

Decision Model for High Throughput Exposure-Based Chemical Prioritization: Expert Elicitation

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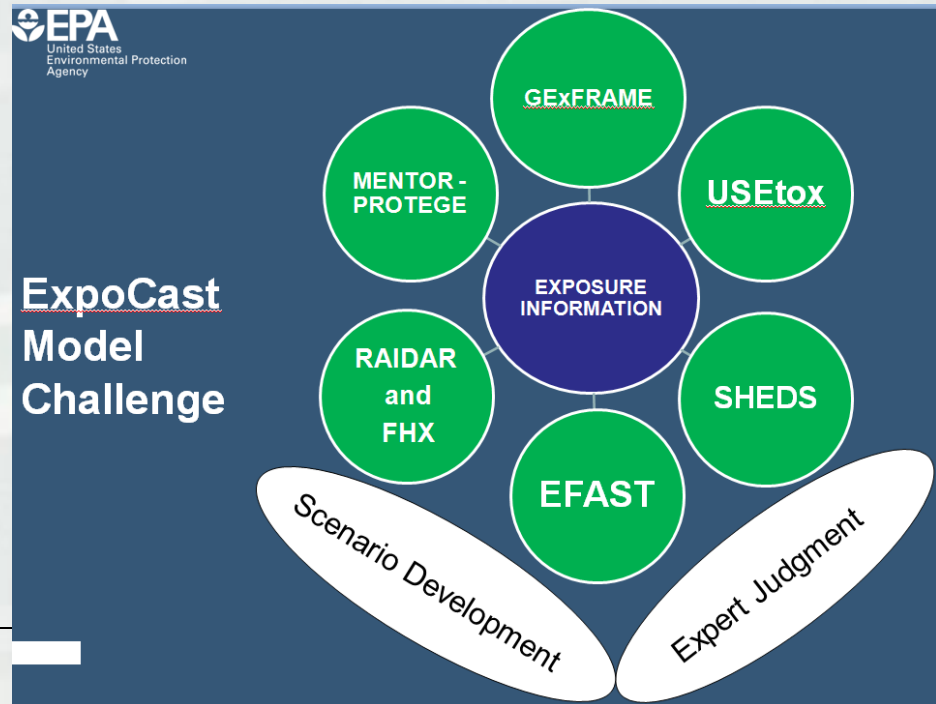


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Project Goals

- Create a high-level, high-throughput **screening tool** using minimal additional data to support exposure-based prioritization
- Chemicals must be **screened**, **evaluated**, and **classified** based on their potential for human exposure
- Screening results will be used to prioritize chemicals for **further data gathering** and toxicological analysis
- Support **risk-based decision making**

