

Rethinking Chronic Fish Toxicity Testing: Case Studies Toward an Integrated Approach to Testing and Assessment

Heike Laue¹; Michelle Embry²; Gordon Sanders³; Mathijs Smit⁴; Lucy Wilmot⁵

¹Givaudan International SA, Kempthal, Switzerland; ²Health and Environmental Sciences Institute (HESI), Washington, DC, USA; ³Givaudan International SA, Vernier, Switzerland; ⁴Shell Global Solutions International BV, The Hague, The Netherlands; ⁵ECETOC, Brussels, Belgium.

BACKGROUND

Chronic fish toxicity data are often required for environmental hazard and risk assessment under various regulatory frameworks (e.g. REACH Regulation, PPP Regulation etc.). *Fish = representative predator species for the pelagic environment.*

Growing interest in WOE approaches combining available data, e.g. read-across, acute fish toxicity data, non-vertebrate data (e.g., Daphnia), *in silico* predictions and *in vitro* fish cell line assays.

Tiered testing frameworks and integrated testing strategies (ITS) for fish toxicity	✓	e.g. OECD 2012, ECHA 2023, Coors et al., 2023
Practical examples and a dedicated Integrated Approach to Testing and Assessment (IATA) for chronic fish toxicity	✗	

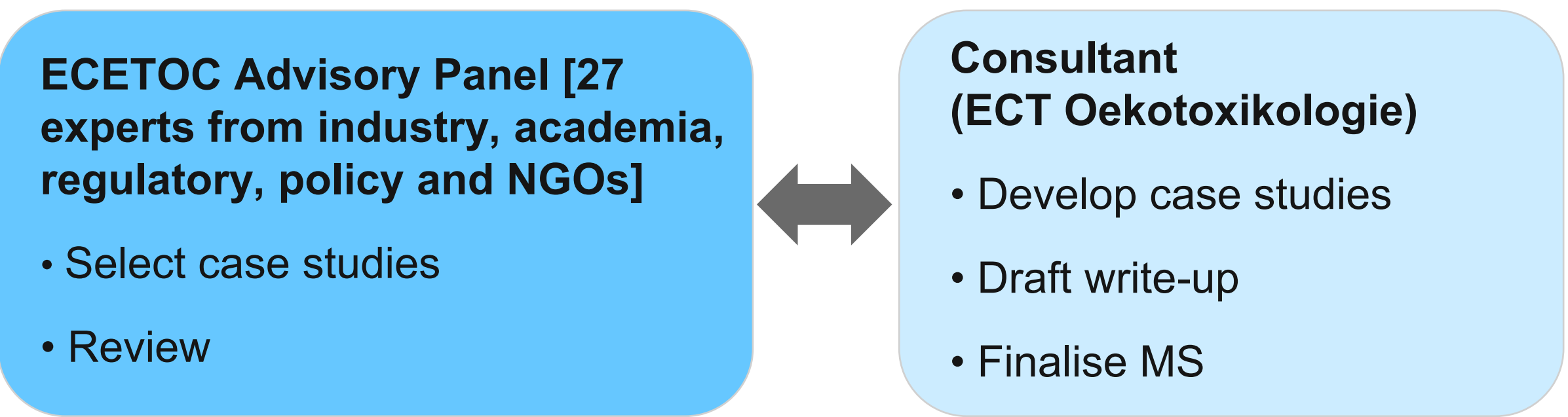
WHY NOW?

- IATAs can strengthen predictive power in hazard and risk assessments while supporting the goal of reducing vertebrate testing.
- New *in vitro* methods for assessing chronic fish toxicity are under development.
- European Commission Roadmap toward phasing out animal testing in chemical safety assessment.

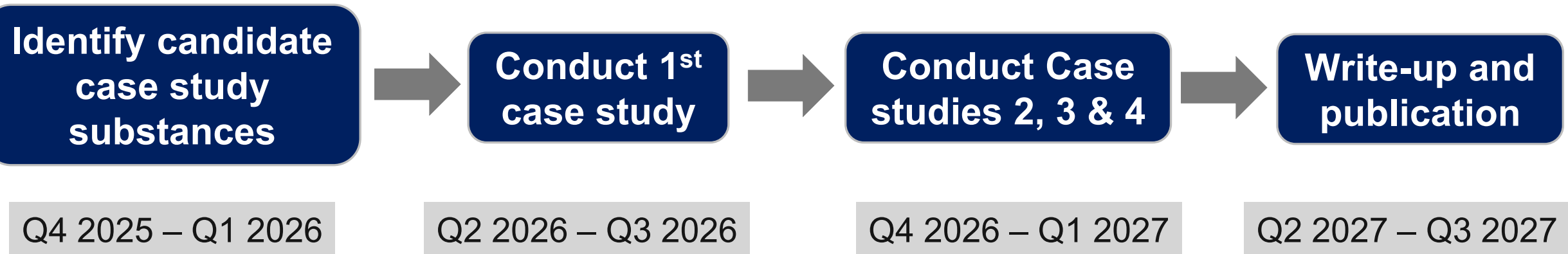
OBJECTIVES

- Develop case studies to inform a future Integrated Approach to Testing and Assessment (IATA) for chronic fish toxicity.
- Case studies aim to **use a weight of evidence approach integrating various lines of evidence to conclude on chronic fish toxicity.**

