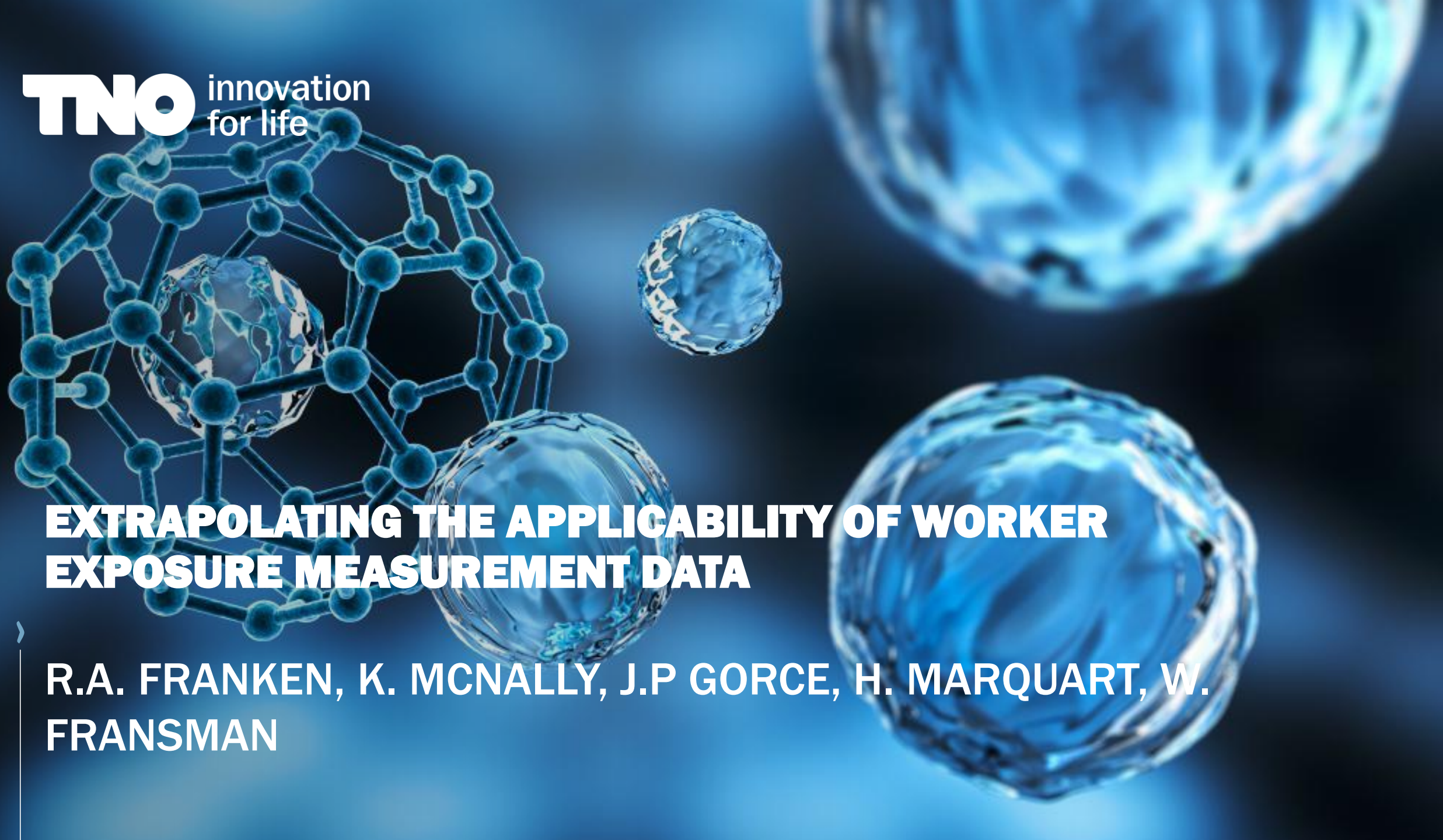

EXTRAPOLATING THE APPLICABILITY OF WORKER EXPOSURE MEASUREMENT DATA

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INTRODUCTION

- Exposure assessment is an essential component of the risk assessment process

- In the occupational setting, the “gold standard” approach for exposure assessment is based upon representative measurements
  - Representative?
    - Companies/sites, workers, repeats
- In practice the vast majority of exposure assessments are not supported by measurement data
  - A single substance alone may require many exposure assessments
- Exposure models play an important role
  - Estimates of exposure based upon contextual information about a task
    - Screening tools such as ECETOC TRA
    - Tier 2 models such as ART and Stoffenmanager

