Personalized predictions under several treatment options: An online tool for patients with relapsing-remitting multiple sclerosis

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Background

"Which treatment is the best for a specific patient based on an outcome of interest?"

Different patients often have different health outcomes under the same treatment

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Background

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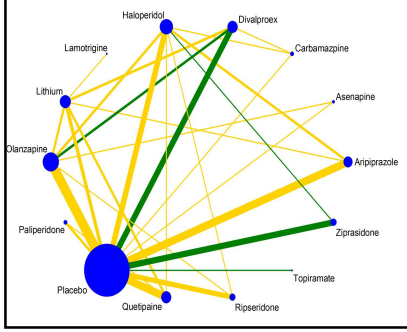

Doctors often have to decide between several treatment options

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One size does not fit all

Treatment choice is (or should be) personalised
Not all patients have the same response to the same treatment
Heterogeneous Treatment Effects

The optimal treatment depends on patients' characteristics.

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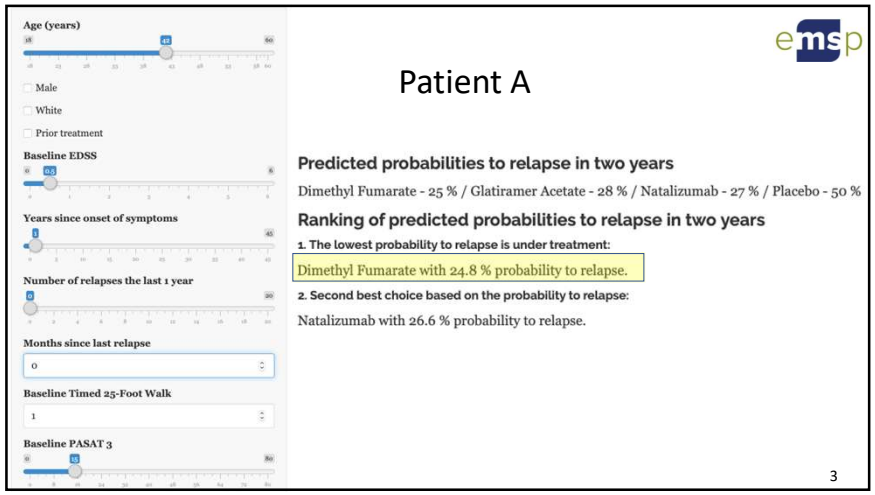

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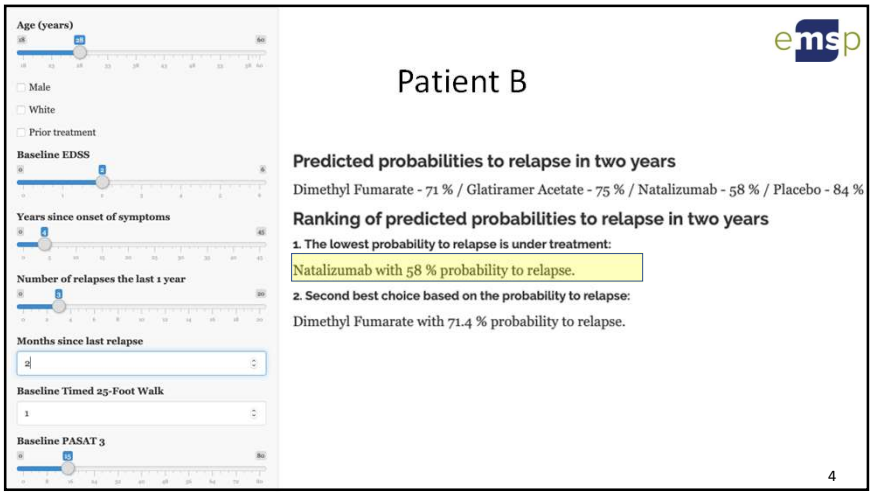

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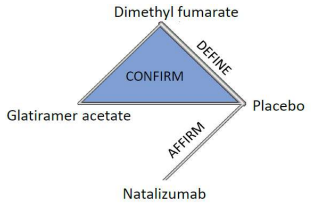
Data

Randomized clinical trials (RCTs)

- 3 phase III RCTs - 2990 participants
- Placebo-arms from 9 phase III RCTs 1083 participants



Observational data – Swiss MS Cohort (SMSC)

https://dkf.unibas.ch/en/competencies/registries-cohorts/swiss-ms-cohort/

Started in June 2012, 8 centres in Switzerland
- 1554 patients
- 10'651 visits (median follow-up 5.7 years)

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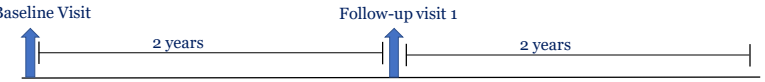
Data

Observational data – Swiss MS Cohort (SMSC)

We included only patients with RRMS with at least 2 years of follow-up



Number of follow-up cycles	Number of patients
1	324
2	405
3	206

935 participants were included with 1752 two-year cycles

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Baseline characteristics of participants

Study	Treatment	Number of patients	Number of patients experiencing relapse at two years (%)	Mean age (sd)	Number of females (%)	Mean baseline EDSS score (sd)	Mean Baseline risk (prior to treatment) (95%CrI)
SMSC	Total	935	191 (20.4)	40.8 (11.2)	631 (67.5)	2.3 (1.4)	20.1 (2.8, 37.5)
AFFIRM	Total	939	359 (38.2)	36.0 (8.3)	657 (70.0)	2.3 (1.2)	36.5 (18.8, 54.1)
	Natalizumab	627	183 (29.2)	35.6 (8.5)	449 (71.6)	2.3 (1.16)	
	Placebo	312	176 (56.4)	36.7 (7.8)	208 (66.7)	2.3 (1.19)	
CONFIRM	Total	1417	451 (31.8)	37.3 (9.3)	993 (70.1)	2.6 (1.2)	37.2 (18.6, 55.7)
	Dimethyl fumarate	703	185 (26.3)	37.8 (9.4)	495 (70.4)	2.5 (1.2)	
	Glatiramer acetate	351	117 (33.3)	36.7 (9.1)	247 (70.3)	2.6 (1.2)	
	Placebo	363	149 (41.0)	36.9 (9.2)	251 (69.1)	2.6 (1.2)	
DEFINE	Total	1234	394 (31.9)	38.5 (9.0)	908 (73.6)	2.4 (1.2)	36.9 (17.7, 56.0)
	Dimethyl fumarate	826	212 (25.7)	38.5 (9.0)	602 (72.9)	2.4 (1.2)	
	Placebo	408	182 (44.6)	38.5 (9.1)	306 (75)	2.5 (1.2)	
Placebo arms dataset	Placebo	1083	801 (74.0)	41.2 (10.3)	752 (69.4)	NA	NA

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R-Shiny app

https://cinema.ispm.unibe.ch/shinies/srrms/

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Discussion

A tool like that should include ***all the available treatments.*** Possible, when at least one IPD study includes each of the available treatments (challenging), or when more information about all treatments is available in Cohort studies

Validation is needed before a tool like that can be used in clinical practice (ongoing work).

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Thank you for your attention!

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