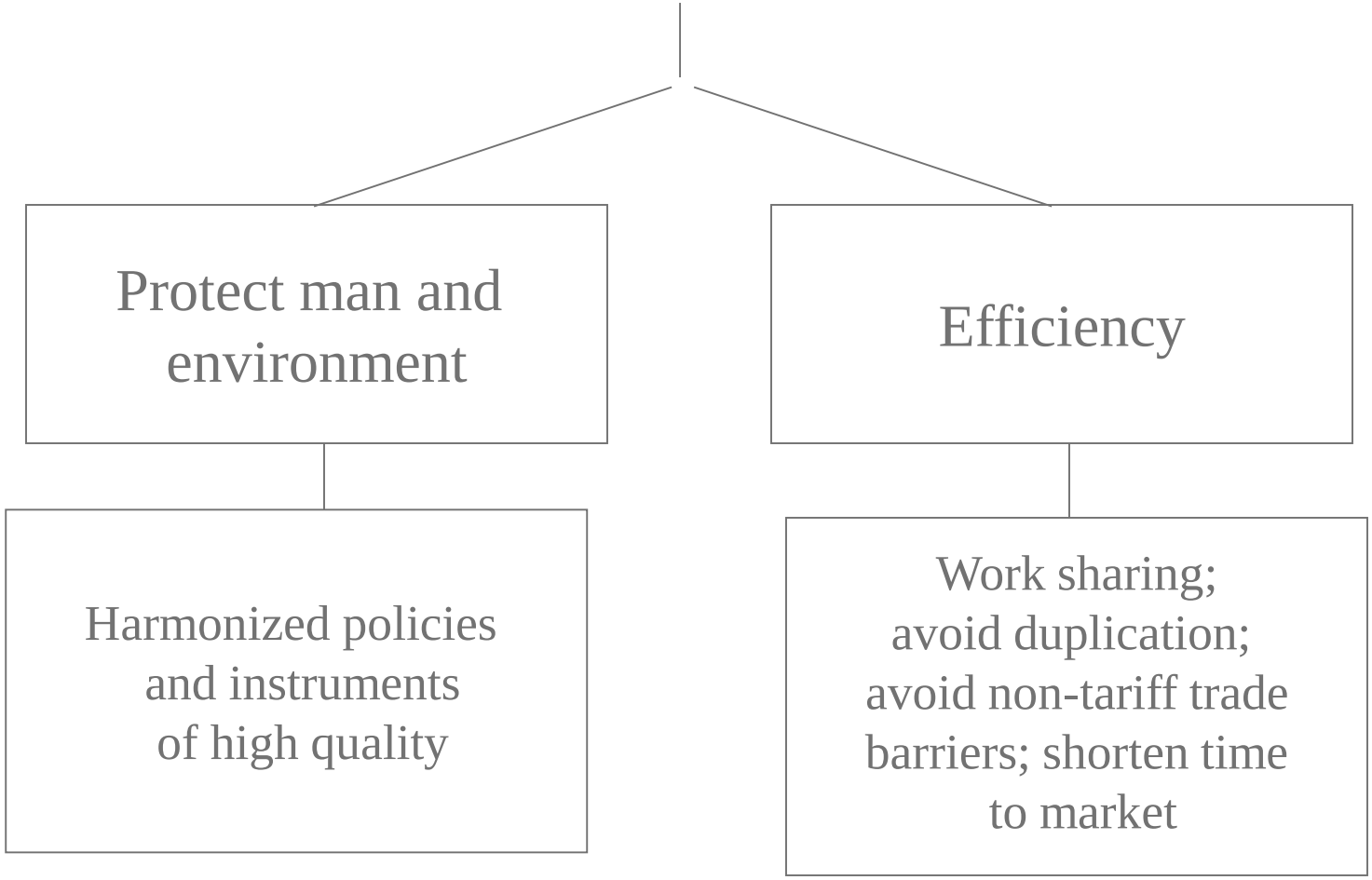
CHALLENGES IN CHEMICALS MANAGEMENT

REACH Congress 2014
Dessau, 1-2 December 2014

OECD
BETTER POLICIES FOR BETTER LIVES

THE OECD ENVIRONMENT HEALTH AND SAFETY PROGRAMME

EHS OBJECTIVES



1981 “MAD” DECISION

- OECD Council Decision on Mutual Acceptance of Data in an Assessment of Chemicals C(81)30(Final)

- “Decides that the data generated in the testing of chemicals in an OECD Member country in accordance with OECD Test Guidelines and OECD Principles of Good Laboratory Practice shall be accepted in other Member countries for purposes of assessment and other uses relating to the protection of man and the environment.”