OBJECTIVES OF THE PROJECT

- Develop an approach that enables the use of existing “source” measurement data more extensively
  - Please note that this approach was intended for “conventional chemicals”
- Identify circumstances where “analogous data” might be introduced and applied to such exposure assessments
- Apply corrections as necessary to account for differences between “source” and “target” scenarios & account for uncertainties
  - Where “source scenarios” mean situations for which exposure measurements exist which can be used for read-across
  - Where “target scenario” means the user scenario for which measurements are not available
- User-friendly

THE FRAMEWORK APPROACH

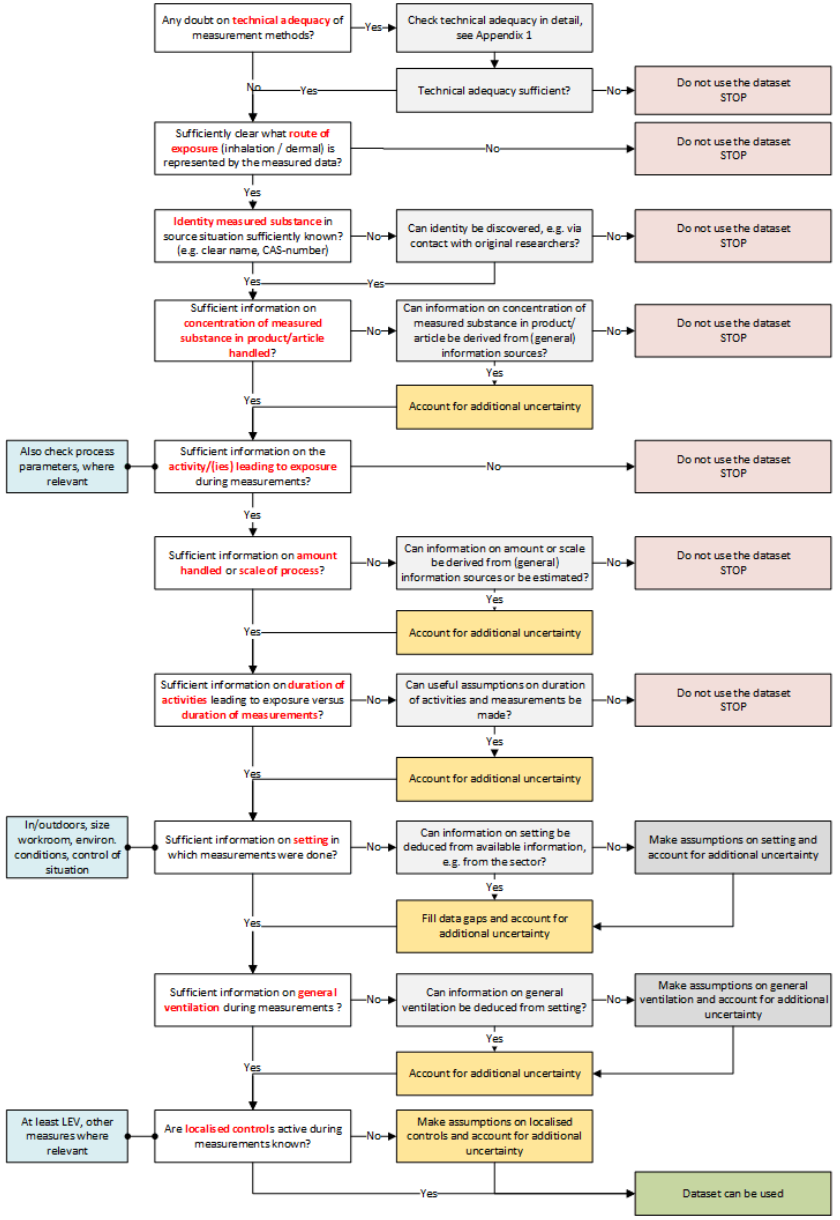
- A hybrid modelling and measurement approach that supplements existing exposure models
- An estimate of exposure is based upon existing measurement data from a **similar** source scenario
- Corrections applied to account for differences between source and target scenarios
  - Same underpinning theory of exposure determinants as used in models such as ECETOC TRA and ART

