Cost Effectiveness of Oral Agents in Relapsing-Remitting Multiple Sclerosis Saudi Patients Compared to Interferon-Based Therapy

Mai Al-saqa'aby, MSP, Pharmacoeconomics Specialist

King Faisal Specialist Hospital & Research Center, Riyadh, KSA

Background

- Multiple sclerosis (MS) is a chronic demyelinating disorder of the central nervous system (CNS).[1]
- Relapsing-Remitting MS (RRMS) is the most common type of MS that accounts for 90% of all cases.[1]
- Recent evidence suggests medium to high prevalence in Saudi Arabia nearby 40 cases per 100,000 individuals.[2]
- The mean age at onset in Saudi population is 25 years old. [2]
- Increasing the burden of disease management and high cost of disease-modifying drugs (DMDs) designates a necessity of conducting Pharmacoeconomic studies to determine the long-term effectiveness of DMDs especially new oral agents.

Objective

To assess the cost-effectiveness of fingolimod, teriflunomide and dimethyl fumarate (DMF) versus Interferon-beta 1a (IFN) formulations including Avonex and Rebif from a tertiary care hospital perspective in Saudi Arabia (King Faisal Specialist Hospital & Research Center, KFSH&RC).

Methods

- A full economic evaluation using direct medical costs and effectiveness measures was performed.
- A modified Markov model was used based on a previously published cohort simulation by the Canadian Agency for Drugs and Technology in Health (CADTH).[3]

- Relapse and disease progression rates for each intervention were obtained from CADTH report.[3]
- Quality-adjusted life years (QALYs) were utilized as an outcome measure in which they were calculated from utility scores provided by Prosser study. [4]
- Cost data were measured and valued in Saudi Riyals and converted into US dollars.
- A payer's perspective was adopted with a time horizon of 20 years with an annual cycle length.
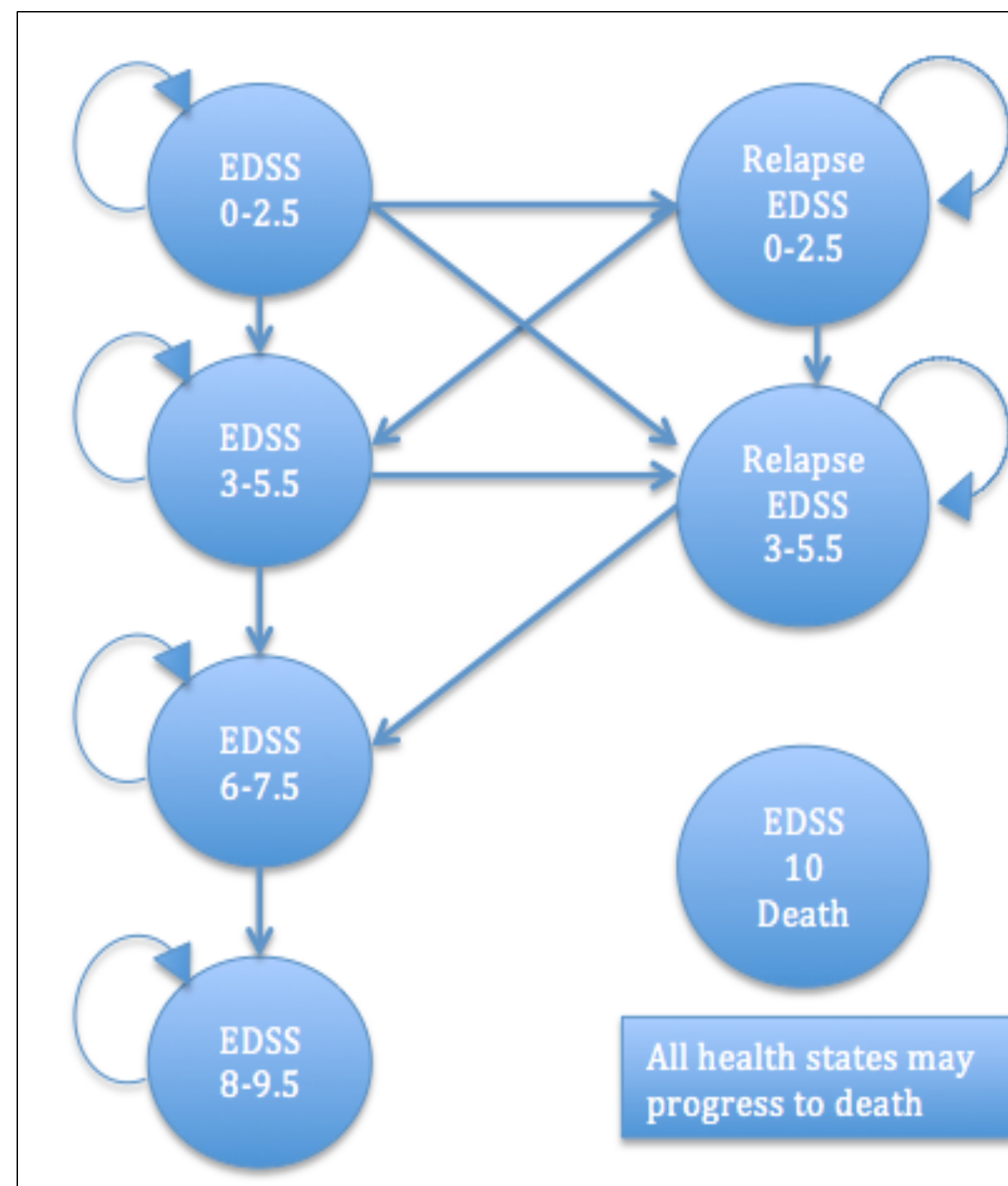- 3% discount rate per annum was applied to cost and QALYs.