SAVINGS FROM MAD

- BY AVOIDING DUPLICATIVE TESTING:

  AT LEAST € 150 MILLION / YEAR

- http://www.oecd.org/chemicalsafety/cuttingcostsinchemicalsmanagementhowoecdhelpsgovernmentsandindustry.htm

TEST GUIDELINES

Approximately 150 Test Guidelines:

- Physical-chemical properties
- Bio-degradation and accumulation
- Ecotoxicity
- Mammalian toxicity
- Efficacy, Pesticide residue testing

http://www.oecd.org/env/testguidelines

NEW TYPES OF EFFECTS: ENDOCRINE DISRUPTORS

EDTA Conceptual Framework (2012)

Level 1: Existing Data and Non-Test Information
Level 2: *In vitro* assays providing data about selected endocrine mechanism(s) / pathways(s) (Mammalian and non mammalian methods)
Level 3: *In vivo* assays providing data about selected endocrine mechanism(s) / pathway(s)
Level 4: *In vivo* assays providing data on adverse effects on endocrine relevant endpoints
Level 5: *In vivo* assays providing more comprehensive data on adverse effects on endocrine relevant endpoints over more extensive parts of the life cycle of the organism

EDTA Conceptual Framework (2012)

Mammalian and non mammalian Toxicology	
Level 1 **Existing Data and Non-Test Information**	• Physical & chemical properties, e.g., MW reactivity, volatility, biodegradability • All available (eco)toxicological data from standardized or non-standardized tests. • Read across, chemical categories, QSARs and other in silico predictions, and ADME model predictions
Level 2 **In vitro assays providing data about selected endocrine mechanism(s) / pathways(s)**	• Estrogen or androgen receptor binding affinity • Estrogen receptor transactivation (OECD TG 455 – OECD TG 457) • Androgen or thyroid transactivation (If/when TGs are available) • Steroidogenesis in vitro (OECD TG 456) • MCF-7 cell proliferation assays (ER ant/agonist) • Other assays as appropriate
	Mammalian Toxicology / **Non-Mammalian Toxicology**
Level 3 **In vivo assays providing data about selected endocrine mechanism(s) / pathway(s)[1]**	• Uterotrophic assay (OECD TG 440) • Hershberger assay (OECD TG 441) • Xenopus embryo thyroid signalling assay (When/if TG is available) • Amphibian metamorphosis assay (OECD TG 231) • Fish Reproductive Screening Assay (OECD TG 229) • Fish Screening Assay (OECD TG 230) • Androgenized female stickleback screen (GD 140)

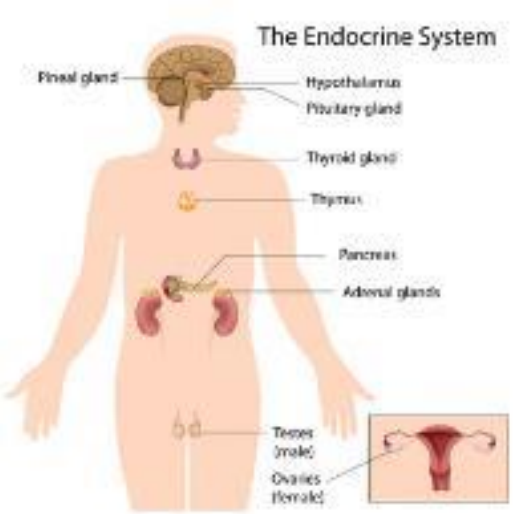
EDTA Conceptual Framework (2012)

