

Species Non-Exchangeability for Ecotoxicological Risk Assessment

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Preamble

- Statistical concept of **Species Sensitivity Distributions** (SSDs) is used frequently.
- Assumption: data are a **random** sample from the same SSD - *realistic?*

What is non-exchangeability?

- If a particular species regularly occurs in one half of an SSD (across many substances) then the species is said to be **non-exchangeable** with the other tested species.
- Idea has been floating around for some time (c.f. 'sensitive species' adoption); formal investigation in EFSA (2006) report.
- Statistical analysis supports hypothesis that Rainbow trout, a standard dossier species, is **non-exchangeable** (to other fish species).
[~ 72% have $EC_{50} < \text{median } EC_{50}$ of fish]



What to do with this knowledge?

- Rainbow trout is typically sensitive = greater impact (increases conservatism) on estimation of HC_p s.
- Do we want to be: precautionary *or* obtain actual level of risk?
- Exploit information on non-exchangeable species from large relevant databases (e.g. RIVM fish database).
- Can adapt current HC_p -estimation methods to get mathematically tractable estimates which account for non-exchangeability of a species.