Introduction & Background NAMs Roadmap Draft Version 3 (2023)

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Chemical Landscape

“The Toxicity Data Landscape for Chemicals” paper (Judson et al., 2009) reported that 28 million chemicals had been discovered. Only three million had been tested on animals and some of these also tested in human studies. Approximately, a further one million had some in vitro/in silico screening assay data only. By 2020, over 350,000 chemicals and mixtures of chemicals had been registered for production and use worldwide. The identities of many chemicals remain publicly unknown because they are claimed as confidential (over 50,000) or ambiguously described (up to 70,000) (Wang et al., 2020).

It is understandable that with those numbers, finding an accurate and optimized model poses a big challenge, not least for example some of the environmental chemicals that don’t necessarily come with a toxicological package. However, by combining data from traditional methodologies with data from these new emerging technologies we will be able to predict chemical risk more accurately, rapidly and efficiently.

Hopefully this will also be an opportunity to engage cross cutting themes, continue to collaborate with: the National Centre for the Replacement, Refinement and Reduction of Animal Research (NC3Rs); Partnership for the Assessment of Risks from Chemicals (PARC) and feed into other projects e.g., Genome UK: the future of healthcare (2020); and Accelerating the Pace of Chemical Risk Assessment (APCRA), as well as collaborations across academia, industry and beyond.

Current Chemical Challenges

- Too many chemicals to assess.
- Traditional methods can be slow, costly and have ethical considerations.
- Adopting the principles of the 3Rs (i.e. Replacement, Reduction and Refinement of animal experiments).
- Not enough data on compound/compounds being assessed.

Opportunities

- Adopt new approach methodologies (NAMs) to predict risk more rapidly, accurately, and efficiently towards optimum consumer safety.