Level 4 **In vivo assays providing data on adverse effects on endocrine relevant endpoints [2]**	• Repeated dose 28-day study (**OECD TG 407**) • Repeated dose 90-day study (**OECD TG 408**) • 1-generation reproduction toxicity study (**OECD TG 415**) • Male pubertal assay (see GD 150, Chapter C4.3)[3] • Female pubertal assay (see GD 150, Chapter C4.4)[3] • Intact adult male endocrine screening assay (see GD 150, Chapter Annex 2.5) • Prenatal developmental toxicity study (**OECD TG 414**) • Chronic toxicity and carcinogenicity studies (**OECD TG 451-3**) • Reproductive screening test (**OECD TG 421 if enhanced**) • Combined 28-day/reproductive screening assay (**OECD TG 422 if enhanced**) • Developmental neurotoxicity (**OECD TG 426**)	• Fish sexual development test (**OECD TG 234**) • Fish Reproduction Partial Lifecycle Test (when/If TG is Available) • Larval Amphibian Growth & Development Assay (when TG is available) • Avian Reproduction Assay (**OECD TG 206**) • Mollusc Partial Lifecycle Assays (when TG is available) [4] • Chironomid Toxicity Test (**TG 218-219**) [4] • Daphnia Reproduction Test (with male induction) (**OECD TG 211**) [4] • Earthworm Reproduction Test (**OECD TG 222**) [4] • Enchytraeid Reproduction Test (**OECD TG 220**) [4] • Sediment Water Lumbriculus Toxicity Test Using Spiked Sediment (**OECD TG 225**) [4] • Predatory mite reproduction test in soil (**OECD TG 226**) [4] • Collembolan Reproduction Test in Soil (**TG OECD 232**) [4]

EDTA Conceptual Framework (2012)

Level 5 **In vivo assays providing more comprehensive data on adverse effects on endocrine relevant endpoints over more extensive parts of the life cycle of the organism [2]**	• **Extended one-generation reproductive toxicity study (OECD TG 443)[5]** • **2-Generation reproduction toxicity study (OECD TG 416 most recent update)**	• **FLCTT (Fish LifeCycle Toxicity Test) (when TG is available)** • **Medaka Multigeneration Test (MMGT) (when TG is available)** • **Avian 2 generation reproductive toxicity assay (when TG is available)** • **Mysid Life Cycle Toxicity Test (when TG is available)[4]** • **Copepod Reproduction and Development Test (when TG is available)[4]** • **Sediment Water Chironomid Life Cycle Toxicity Test (OECD TG 233) [4]** • **Mollusc Full Lifecycle Assays (when TG is available) [4]** • **Daphnia Multigeneration Assay (if TG is available) [4]**

Guidance document on standardised test guidelines for evaluating chemicals for endocrine disruption



provide guidance on how to interpret the outcome of individual tests and how to increase evidence on whether or not a substance may be an endocrine disrupter.

http://www.oecd.org/env/ehs/testing/oecdguidancedocumentonstandardisedtestguidelinesforevaluatingchemicalsforendocrinedisruption.htm

Guidance Document No.150 (2012)

- For each standardised assay,
  - a background is provided, e.g. ER binding assay:

WHAT IT TELLS YOU	WHAT IT DOES NOT
• Chemical binds to the receptor • Potency of binding	• Whether it is an agonist or an antagonist • Whether this occurs in vivo • What the phenotypic consequences may be in vivo • Whether it has other activities

NEW TYPES OF CHEMICALS: NANOMATERIALS

OECD Council Recommendation 2013

- "… the approaches for the testing and assessment of traditional chemicals are in general appropriate for assessing the safety of nanomaterials, but may have to be adapted to the specificities of nanomaterials."

http://www.oecd.org/chemicalsafety/oecd-countries-address-the-safety-of-manufactured-nanomaterials.htm