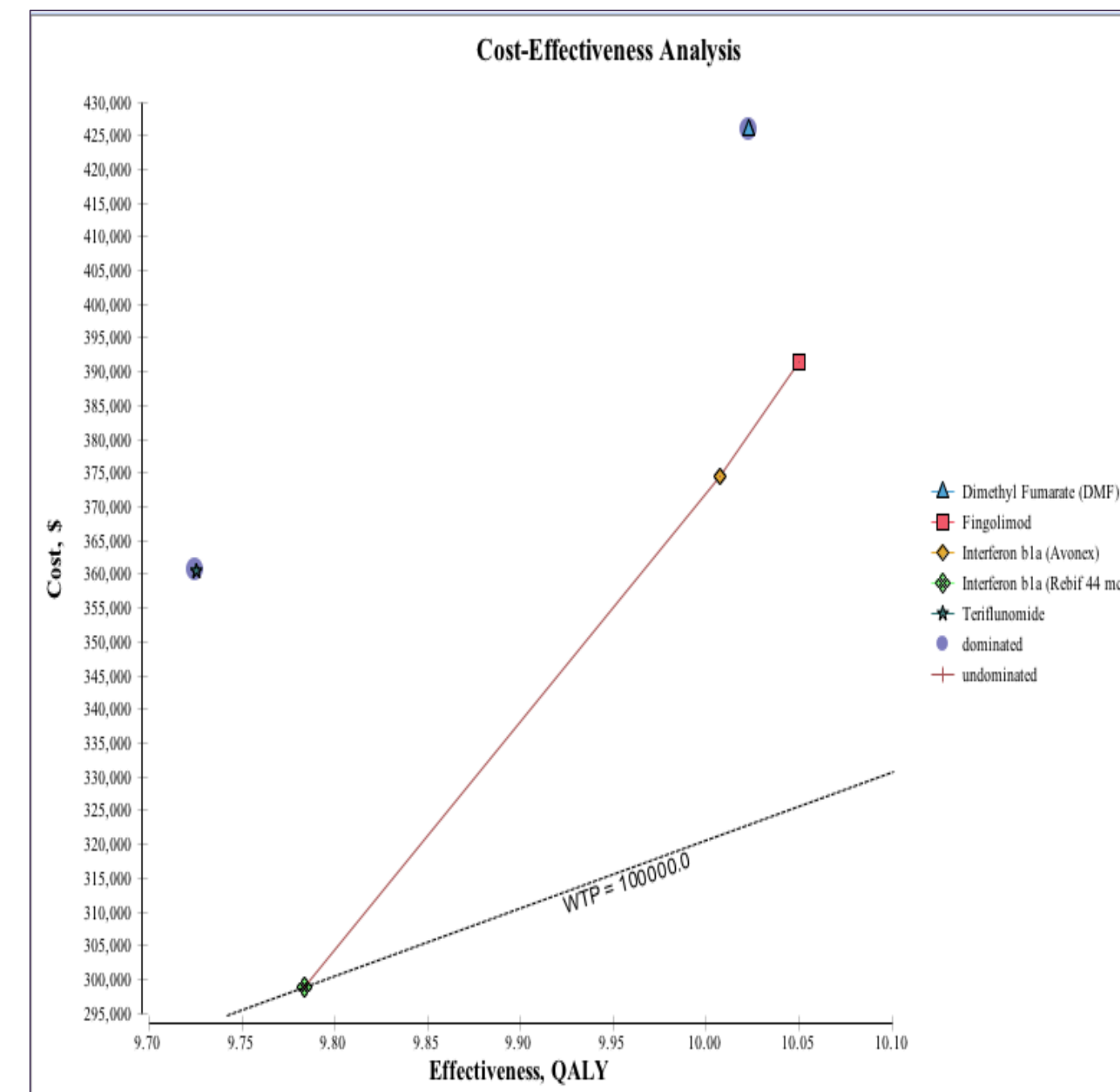Figure 1. Schematic representation of the Markov model

