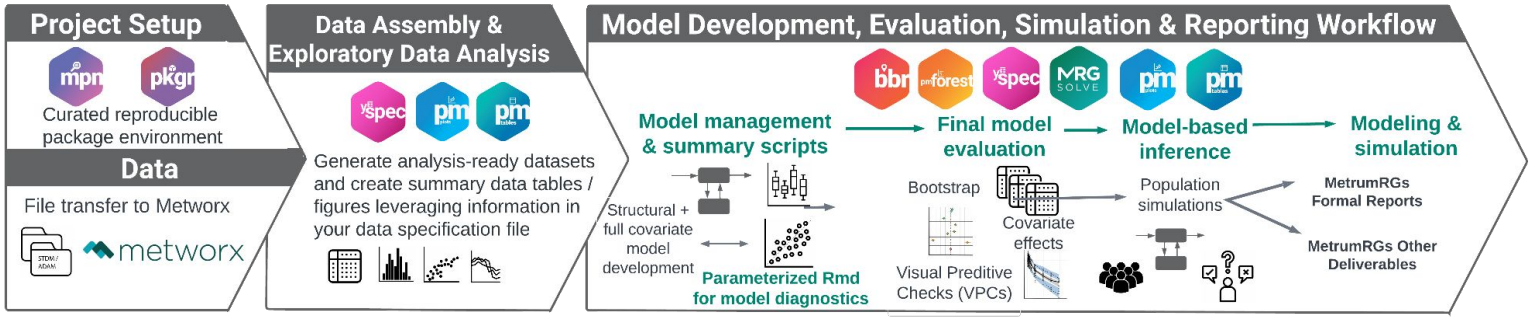
# Hands On Exercises from the MeRGE workshop at the PAGE32 conference in Rome, Italy

Example code is in the page32-merge-workshop repo

Much of this content is adapted from Expo 1: Population PK Expo



# Hands On Exercise: Add a new package with *pkgr*



1. Open the `pkgr.yml` file
2. **Add a package** that you would like installed and save the file
3. Open a **terminal** (*not* an R console) and navigate the directory containing your pkgr.yml file
   a. *This is typically at the top-level of the project/repo*
4. Run **`pkgr plan`** and then, if all looks good, run **`pkgr install`**
   a. *Note how many new packages were installed*
   b. *If no new packages were installed, try adding some else new*

**Reference Documentation:**

- *Metworx KB: The `pkgr.yml` file*
- *Metworx KB: R Package Management*

# Package Documentation: *bbr* and *pmplots*




Reference and Code

- Function Reference
- *bbr* "cheat sheet"
- GitHub Issues

Relevant Articles

- *Expo 1: Model Management*
- *Expo 1: Parallelizing with bbr*
- *Expo 1: Model Diagnostics*
- *Expo 1: Bootstrap*


Reference and Code

- *pmplots* "Gallery" Book
- Function Reference
- GitHub Issues

Relevant Articles

- *Expo 1: Intro to pmplots*
- *Expo 1: Model Diagnostics*
- *Expo 1: Rmd Reports*

# Hands On Exercise: Run example models with *bbr*



1. Open **`script/model-management.Rmd`**
2. Step through creating your first model (100)
3. Return to "**1 - run log**" section and proceed with model iteration
   a. *Create a new model (101) and execute it*
   b. *Look at diagnostics*
   c. *Add model notes and other annotation*
4. Now, on your own, return to the top and iterating on another model
   a. Add a covariate, adjust error structure, etc.

**Reference Documentation:**

- *bbr* Function Reference
- *Expo 1: Model Management*

# Package Documentation: *pmplots* and *yspec*




Reference and Code

- *pmplots* "Gallery" Book
- Function Reference
- GitHub Issues

Relevant Articles

- *Expo 1: Intro to pmplots*
- *Expo 1: Model Diagnostics*
- *Expo 1: Parameterized Rmd Reports*


Reference and Code

- *yspec* User Book
- YAML Spec
- GitHub Issues

Relevant Articles

- *Expo 1: Intro to yspec*
- *Expo 1: Data Prep*
- *Expo 1: EDA Figures*

# Hands On Exercise: *yspec* for report-ready figures



- Open **`script/model-management.Rmd`** and scroll to the **"render report-ready diagnostics"** section
- Render the diagnostics template to HTML
- Open the yspec **`data/derived/pk.yml`** file and make a change, for example:
  - *Change **`EGFR`** **`short`** field from "**`Estimated GFR`**" to "**`eGFR`**"*
  - *Add **`STUDY`** to **`diagCatCov`** in **`flags`** section*
- Re-render to see the updates in the HTML
- Change **`run_mrggsave = TRUE`** in the rendering call
  - *Find and open the generated PNG files*

**Reference Documentation:**

- *yspec* User Book
- *Expo 1: Parameterized Rmd Reports*

# Bonus Exercises

## Create Run Log and Parameter Tables

# Package Documentation: *pmparams* and *pmtables*




Reference and Code

- Function Reference
- Parameter Key docs
- GitHub Issues

Relevant Articles

- *Expo 1: Parameter Tables*
- *Expo 3: Parameter Tables*


Reference and Code

- *pmtables* User Book
- GitHub Issues

Relevant Articles

- *Expo 1: EDA Tables*
- *Expo 1: Study Summary*
- *Expo 1: Model Summary*

# Hands On Exercise: Run log with *bbr* and *pmtables*



- Open **`script/run-log.R`**
- Preview with all models that you've run
- Make sure the ones you want in your Run Log have a "star" added
- Create a report-ready Run Log table
- Bonus: modify the description of one of your key models
  - *Load the relevant model with* ***`read_model()`***
  - *Use* ***`add_description()`*** *or* ***`replace_description()`***
  - *Re-run the script and note the updated description in the table*

**Reference Documentation:**

- *Expo 1: Model Summary*
- *pmtables* User Book

# Hands On Exercise: Parameter tables with *pmparams*



- Open **`script/parameter-table-final.R`**
- Run through the script to create a parameter table for model 199
- Open the parameter key YAML and adjust one of the parameter abbreviations
- Re-run the script and note the updated abbreviation in the table
- Bonus: create a parameter table for one of the new models that you created earlier
  - *Update the **`THIS_MODEL`** variable in the script*
  - *Add or modify any relevant metadata in the parameter key*
  - *Re-run the script to create your new table*

**Reference Documentation:**

- *Expo 1: Parameter Tables*

# Appendix

## Additional resources for other MeRGE tools

# Package Documentation



- References
  - *mrgsolve* User Guide
  - *mrgsolve* blog
  - *bbr* function reference
  - Parallelizing with *bbr*
  - *bbr* "cheat sheet"
  - *pmparams* function reference
- Introductory articles
  - Introduction to *yspec*
  - Introduction to *mrggsave*
  - Introduction to *pmforest*
- "Books" with galleries and examples
  - *pmplots* book
  - *pmtables* book
  - *yspec* book
- All package source code on github.com/metrumresearchgroup
- File questions or feature ideas on any package GitHub site, under <package>/issues

# Expo Resources



- General Expo pages
  - About the MeRGE PopPK Expo
  - Overview of MetrumRG tools *(with links to docs for each package)*
  - Expo 1 GitHub Code Repository
- Project walk-through
  - Model Diagnostics
  - Parameterized Reports for Model Diagnostics
  - Parameter Tables
  - Covariate Forest Plots
- Other Expos
  - Expo 2: Bayesian-Exposure Response with Stan and bbr
  - Expo 3: Bayesian Population PK with NONMEM and bbr