NANOSAFETY PROJECTS

Testing and Assessment

Risk assessment and regulatory issues

Exposure assessment and mitigation

Sustainable use of manufactured nanomaterials

http://www.oecd.org/env/ehs/nanosafety/

NanoSafety: Recent publications

- Guidance on Sample Preparation and Dosimetry for the Safety Testing of Manufactured Nanomaterials
- Expert Meeting on Potential Revisions to OECD Test Guidelines and Guidance Document
  - Inhalation toxicity
  - Ecotoxicology and Environmental Fate
- Important Issues on Risk Assessment of Manufactured Nanomaterials
- Nanotechnology and tyres: Greening industry and transport

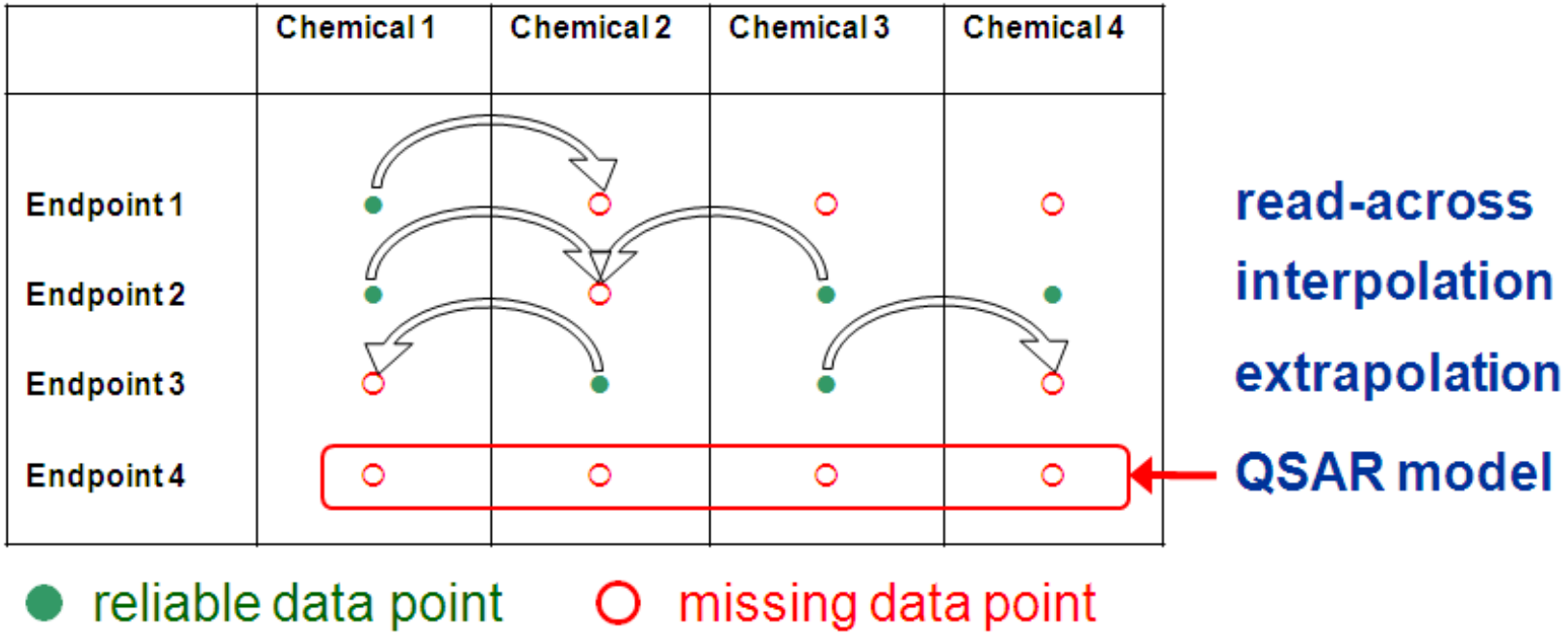
NOVEL METHODS FOR HAZARD ASSESSMENT

Integrated Approaches to Testing and Assessment

- Use of (or combination of):
  - (Q)SARs
  - Grouping of chemicals into chemical categories
  - Non-standard test methods (including high throughput methods & toxicogenomics)
- Testing strategies

Grouping of Chemicals

Not every chemical needs to be tested for every endpoint because available test results for members of the category allow an estimation of the results for the untested endpoints.