MULTI-STEP READ-ACROSS

- Step 1: Quality check on the source dataset
- Step 2: Inventory/mapping of the source- and target situation for relevant read-across parameters
- Step 3: Statistical correction for differences between source- and target situation and quantification of uncertainty
- Step 4: Read-across results in a user-friendly way

STEP 1: DATA QUALITY

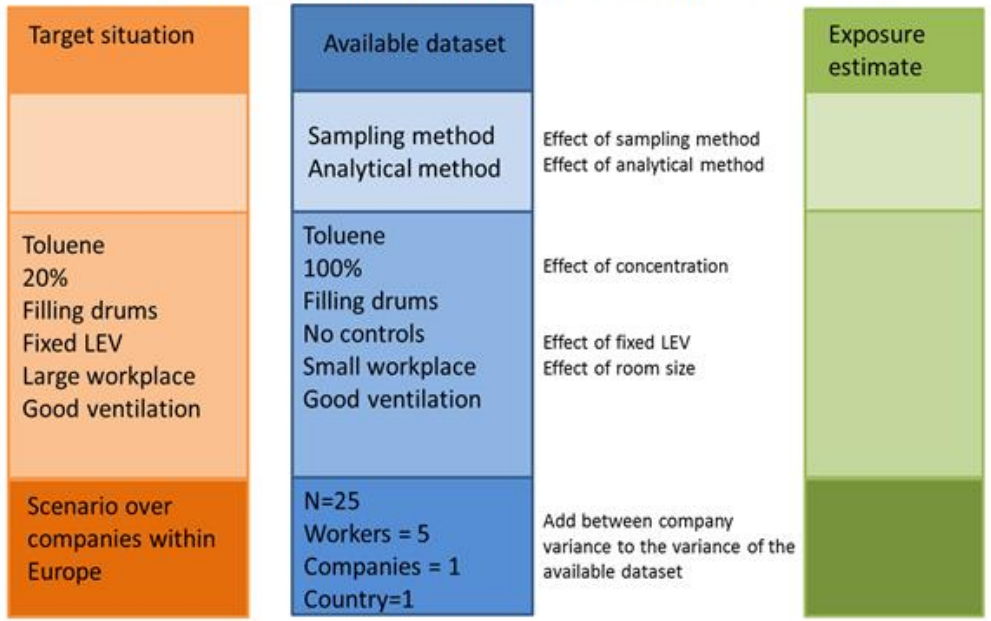
- Quality of source data should be sufficient before used for read-across
- Technical aspects:
  - Sampling / analytical methods
- Contextual information:
  - Route of exposure
  - Substance & concentration in product/article
  - Activities
  - Scale
  - Duration
  - Localised controls
  - Setting



STEP 2: MAPPING

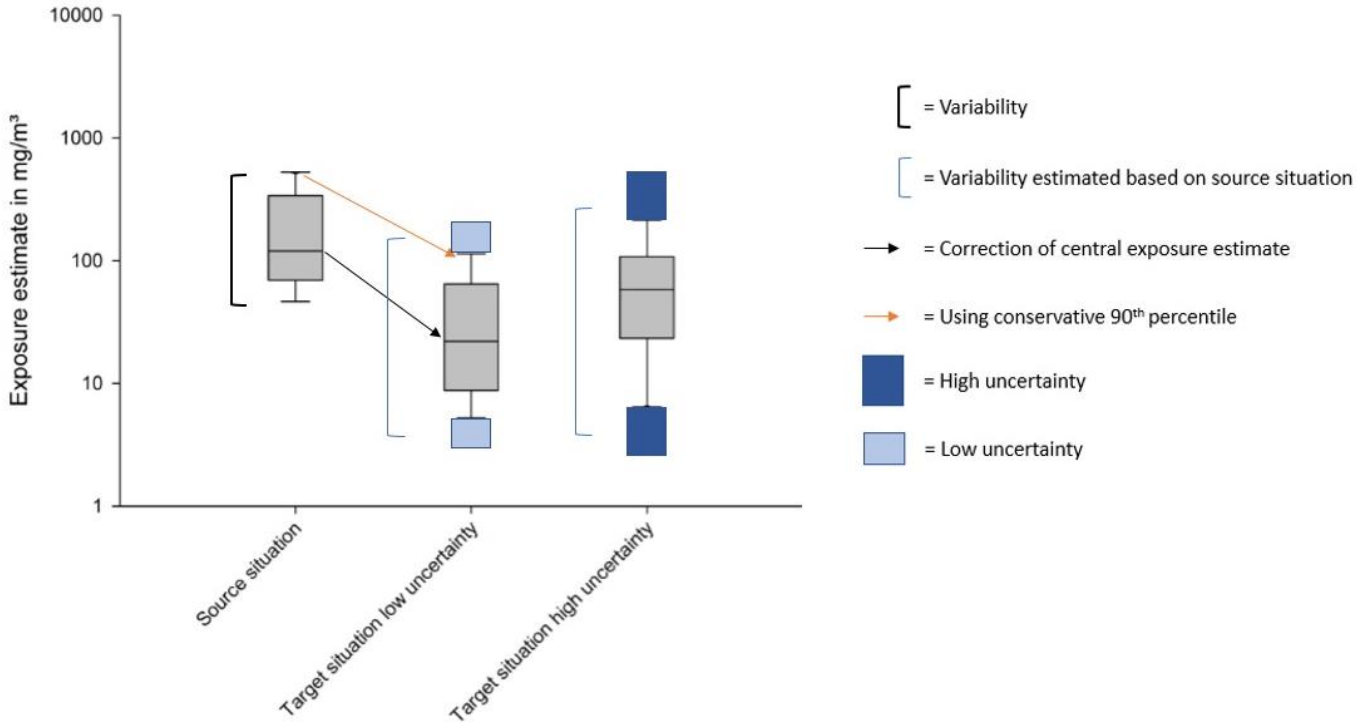
- Transcribe contextual information on the source and target scenarios into determinants
  - PROCs and ART activity classes supported
  - Determinants relating to the source depend upon the exposure scenario class
- Systematic comparison of determinants in source and target scenarios to assess whether read-across is reasonable
  - A small rule-base governs the extrapolations from source to target scenario that is supported by the framework

Figure 1: Illustration of the mapping of the target situation and the available data source(s) and the rule-base needed to extrapolate the measured exposure from the available data source(s) to the target situation.