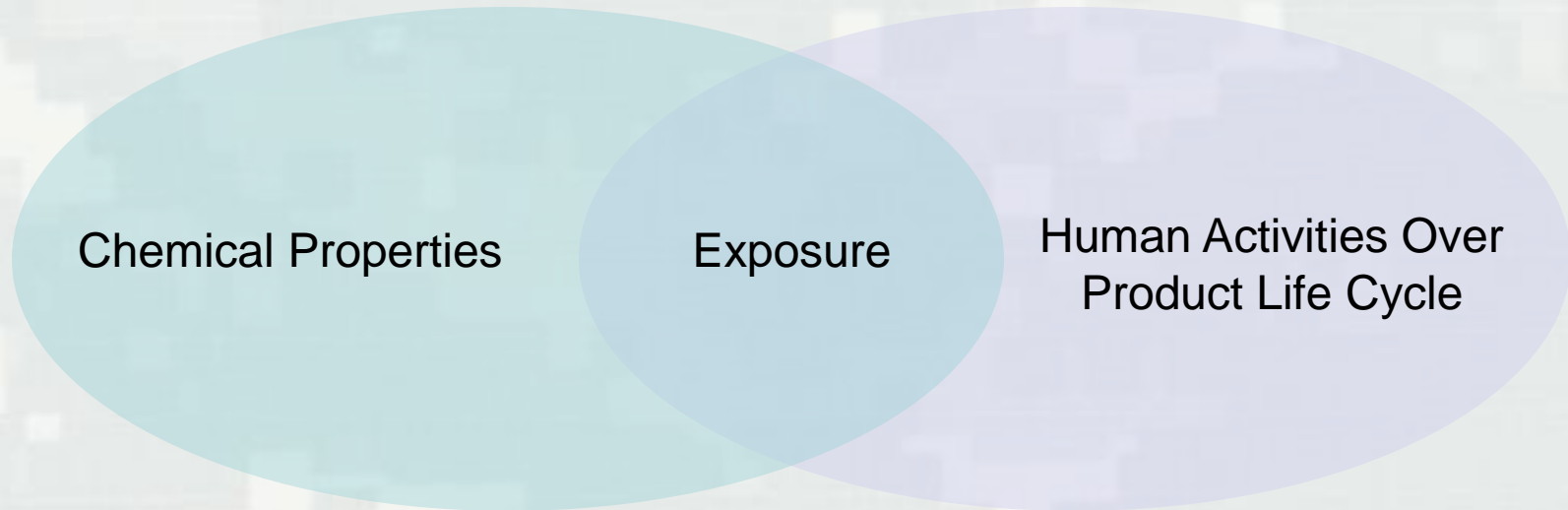


Expert Elicitation

- Expert elicitation is used to **aggregate** the view of the scientific community for subjects with **insufficient data** and/or **high uncertainty**.
- The goal of this **expert elicitation** is to integrate domain-specific knowledge and judgment of **subject matter experts** into the existing prioritization framework.
- This task will allow us to fill **knowledge gaps** on the relative importance of exposure factors.
- You have been contacted because you **possess expertise** in the area of chemical exposure for humans and we would like to **incorporate your expertise** into the exposure model.



What Drives Exposure?

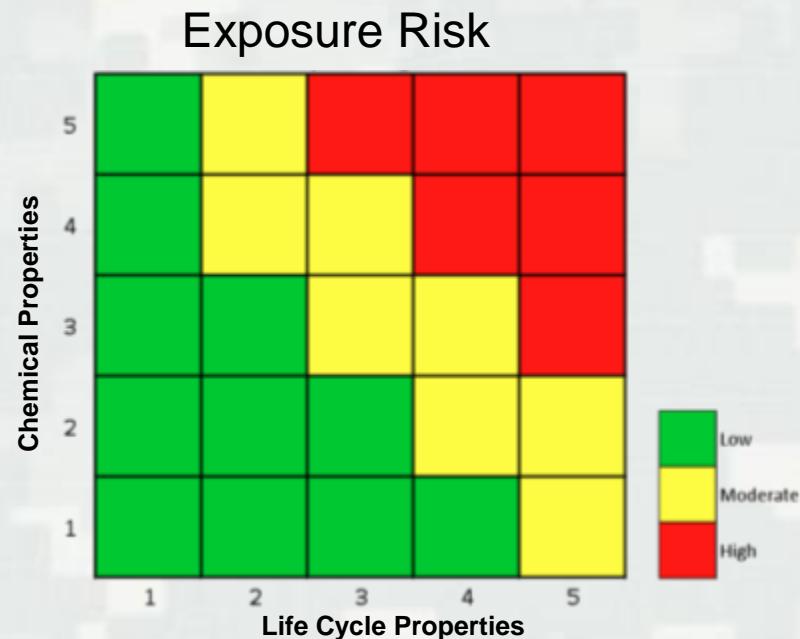
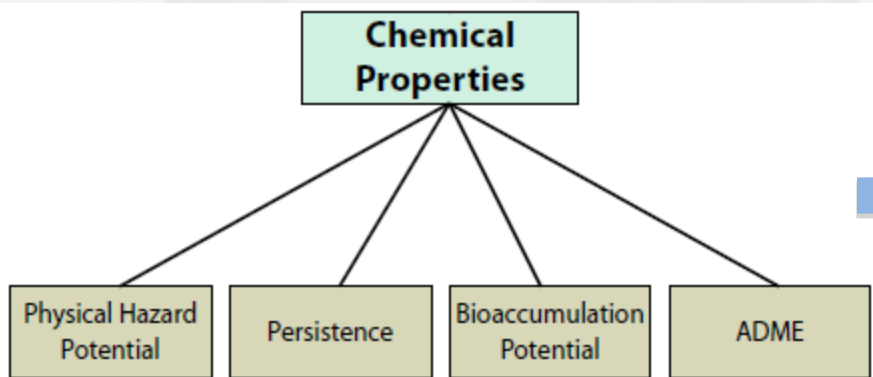


- Exposure is a function of both the physical-chemical properties of the substance and human activities