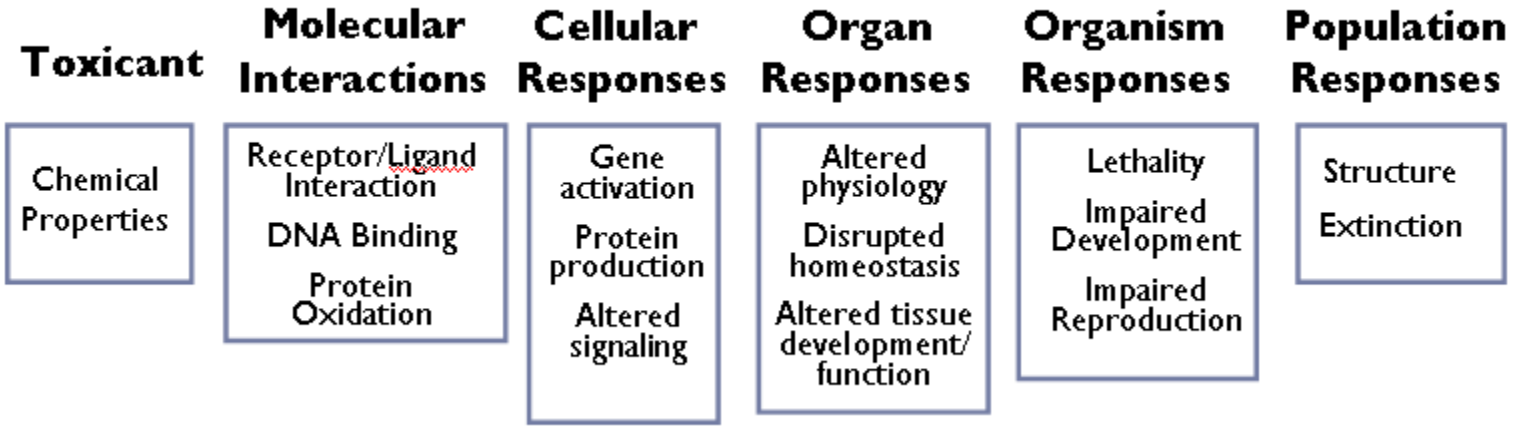
Updated guidance document: http://www.oecd.org/env/ehs/risk-assessment/groupingofchemicalschemicalcategoriesandread-across.htm

- Free software application to predict the properties of chemicals (currently version 3.2)
- Estimate missing experimental values by read-across and trend analysis (grouping of similar chemicals, chemical categories)

