Toward a Tiered, Fit-for-Purpose Framework for Occupational Dermal Exposure Assessment in Chemical Management

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BACKGROUND AND PROBLEM STATEMENT

Occupational dermal exposure evaluation is a critical component of chemical risk assessment

However:

- Criteria for determining when dermal exposure assessments are warranted are often unclear
- Approaches vary widely across organizations and regulatory programs
- Empirical dermal exposure data are often limited
- Exposure scenarios may not represent actual conditions
- Exposure assessments frequently rely on default parameters and assumptions
- Available tools are not consistently applied

PB. STATEMENT

Dermal exposure can become a substantial driver of risk estimates despite considerable uncertainty in the underlying exposure estimate

PROPOSED APPROACH

A FIT-FOR-PURPOSE REFINEMENT OF DERMAL EXPOSURE ASSESSMENTS

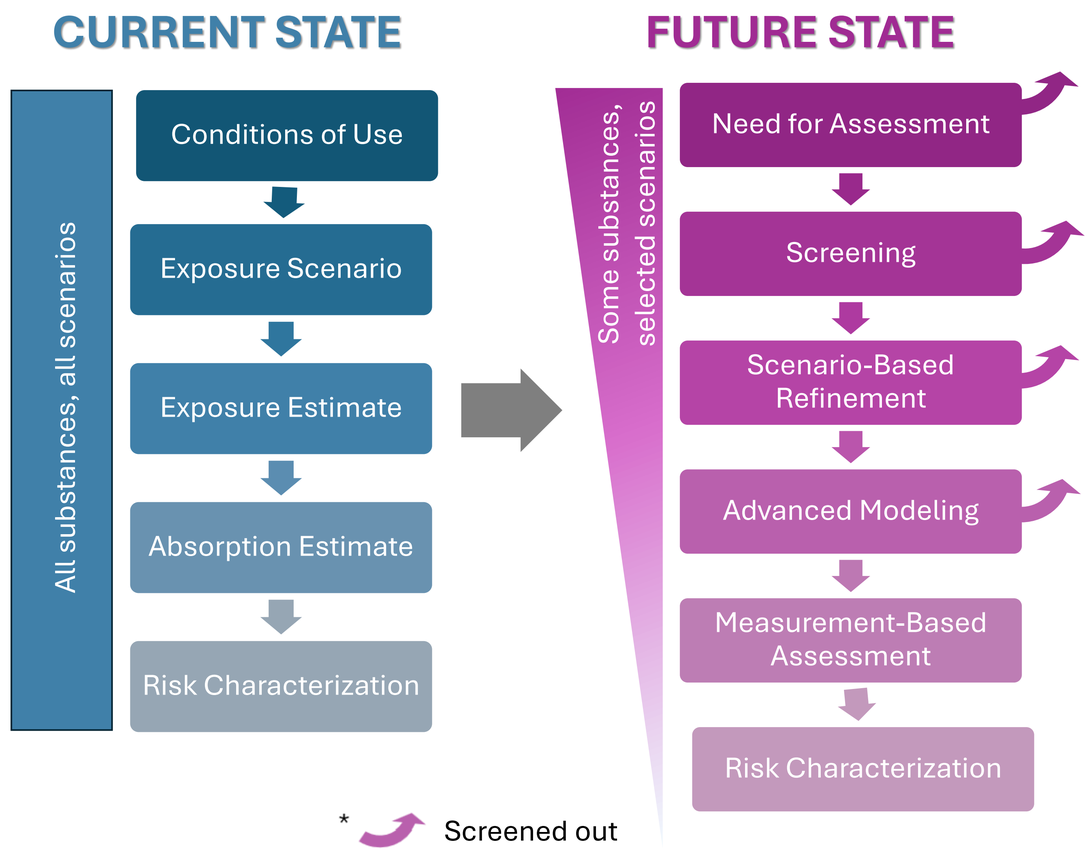
- Evaluate when dermal exposure assessment is needed or not
- Define consistent generic scenarios and key exposure determinants
- Align model inputs and scenario refinements
- Refine assessments to better represent real-world conditions
- Leverage existing tools, models, frameworks, and data appropriately

A NEW FRAMEWORK IS NEEDED TO:

- Systematically determine when dermal assessment is necessary
- Define the level of refinement needed to support risk management decisions
- Provide guidance for selecting appropriate tools and default assumptions
- Clarify acceptable levels of uncertainty across different problem contexts

GOAL

Improve realism, consistency, transparency
Harmonize approaches globally



DEVELOPMENT OF A GLOBAL EXPERT GROUP

MISSION: Develop a tiered framework for occupational dermal exposure assessment

The Health and Environmental Sciences Institute (HESI Global) is a 501c3 nonprofit institute operating globally to build science for a safer, more sustainable world through cross-sector collaborative initiatives.

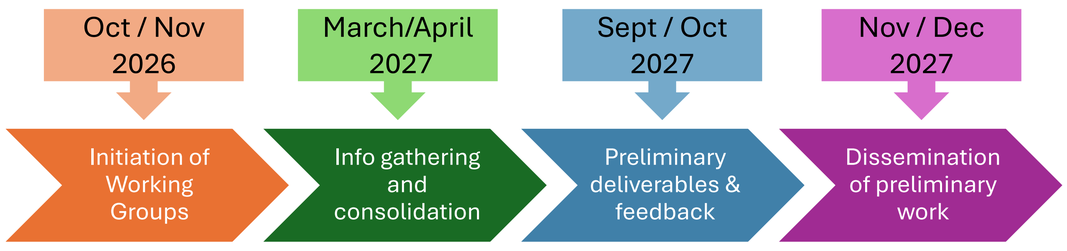
CURRENT STATUS AND CALL FOR PARTNERS

An international Steering Team* has been formed and work is ongoing to scope initial project teams, identify partners, and secure funding.

Two working groups are being formed and scoped:

- **The Tier 0 subgroup** is exploring:
  - The criteria characterizing "Tier 0"
  - Whether qualitative dermal exposure estimates can help develop these "Tier 0" criteria?
  - If a set of properties can define when dermal exposure is not relevant?
  - If certain transfer pathways can be screened out?
  - The Tier 0 assumptions informing transfer → loading → absorption.
- **The Scenario Library subgroup** will:
  - Develop sentinel scenarios
  - Leverage existing strategies, frameworks, and information
    - Exposure factors, databases
    - State of the science on dermal loading
    - State of the science on dermal absorption

TIMELINE



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