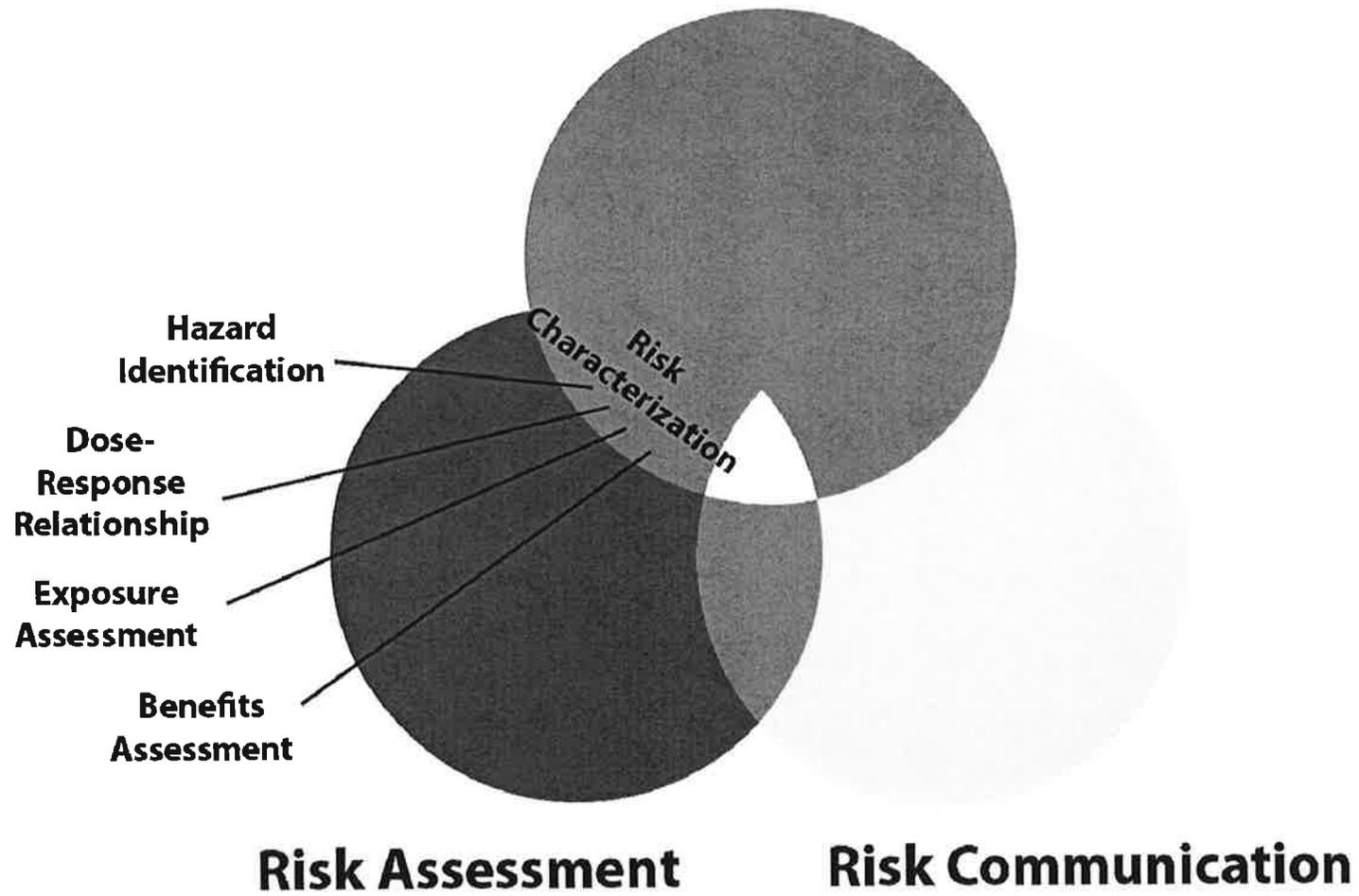


**Divide by
10-100**
(Repro- or
Neuro-toxicity)

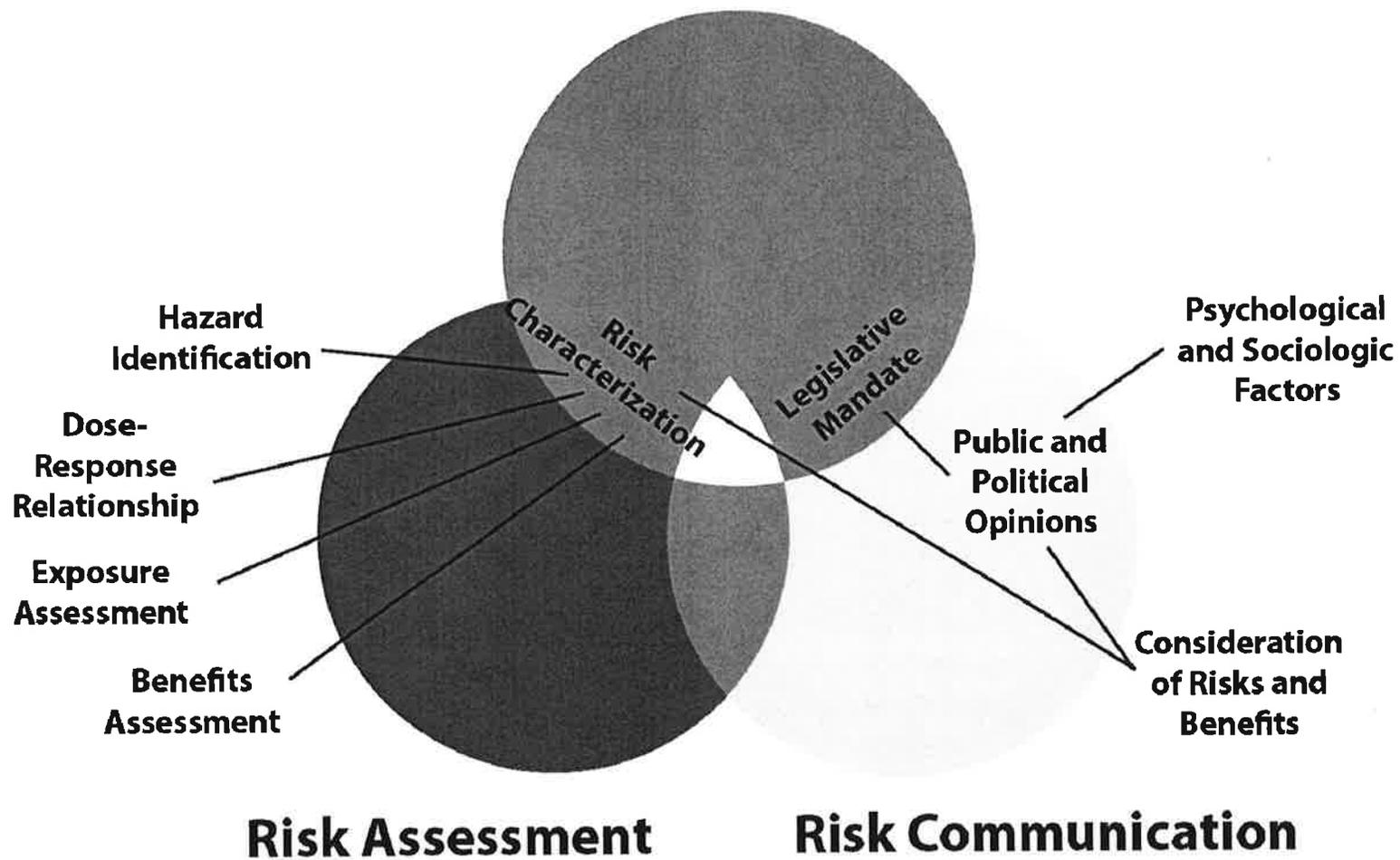


Deterministic modeling can compound uncertainty, versus stochastic modeling