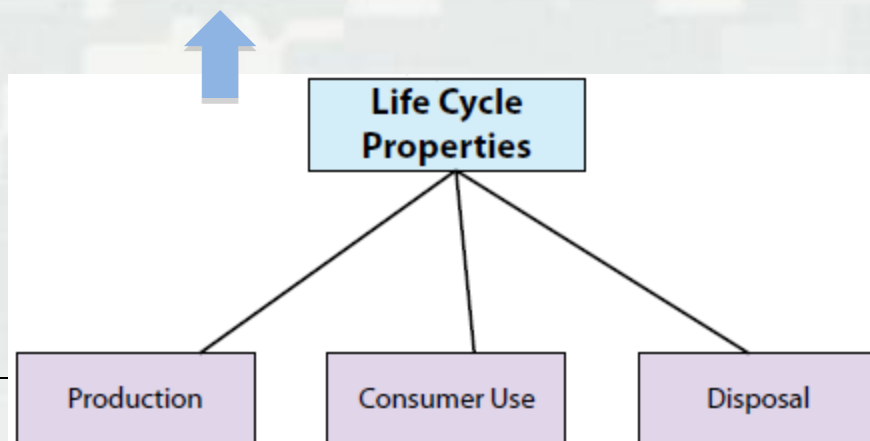


Prioritization Approach

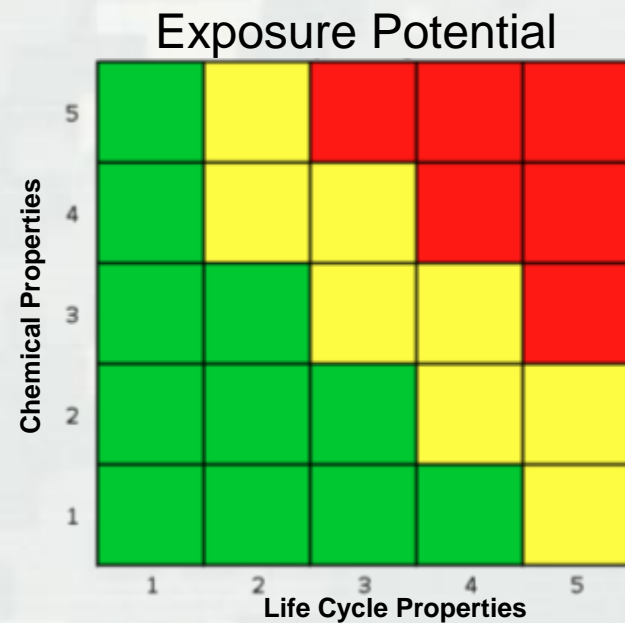
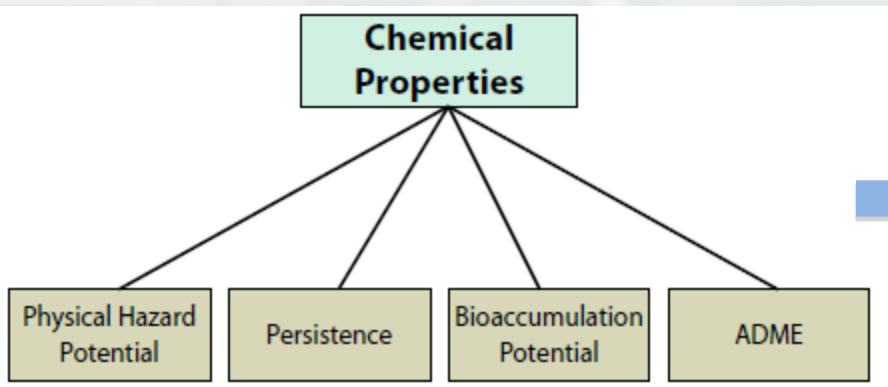
Exposure Potential Assessment Model



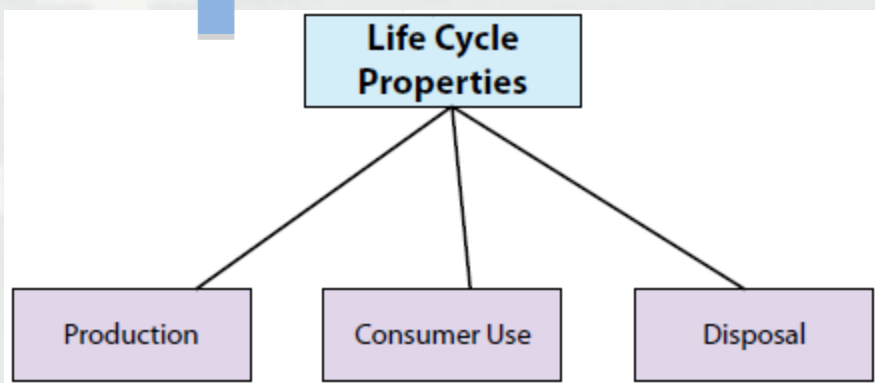
Compounds with both chemical properties and life cycle properties implying high exposure potential will be ranked the highest, indicating compounds which require the most attention.



