



# Breakout: PatientLevelPrediction

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Last year we had > 13 papers published



Plus, even more research about to be submitted/published soon...



# Where we have been (in past year)

## Best Practice Research:

Loss to follow-up

<https://link.springer.com/article/10.1186/s12911-021-01408-x>

Split design (test/train/validation design)

<http://dx.doi.org/10.1136/bmjopen-2021-050146>

Covariate lookback

<https://bmcmedresmethodol.biomedcentral.com/articles/10.1186/s12874-021-01370-2>

Data design (cohort vs case-control)

<https://link.springer.com/article/10.1186/s40537-021-00501-2>

Impact of Phenotype sensitivity/specificity\*

The whole OHDSI prediction framework (and how it supports transparency/reproducibility)

<https://doi.org/10.1016/j.cmpb.2021.106394>



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## Methods Research:

Distributed learning	<a href="https://www.medrxiv.org/content/10.1101/2020.11.16.20230730v2">https://www.medrxiv.org/content/10.1101/2020.11.16.20230730v2</a>
Ensembles across databases	<a href="https://doi.org/10.21203/rs.3.rs-1217376/v1">https://doi.org/10.21203/rs.3.rs-1217376/v1</a>
Ensembles within database	*In development
	<a href="https://academic.oup.com/jamia/article-abstract/28/6/1098/5992328">https://academic.oup.com/jamia/article-abstract/28/6/1098/5992328</a>

## Reviews:

Reporting guidelines	<a href="https://academic.oup.com/jamia/advance-article/doi/10.1093/jamia/ocac002/6511611?login=true">https://academic.oup.com/jamia/advance-article/doi/10.1093/jamia/ocac002/6511611?login=true</a>
Understandable models	<a href="https://doi.org/10.1016/j.jbi.2020.103655">https://doi.org/10.1016/j.jbi.2020.103655</a>



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## Applications:

Bipolar misdiagnosed as MDD	<a href="https://www.nature.com/articles/s41398-021-01760-6">https://www.nature.com/articles/s41398-021-01760-6</a>
90-day mortality after total knee replacement	<a href="https://link.springer.com/article/10.1007/s00167-021-06799-y">https://link.springer.com/article/10.1007/s00167-021-06799-y</a>
Diabetes and heart failure	
COVID predictions	<a href="https://bmcmmedresmethodol.biomedcentral.com/articles/10.1186/s12874-022-01505-z">https://bmcmmedresmethodol.biomedcentral.com/articles/10.1186/s12874-022-01505-z</a>
...	



# R Package Updates

- Updated PatientLevelPrediction – new version will be released soon. Now supports:
    - custom feature engineering
    - custom sampling
    - custom splitting
    - models saved as json objects
    - database result schema
  - New DeepPatientLevelPrediction package
  - New EnsemblePatientLevelPrediction package
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# New Tools/Software

- Model Repository – Sicco/Ross have developed a model repository website
- Protocol generator – an app where you can design a study and generate diagnostics (if you have data access) to identify potential design bias



# Future Research Ideas

What topics would the group like to address this year?

- Health equity (make a new package)?
- New visualizations for prognostic models
- Diagnostics to estimate bias using the design and data
- Transfer learning vs global model vs local model (only using local data)
- ...





# Future Events

What activities would the group like to do this year?

- Hack-a-thon – focus on some part of the framework and improve the current code (e.g., enable custom objective features, improve tests, etc.)
- Study-a-thon – pick a clinical prediction task and develop models
- Workshops – discuss/review focused prediction topic of interest
- Bring back monthly or 8 weekly meeting?
- YouTube tutorials (updated)



# Discussion



- Topics
- Activities
- R Package
- Software/Tools