

Cross-Study Analyses of SEND Data: Toxicity Profile Classification

M. Carfagna¹, Cm Sabbir Ahmed^{2,3}, Md Yousuf Ali^{2,3}, B.Dharmaraj², S. Butler^{2,3}, T. Fukushima⁵, H. Hanafusa⁵, W. Houser⁶, N. Jensen⁷, S. Leuenroth-Quinn², B. Paisley¹, K.Snyder², S. Vispute⁴, W. Wang⁶

BioCelerate
Contact: info@biocelerate.org

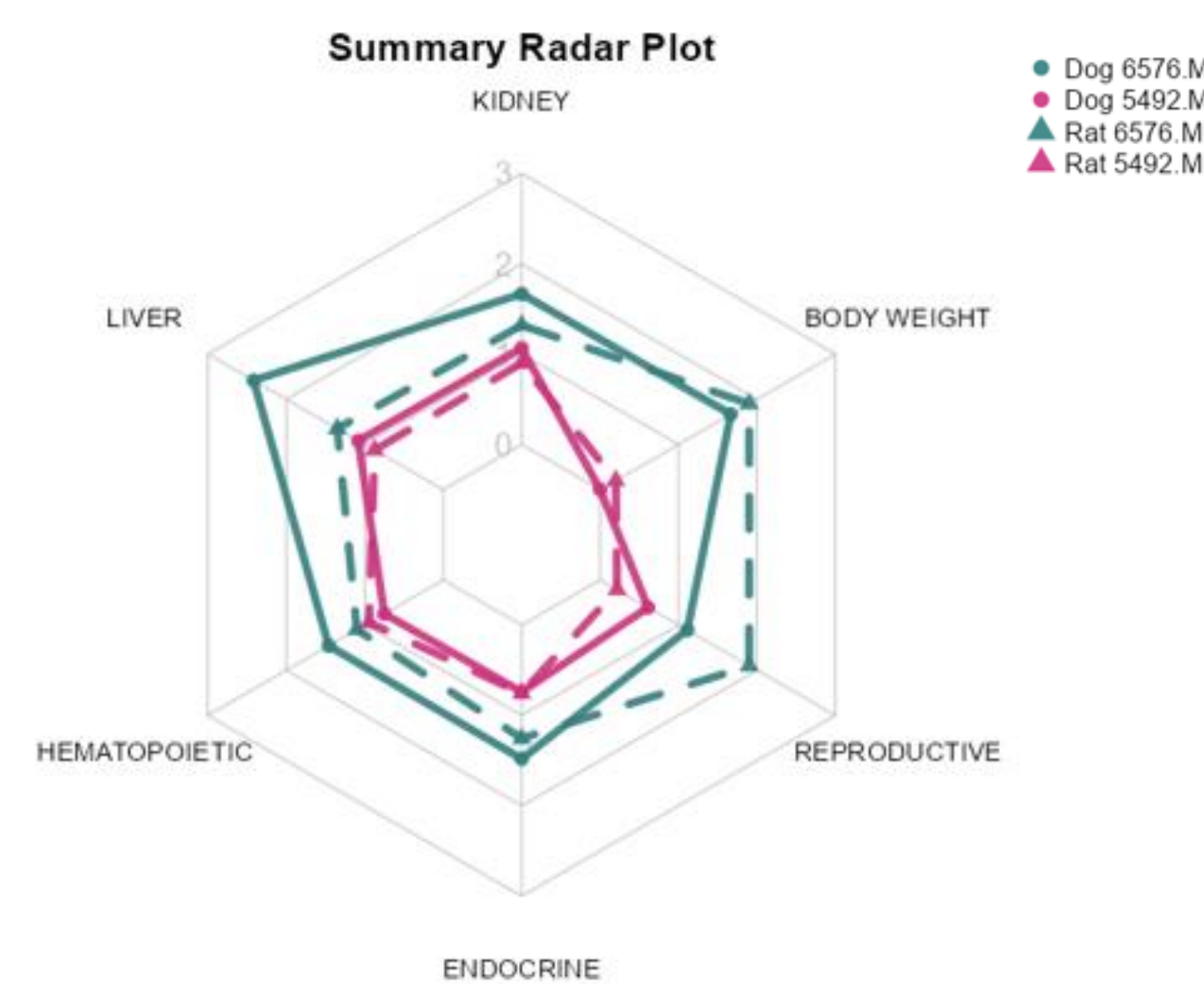
PP27

Introduction

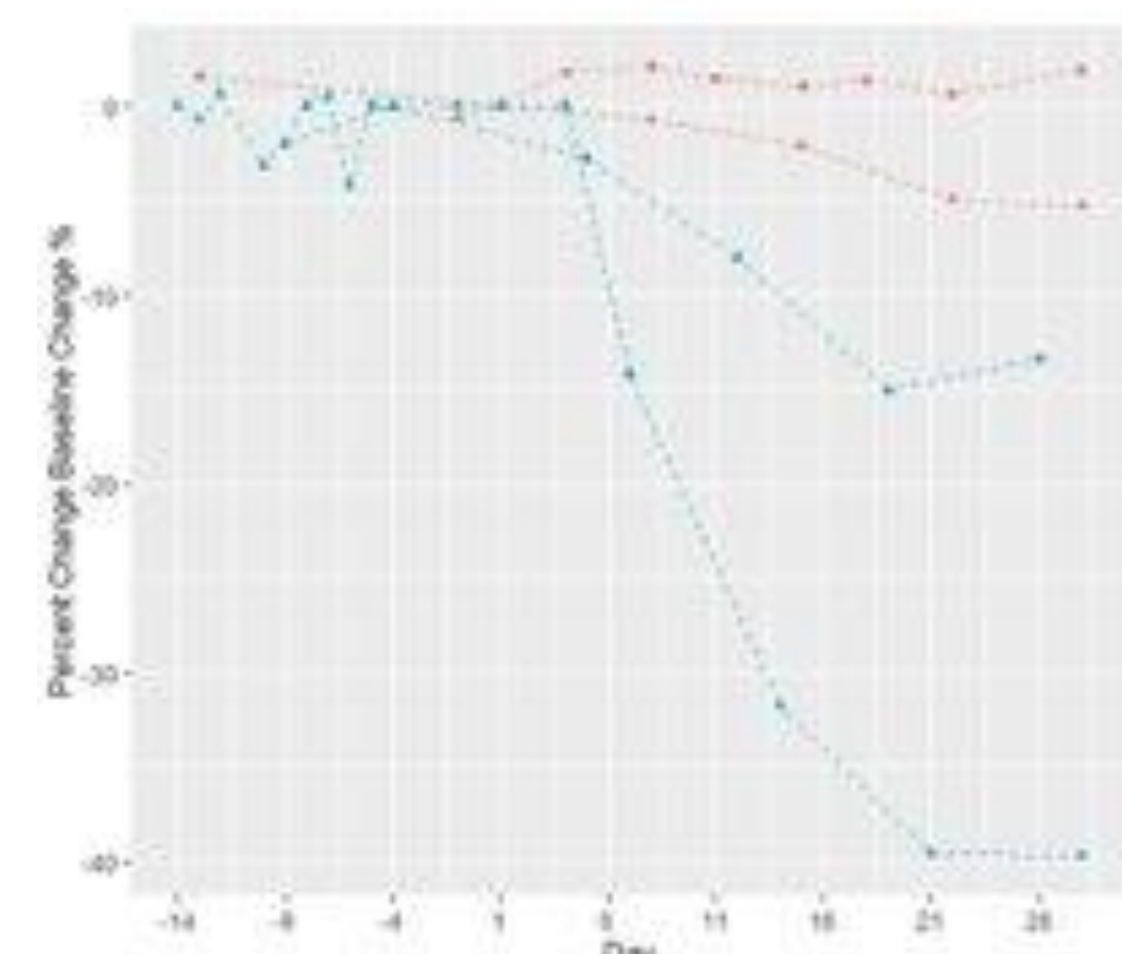
A collaboration between BioCelerate and US FDA CDER is developing analytic approaches to enable the comparison of toxicological findings of two or more studies using SEND. An example analysis was conducted using studies from the BioCelerate Toxicology Data Sharing (TDS) database intended for the same pharmacological target. Cross-study comparisons tools using SEND data are expected to improve the identification of unique findings related to the intended target, species and duration of dosing.