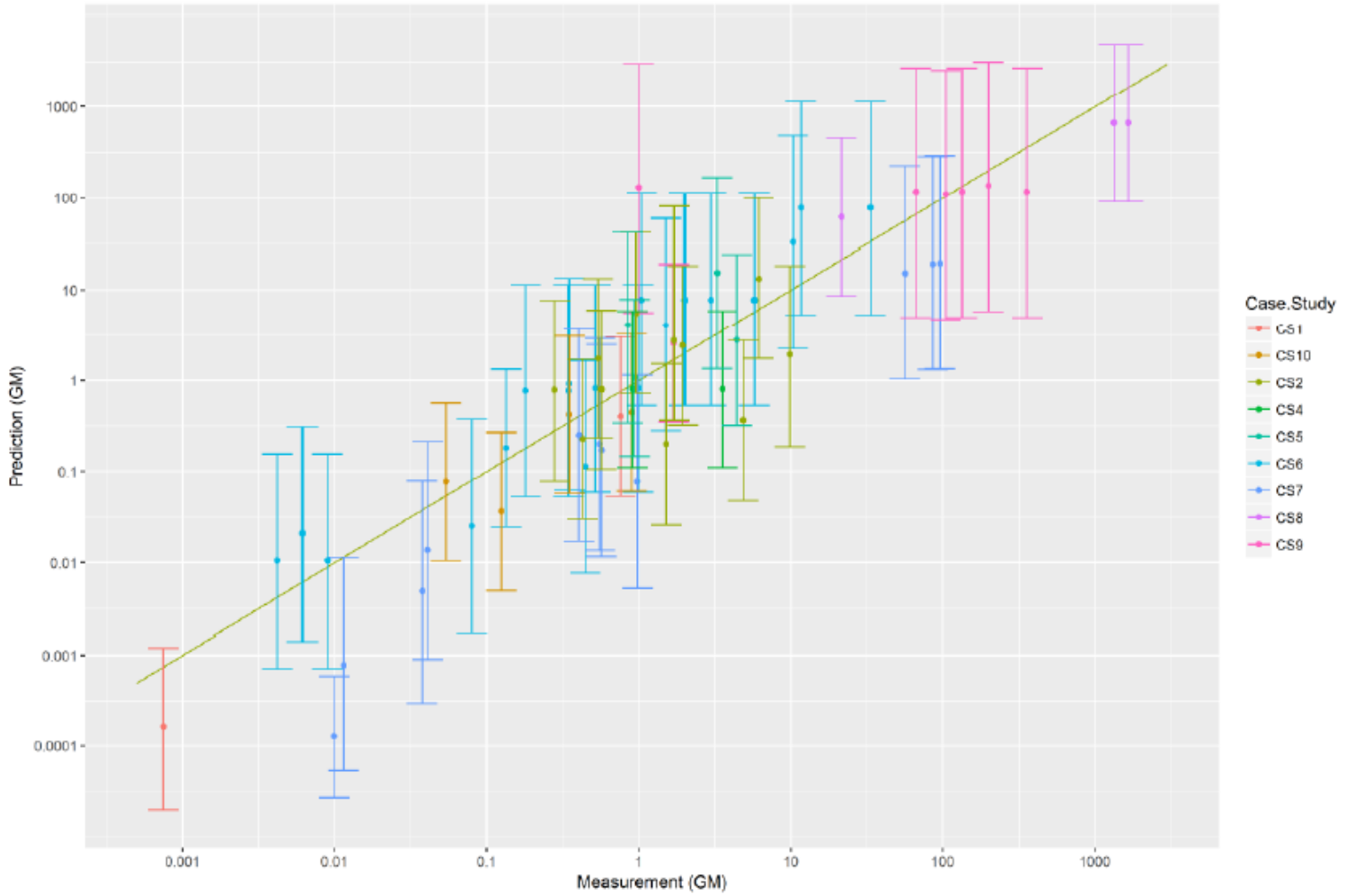
STEP 3: STATISTICAL CORRECTION

- Calculate a read-across score
  - Read-across scores for emission potential, dispersion, localised control and concentration calculated based on a systematic comparison of source and target scenarios
- Emission potential is subject to calibration
  - Exposures in “similar” scenarios are closer than an uncorrected ratio of determinants would imply
  - A methodology for accounting for uncertainty in read-across results from this calibration step
- Final read-across score



DOES IT WORK?

- Framework has been tested in 5 initial case studies and 5 additional challenging case studies following recent refinements to the approach.
  - Single source and multiple target scenarios within each case study
  - Range of activities and substance classes studied



WOULD IT WORK WITH NANOMATERIALS?
SEVERAL OUTCOMES POSSIBLE

- Test approach with a dataset (case studies) containing nanomaterials
- Possibly extra determinants need to be considered
  - Particle size (or distribution), aggregation and agglomeration
  - Additional activities possibly not covered by PROCs or activity classes
  - ?

- Current calculation is (partly) calibrated
  - Possibly a new calibration needs to be performed on a dataset with nanomaterials

- Current tools used within the current framework are ECETOC TRA and ART
  - Possible nano-specific tools can be used if needed to tailor the framework for MNs

- Translate the theory and concept of the framework towards a user-friendly IT tool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