Figure 2. Cost-effectiveness analysis scatterplot of all DMDs (base-case analysis results)
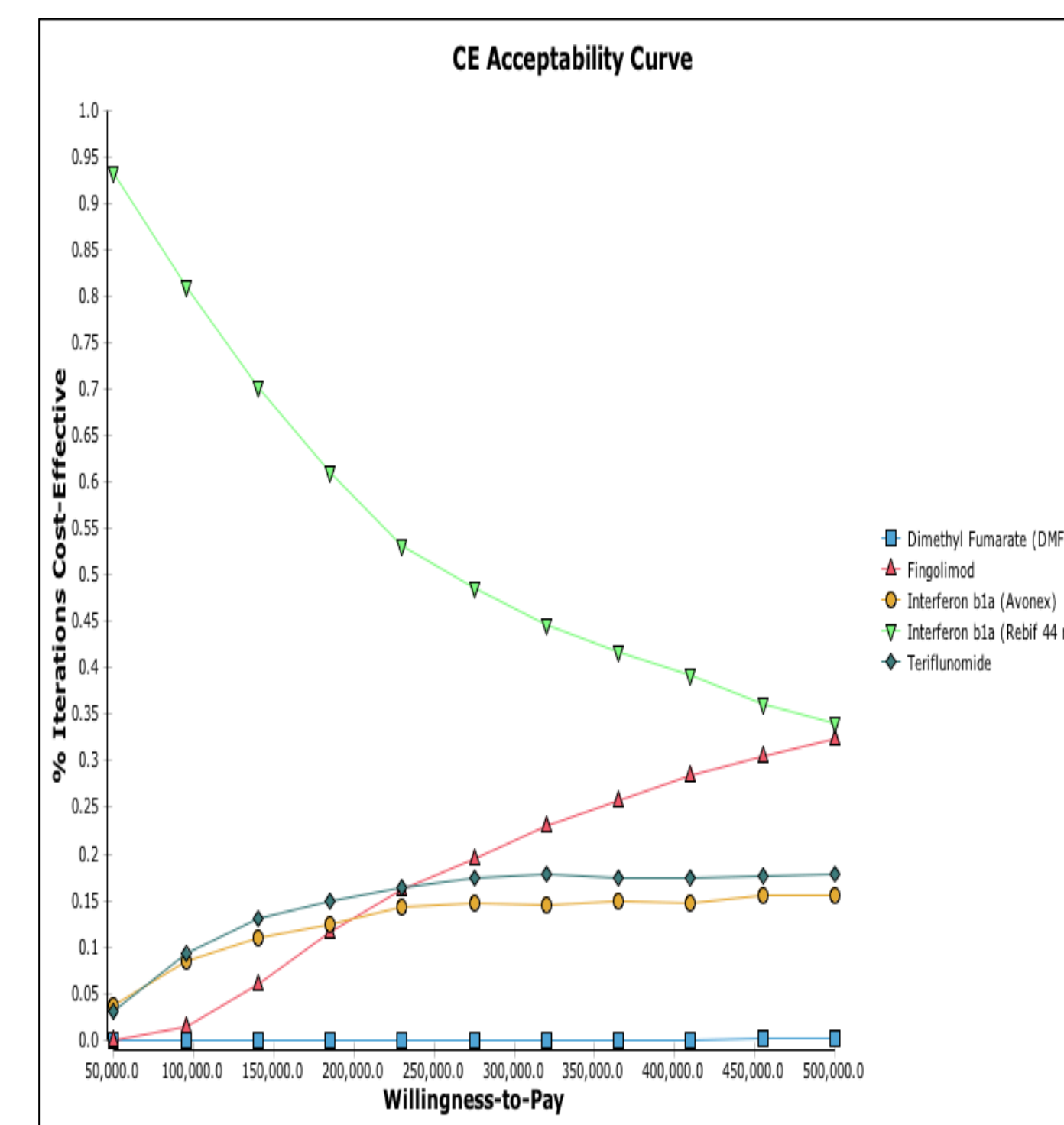

Figure 3. Cost-effectiveness acceptability curve at different levels of WTP thresholds

Results

DMDs	Cost	QALYs	ICER ($/QALY) vs. Rebif	NMB	INMB vs. Rebif
Interferon b1a (Rebif 44 mcg)	$298,892 SAR 1,120,530	9.78	-	$679,440 SAR 2,547,190	-
Teriflunomide	$360,631 SAR 1,351,990	9.72	Dominated	$611,857 SAR 2,293,820	$ -67,583 SAR -253,365
Interferon b1a (Avonex 30 mcg)	$374,502 SAR 1,655,307	10.01	$337,282 SAR 1,264,450	$626,247 SAR 2,348,130	$ -53,193 SAR -199,418
Fingolimod	$391,603 SAR 1,468,100	10.05	$347,338 SAR 1,302,150	$613,420 SAR 2,299,680	$ -66,020 SAR -247,506
Dimethyl Fumarate (DMF)	$426,030 SAR 1,609,040	10.02	$531,329 SAR 1,991,930	$ 576,230 SAR 2,160,260	$ -103,210 SAR -386,929

Discussion & Conclusion

- Base-case results indicated that all DMDs are at a low value (had high ICER values) in the treatment of RRMS at willingness-to-pay (WTP) threshold of $100,000.
- Avonex projected the lowest ICER value at $337,282/QALY compared to Rebif as an optimal therapy which would be considered not cost-effective.
- Fingolimod was the only oral DMD that might be considered a cost-effective option (ICER= $347,338/QALY) when a WTP higher than $300,000 is considered.
- Teriflunomide and DMF were dominated by other treatment strategies.
- IFNs and oral agents have shown to be effective, however, oral had higher cost than IFNs, all DMDs would not considered to be cost-effective at WTP threshold of $100,000.
- More observational studies are required to determine optimal therapy in treating RRMS from a Saudi healthcare system perspective.

References

1. Sperandeo K, Nogrady L, Moreo K, Prostko CR. Managed approaches to multiple sclerosis in special populations. *Journal of Managed Care Pharmacy*.
2. Heydarpour P, Khoshkish S, Abtahi S, Moradi-Lakeh M, Sahraian MA. Multiple sclerosis Epidemiology in middle east and north Africa: A systematic review and Meta-Analysis. *Neuroepidemiology*.
3. CADTH therapeutic review comparative clinical and cost-effectiveness of drug therapies for Relapsing-Remitting multiple sclerosis, Canadian agency for drugs and technologies in health.
4. Prosser LA, Kuntz KM, Bar-Or A, Weinstein MC. Cost-effectiveness of interferon beta-1a, interferon beta-1b, and Glatiramer acetate in newly diagnosed non-primary progressive multiple sclerosis.