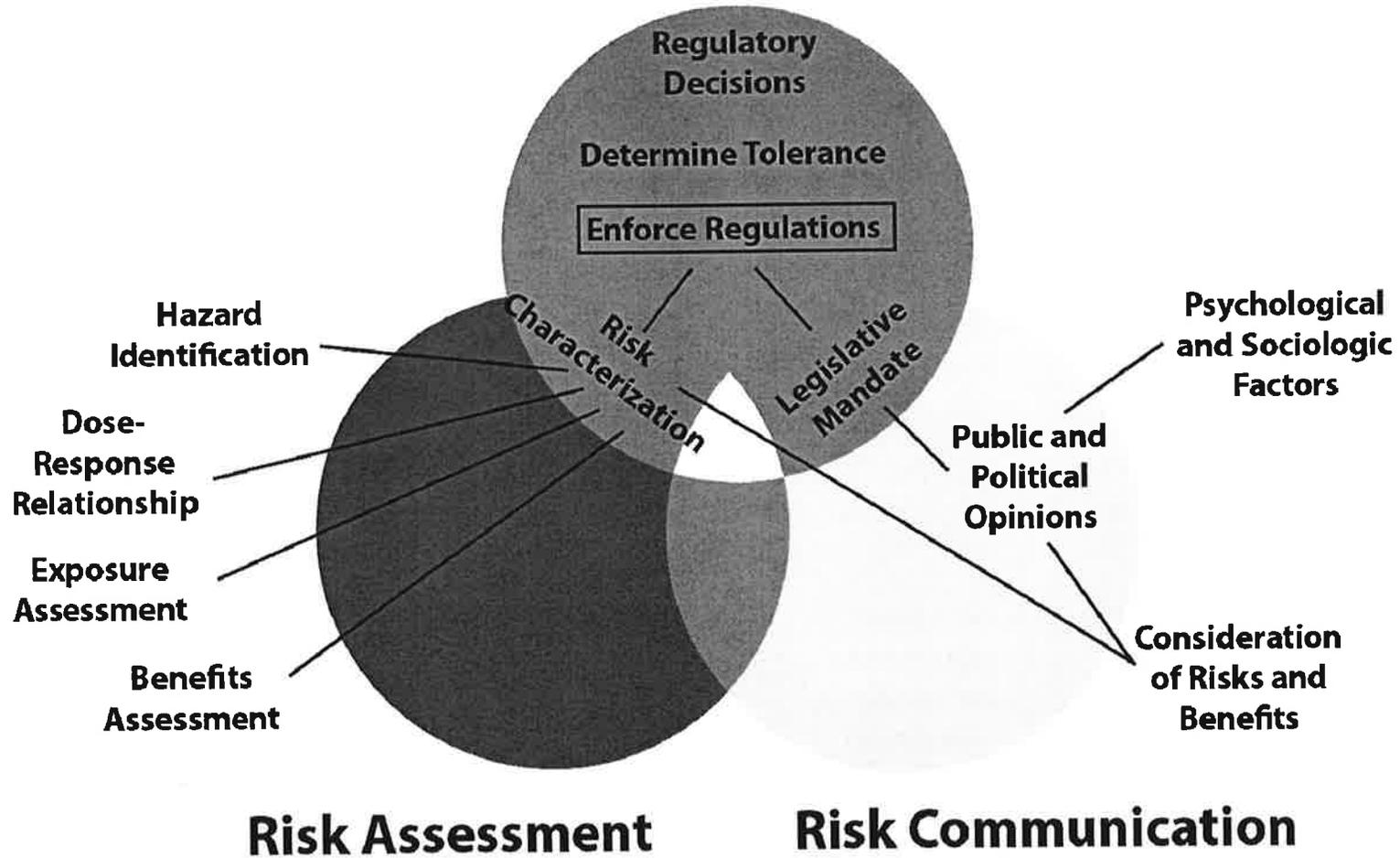
Risk Management



Risk Management



Risk Management



Risk

ASSESSMENT VS. MANAGEMENT

- Separate, but integrated, processes.
- Risk manager's mission: protect human health ...*"how many souls on board?"*
 - i.e., be conservative.
- Risk assessor's mission: provide risk manager with best information possible.
 - – i.e., be honest.



**RISK
TRIAD**