Criteria Scoring



- Chemical and life cycle properties are assigned scores (e.g., the half life of Formaldehyde in water = 74.4 hr)
- Based on literature, experimentation, chemical modeling, or experts
- Scores are normalized to a fixed scale



Criteria Weighting

Criteria	Ranking	Points (0-100)
Persistence	1	100
Bioaccumulation	2	80
ADME	3	65
Physical Hazard	4	50

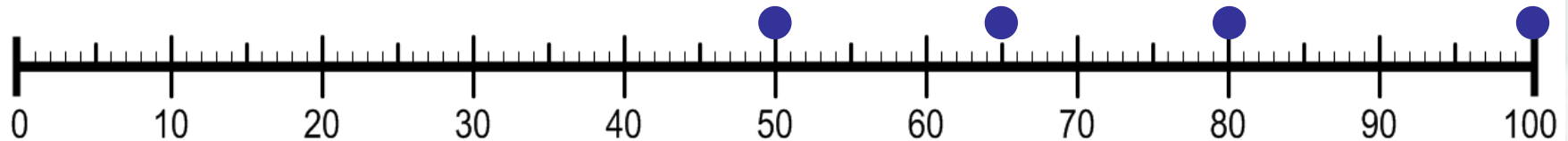
- Weights are elicited from experts to gauge the relative importance of criteria
- Points are converted into relative weights
- Each criterion receives a weight

Physical Hazard

ADME

Bioaccumulation

Persistence



▪ $100 + 80 + 65 + 50 = 295$

- Persistence: $100/295 = 34\%$
- Bioaccumulation: $80/295 = 27\%$
- ADME: $65/295 = 22\%$
- Physical Hazard: $50/295 = 17\%$

Expert Weights

... and so on for all criteria and sub-criteria

What to Expect – Online Survey

Rank each Criteria or Sub-Criteria

Rank the following **Life-Cycle Properties Sub-Criteria** in order of importance from 1 to 3.

Evaluations should be made within the context of **Life-Cycle Properties** defined as *“characteristics of a chemical’s use throughout its life, ranging from production to disposal.”*

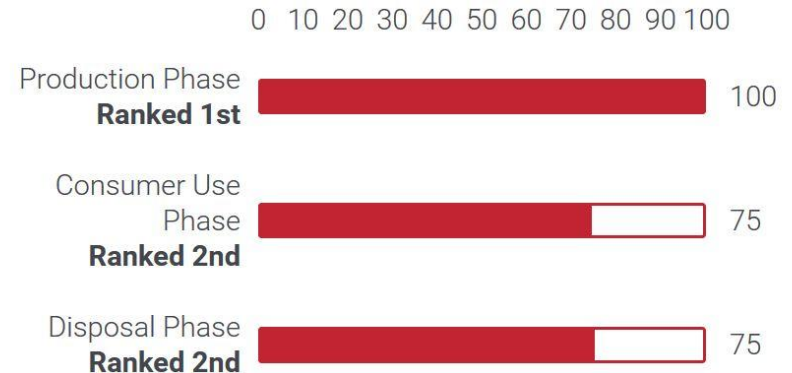
	1st	2nd	3rd
Production Phase	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Consumer Use Phase	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Disposal Phase	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

Note: This process is repeated for each Criteria and Sub-Criteria and each set of Rank and Score will have an area to add comments

Then score each Criteria or Sub-Criteria

Give the criteria ranked 1st a score of 100 points then assign the other criteria points relative to 100 points. Remember there is no set total number of points, i.e. the lowest ranked criterion does not have to have a score of 0.

Evaluations should be made within the context of **Life-Cycle Properties** defined as *“characteristics of a chemical’s use throughout its life, ranging from production to disposal.”*



For More Information:

- See attached packets for additional project details
 - ▶ Survey Hardcopy – a paper copy of the survey if you would like to review.
 - ▶ Supplemental Information – additional details about the project and methods used.
- Contact:
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