www.oecd.org/env/hazard/qsar

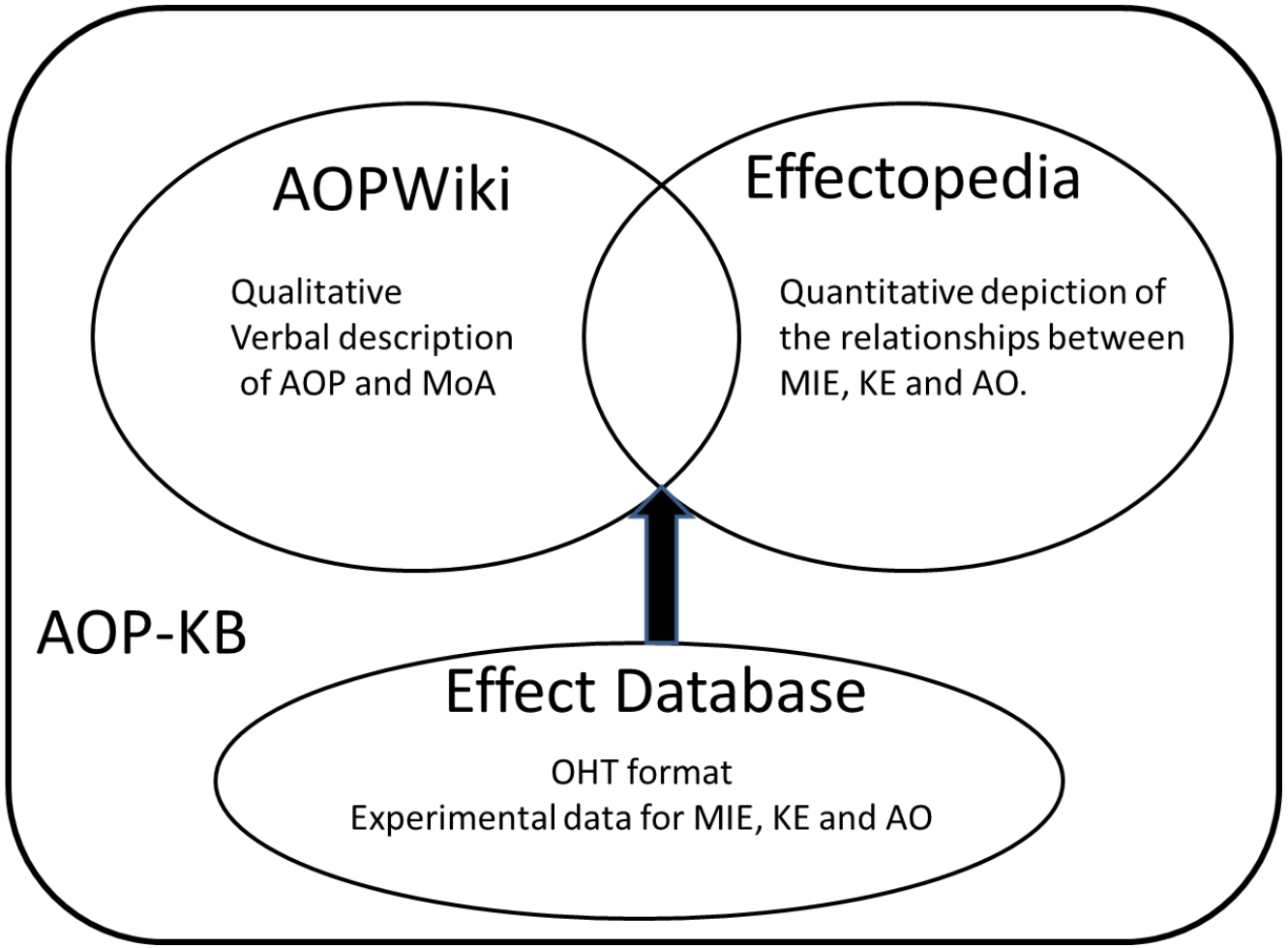
Adverse Outcome Pathways

- Adverse outcome pathways describe the processes by which a chemical induces molecular perturbations and the associated effects at the subcellular, cellular, tissue, organ, whole animal and population levels of observation.



http://www.oecd.org/chemicalsafety/testing/adverse-outcome-pathways-molecular-screening-and-toxicogenomics.htm

Adverse Outcome Pathway Knowledge Base



https://aopkb.org/

SUBSTITUTION

OECD Substitution and Alternatives Assessment Toolbox

Welcome to the OECD Substitution and Alternatives Assessment Toolbox - a compilation of resources relevant to chemical substitution and alternatives assessments. Visit the four resource areas below to learn more about chemical substitution and alternatives assessments and get practical guidance on conducting them.

Learn about...

the current landscape of substitution and alternatives assessment practices in the:

OECD Meta-Review of Current Practices

Alternatives Assessment Tool Selector

A filterable inventory of chemical hazard assessment tools and data sources to help you identify tools most relevant to your substitution and alternatives assessment goals. A listing of non-hazard assessment tools is also available.

Learn more

Alternatives Assessment Frameworks

A summary of the current frameworks that can be used to assess alternatives. Guides and other resources for conducting a chemical substitution or alternatives assessment are included.

Learn more

Case Studies and Other Resources

Links to case studies and other resources that provide examples, insights, and lessons learned on substitution and alternatives assessment approaches.

Learn more

Regulations and

A list of regulations and restrictions throughout OECD member countries that are driving

THANK YOU FOR YOUR ATTENTION

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