TreatmentPatterns: An R package to analyze treatment patterns of a study population of interest

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INTRO

- There is no R package available to analyze treatment patterns of a study population of interest and the standard analytics tool available in ATLAS has the disadvantage that it is not customizable to specific research needs.

METHODS

- We defined the process of constructing pathways following earlier work, highlighting key decisions in the process that need to be made (see Figure 1).
- We demonstrate the functionalities of the package and outputs by analyzing treatment patterns of three common chronic diseases (type 2 diabetes, hypertension, and depression) in the Dutch Integrated Primary Care Information (IPCI) database (see online Shiny application).

RESULTS

- The R package TreatmentPatterns creates sunburst plots (see Figure 2), Sankey diagrams, and various other outputs (e.g. percentage of people treated, average duration of event cohorts) to give insight in first-, second- and higher line treatments.
- The results can be explored in an interactive Shiny application: https://aniekmarkus.shinyapps.io/TreatmentPatterns/

CONCLUSION

- This tool is intended to make the analysis of treatment patterns more accessible, more standardized, and more interpretation friendly.
- We hope it thereby contributes to the accumulation of knowledge on real-world treatment patterns across disease domains.

How to perform a treatment patterns study in 5 steps:

Step 1: define target and event cohorts

cohortId	cohortName	cohortType	atlasId	conceptSet
1	T2DM	target	589	NA
2	Biguanides	event	NA	1593986;1503297; 19033909;40798673
3	Sulfonylureas	event	NA	1502809;1502855;1559684; 1560171;1594973;1597756; 19097821

Step 2: (optional) specify baseline characteristics of interest

covariateName	covariateId
Male	8507001
Age	1002
Charlson comorbidity index	1901

Step 3: specify settings to construct treatment pathways

param	analysis1
studyName	T2DM
targetCohortId	1
eventCohortIds	2;3; etc.
includeTreatmentsPriorToIndex	0
minEraDuration	5
splitEventCohorts	
eraCollapseSize	30
combinationWindow	30
minStepDuration	30
filterTreatments	Changes
maxPathLength	5
minCellCount	5
minCellMethod	Adjust
groupCombinations	10
addNoPaths	TRUE

Step 4: execute study

```
TreatmentPatterns::executeTreatmentPatterns(dataSettings,
                                            cohortSettings,
                                            characterizationSettings,
                                            pathwaySettings,
                                            saveSettings)
```

Step 5: check out results

Go to results: https://aniekmarkus.shinyapps.io/TreatmentPatterns/

R package TreatmentPatterns can be downloaded from GitHub, including:

- **Vignettes**
- **Package manual**

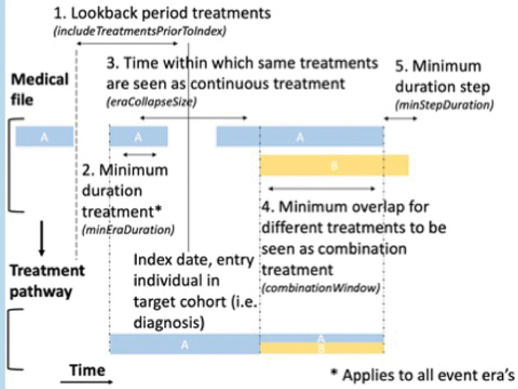

Figure 1: Summary of decisions to construct individual treatment pathways.

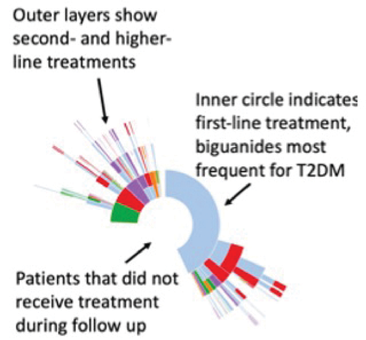

Figure 2: Example sunburst plot.

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