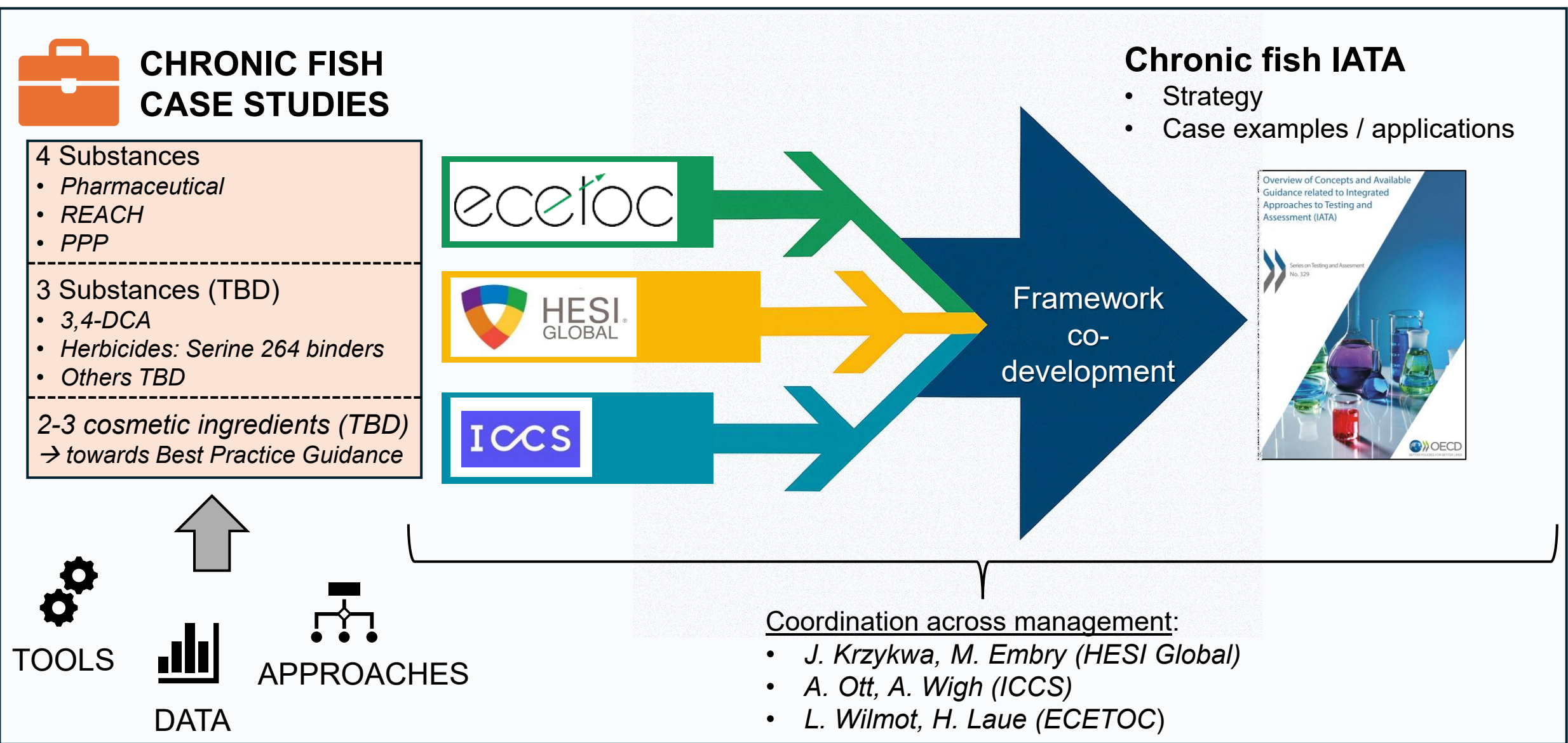
APPROACH



TIMELINE & DELIVERABLES



COORDINATION



See HESI and ICCS posters at Mo054 and Mo042

CASE STUDY SELECTION

Case study candidates [shortlist]

Specific MoA	PPP: - Fungicide; CYP P450 inhibition - Insecticide (pyrethroid); Neurotox - Insecticide, incl veterinary applications; Neurotox - Herbicide	Narcotic MoA	REACH Chemicals: - Fuel ether - Fragrance ingredient - Chelating agent
	Pharma: - Immunosuppressant - Antihistamine		

- **Four case studies to be selected**
- Different mode of action (ED MoA excluded).
 - Different species sensitivity, different levels of toxicity.

LINES OF EVIDENCE

- In silico*/QSAR data
- Read-across
- Available acute fish toxicity data (*in vivo*, *in vitro*)
- Available invertebrate toxicity data (*in vivo*)
- Available fish chronic toxicity data (*in vivo*, *in vitro*)
- ***in vivo* data as cross-comparison of WoE outcome**
- Available mammalian data (*in vivo*, *in vitro* – TBC)
- etc.

GOAL:
Integrating different LoE to conclude on chronic fish toxicity

OUTCOME

- Inform regulatory and industry decision-making
- Contribute to the development of an OECD IATA
- Support the implementation of the European Commission Roadmap toward phasing out animal testing in chemical safety assessment.

References

OECD. (2012). *Fish toxicity testing framework, Series on testing and assessment, No 171*.
ECHA. (2023). Chapter R.7b: Endpoint specific guidance (Version 5.0; December 2023). <https://doi.org/10.2823/161062>.
Coors A, Brown AR, Maynard SK, Nimrod Perkins A, Owen S, Tyler CR. (2023). Minimizing Experimental Testing on Fish for Legacy Pharmaceuticals. Environ Sci Technol. 2023 Jan 31;57(4):1721-1730. doi: 10.1021/acs.est.2c07222.

Contact: info@ecetoc.com