Integrated analysis and visualization of toxicological profiles across compounds as related to pharmacologic target, nonclinical species and dosing duration.

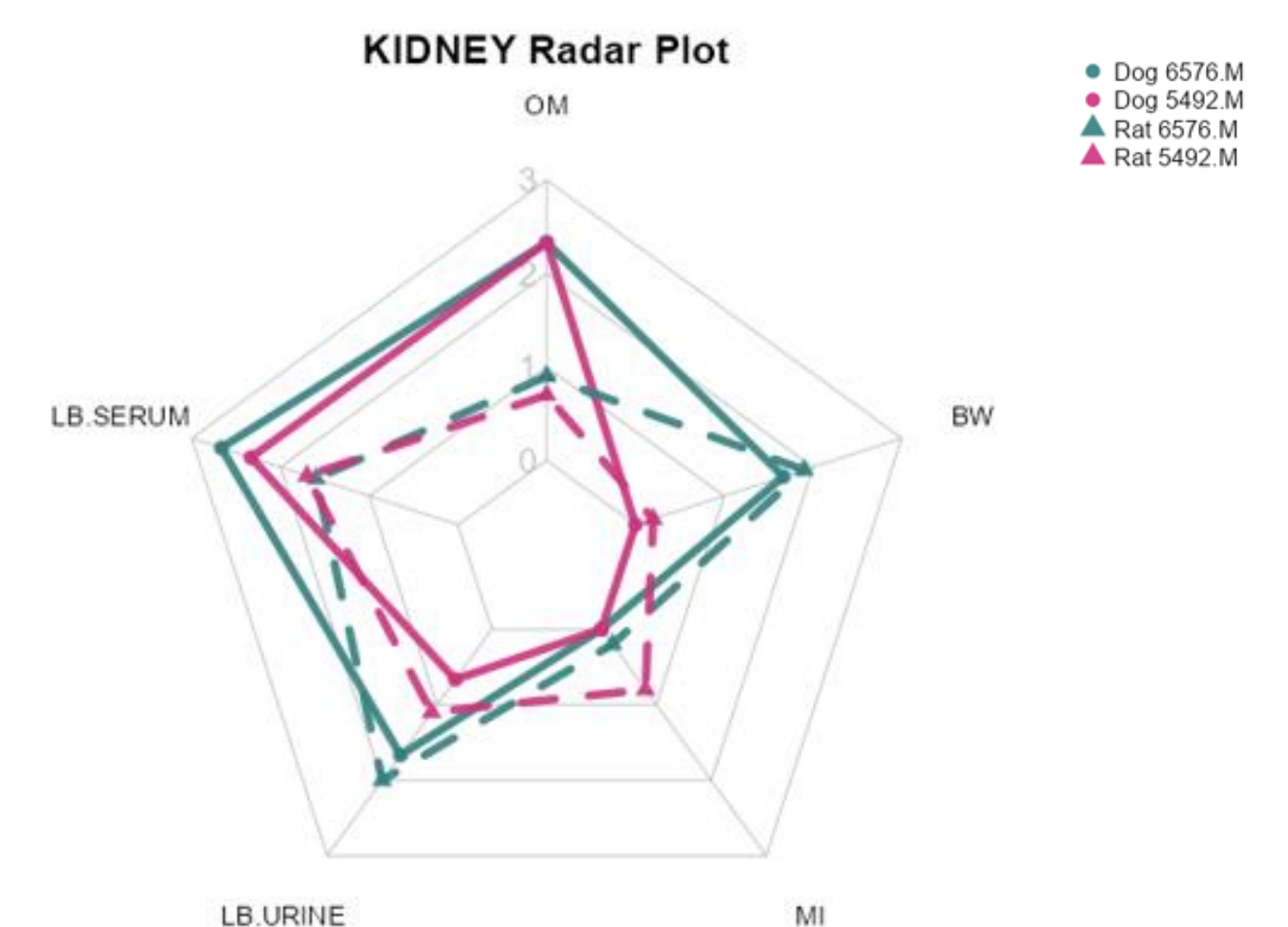
First Level Radar Plot



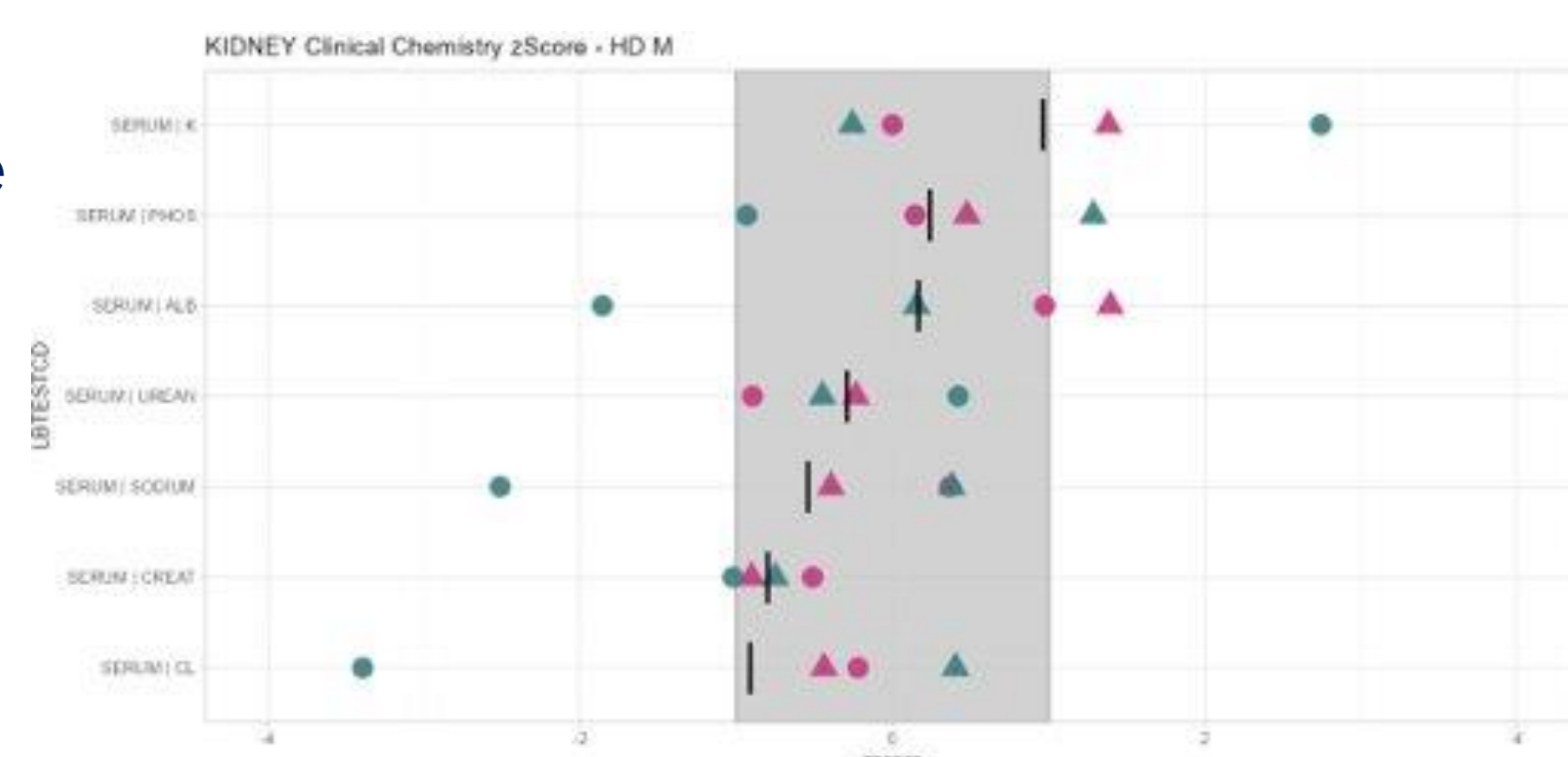
Body Weight Detail



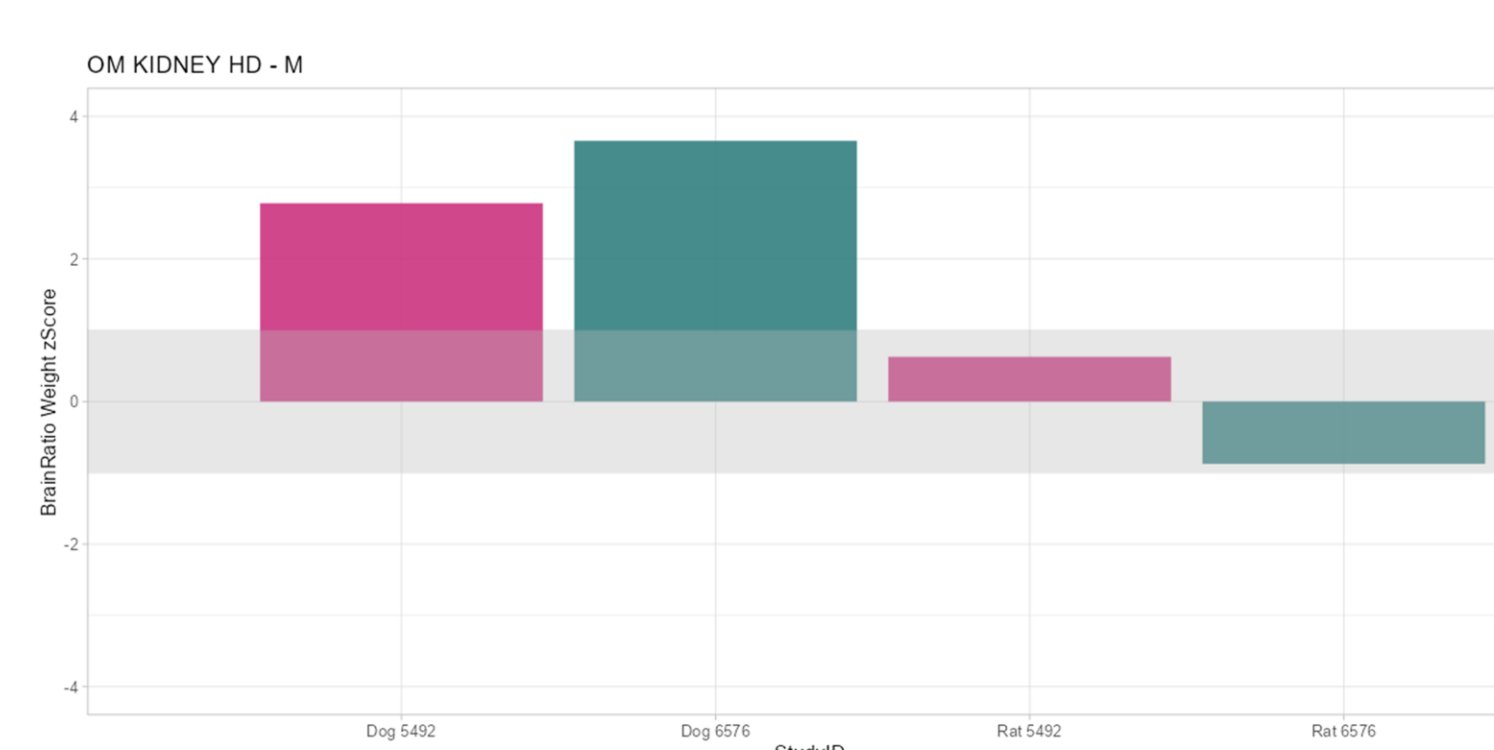
Second Level – Kidney Parameters



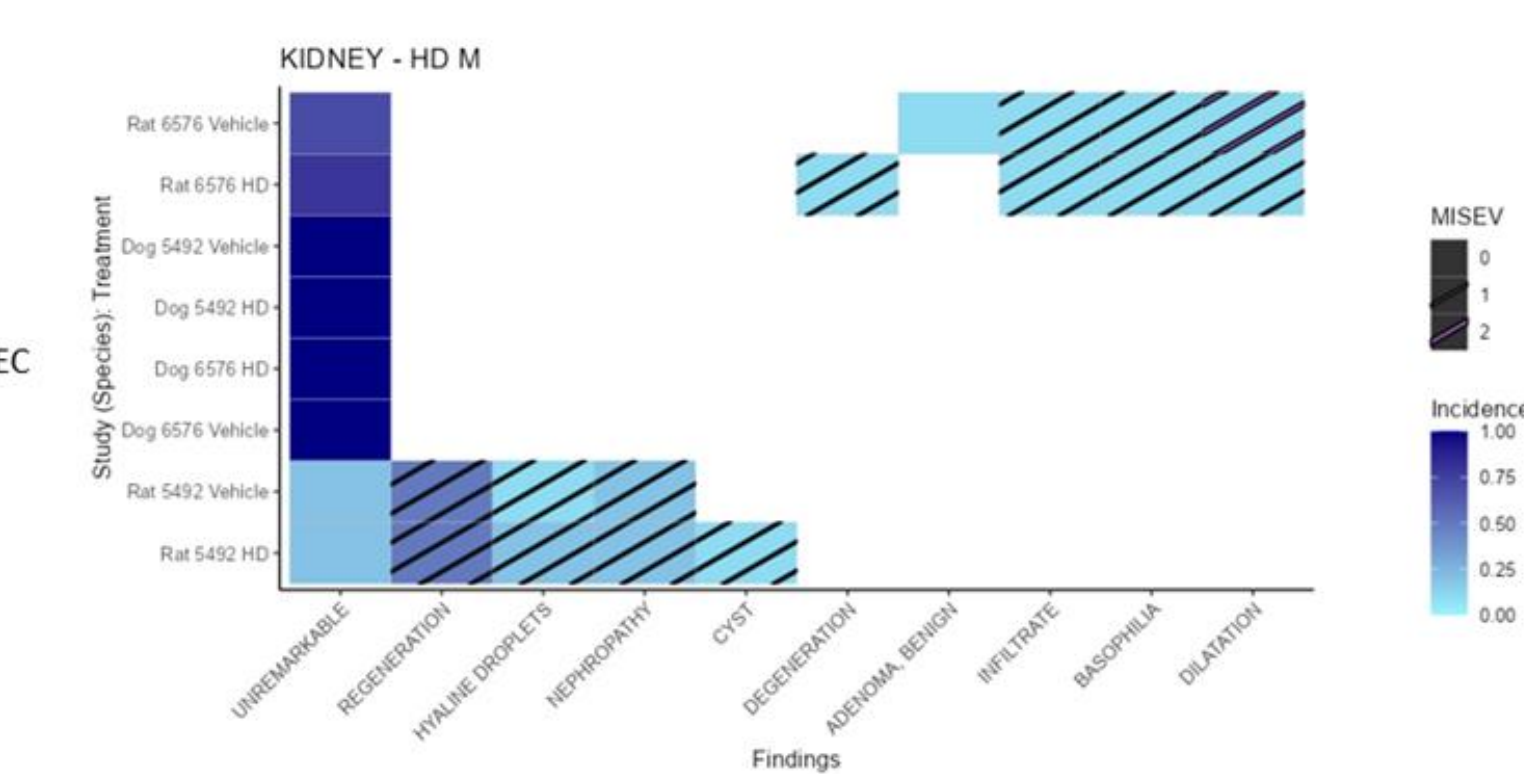
Third Level – Clinical Chemistry



Third Level – Organ Weight



Third Level – Microscopic



Methodology

Toxicologically important target systems were identified and data relevant to the system were structured to perform focused analyses. Domains used for data analysis were BW, LB, MI and OM.

SEND datasets were scored relative to control animals of their respective studies in the LB, MI, and BW domains. MI is scored through a combination of incidence and severity. LB, and BW domains are scored through their relative zscore per column.

A Rshiny app is being developed to display the visualizations and allow the user to control aspects of the scoring algorithm and visualizations.

Summary and Conclusions

- Data transformation enabled cross study analysis by facilitating comparisons of domains between studies from different species
- A user defined scoring system was developed to visualize trends and differences between multiple studies
- Cross study analyses extract additional information from SEND data beyond single study evaluations.
- The analysis can be expanded to include organ systems of interest and is expected to be scalable to larger data sets.

BioCelerate Members:

