BIG MS DATA

Big Multiple Sclerosis Data network: data sharing among five large MS registries

P. Iaffaldano[1], H. Butzkueven[2], J. Hillert[3], R. Hyde[4], M. Magyari[5], M. Trojano[1], S. Vukusic[6,7], T. Spelman[2], on behalf of MSBase, OFSEP and the Danish, Italian and Swedish MS registries

[1]University of Bari Aldo Moro | Department of Basic Medical Sciences, Neurosciences and Sense Organs, University of Bari Aldo Moro, BARI, Italy, [2]Department of Neurology, Box Hill Hospital, Monash University, Melbourne, VIC, Australia, [3]Department of Clinical Neuroscience, Karolinska Institutet, Stockholm, Sweden, [4]Biogen International GmbH, Zug, Switzerland, [5]Department of Neurology, The Danish Multiple Sclerosis Registry, Rigshospitalet, Copenhagen, Denmark, [6]Neurology, Multiple Sclerosis, Myelin Disorders and Neuroinflammation, Pierre Wertheimer Neurological Hospital, Hospices Civils de Lyon, [7]Observatoire Français de la Sclérose en Plaques (OFSEP), Lyon, France

Introduction

- There is a large unmet need in areas of MS research requiring big data which single-country or even international registries lack the sample size and power to address.
- The Danish, Italian and Swedish national MS registries, the MSBase and the OFSEP of France merged data for specific projects in the Big Multiple Sclerosis Data (BMSD) Network.

BMSD network mission

- BMSD network, by pooling of large scale MS data, aspires to become a leading MS research engine in the world with the ultimate goal of answering and solving key questions in MS research and MS research management.

Purpose

- To describe the BMSD network governance, data structure, procedures for data sharing and feasibility of an initial demonstrator project in the BMSD network.

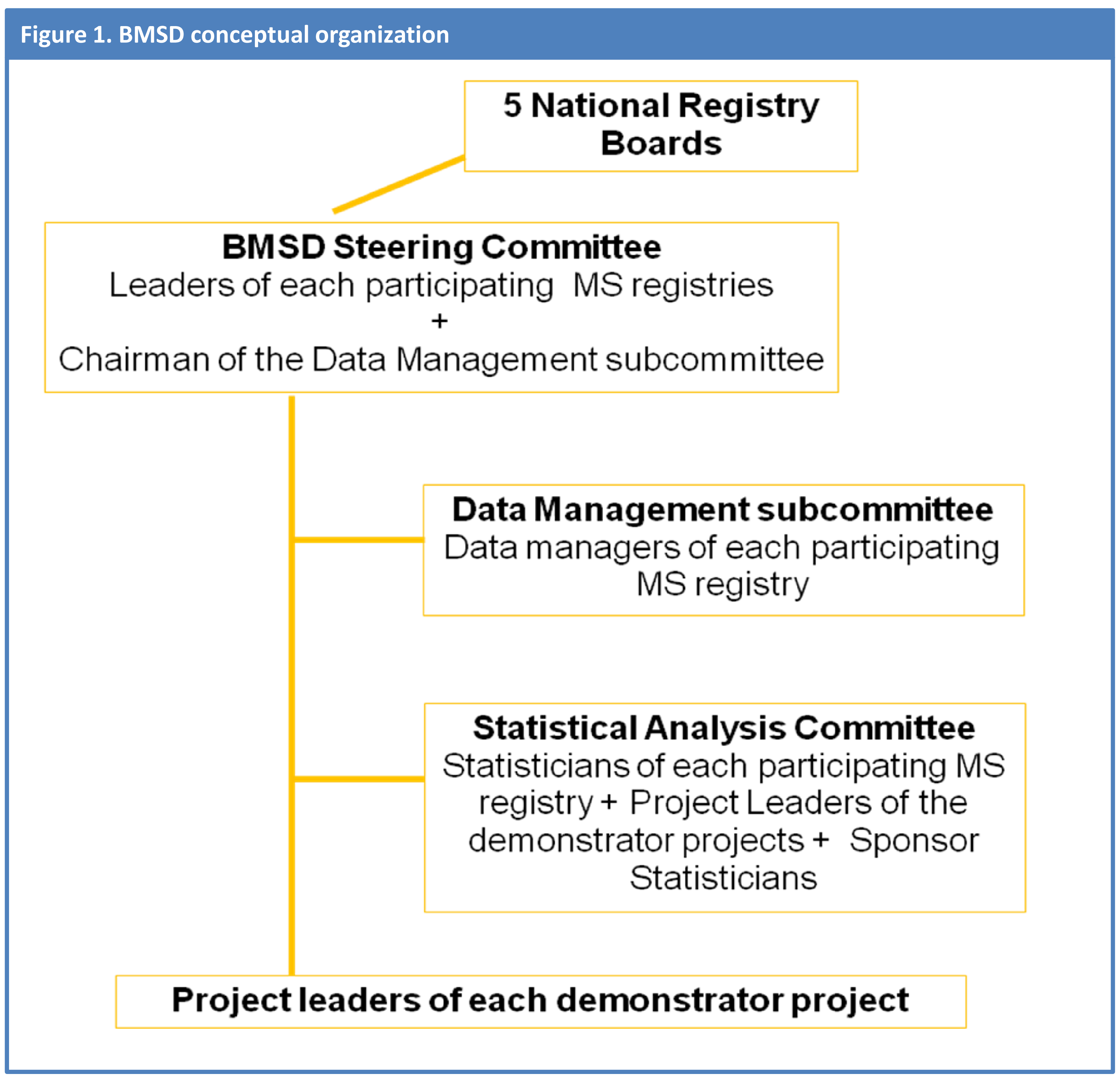
Methods

- A feasibility phase of the study has been performed to evaluate differences and commonalities among the five registries.
- Data counts of the minimum dataset variables needed to describe the disease course of a typical MS patient have been performed and compared among sources. A standardization of definitions and procedures has been performed to ensure the possibility of merging data from different sources.
- Data counts to evaluate capacity to perform a demonstrator project, namely longitudinal treatment efficacy evaluation in Relapsing-Remitting MS (RRMS) patients followed for more than 10 years, have been performed.

Results

- The BMSD conceptual organization is reported in figure 1.
- A flow chart explaining an example of the selection criteria requested to extract the target population in each registry for a demonstrator project is reported in figure 2.

Figure 1. BMSD conceptual organization



5 National Registry Boards

BMSD Steering Committee
Leaders of each participating MS registries
+
Chairman of the Data Management subcommittee

Data Management subcommittee
Data managers of each participating MS registry

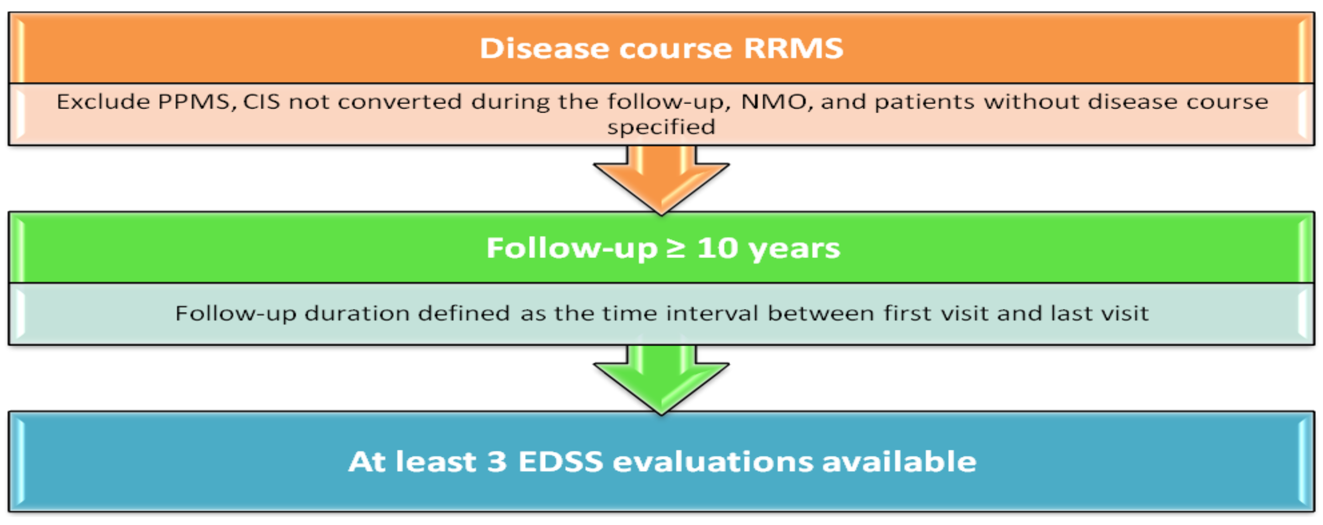
Statistical Analysis Committee
Statisticians of each participating MS registry + Project Leaders of the demonstrator projects + Sponsor Statisticians

Project leaders of each demonstrator project

Results (cont'd)

- The BMSD merged datasets for the first demonstrator project aimed at evaluating the longitudinal treatment efficacy in RRMS patients followed for at least 10 years and with at least 3 EDSS score evaluations available consisted of 21,410 MS patients (Table 1).
- The treated cohort consisted of 18,275 patients who had received at least 1 DMD prescription, whereas 3,135 patients did not receive any DMD prescription during the follow-up (Table 1).
- The follow-up distribution by each registry is reported in figure 3.

Figure 2. Example of a data extraction flow chart for a demonstrator project - longitudinal treatment efficacy evaluation in RRMS.



Disease course RRMS
Exclude PPMS, CIS not converted during the follow-up, NMO, and patients without disease course specified

Follow-up ≥ 10 years
Follow-up duration defined as the time interval between first visit and last visit

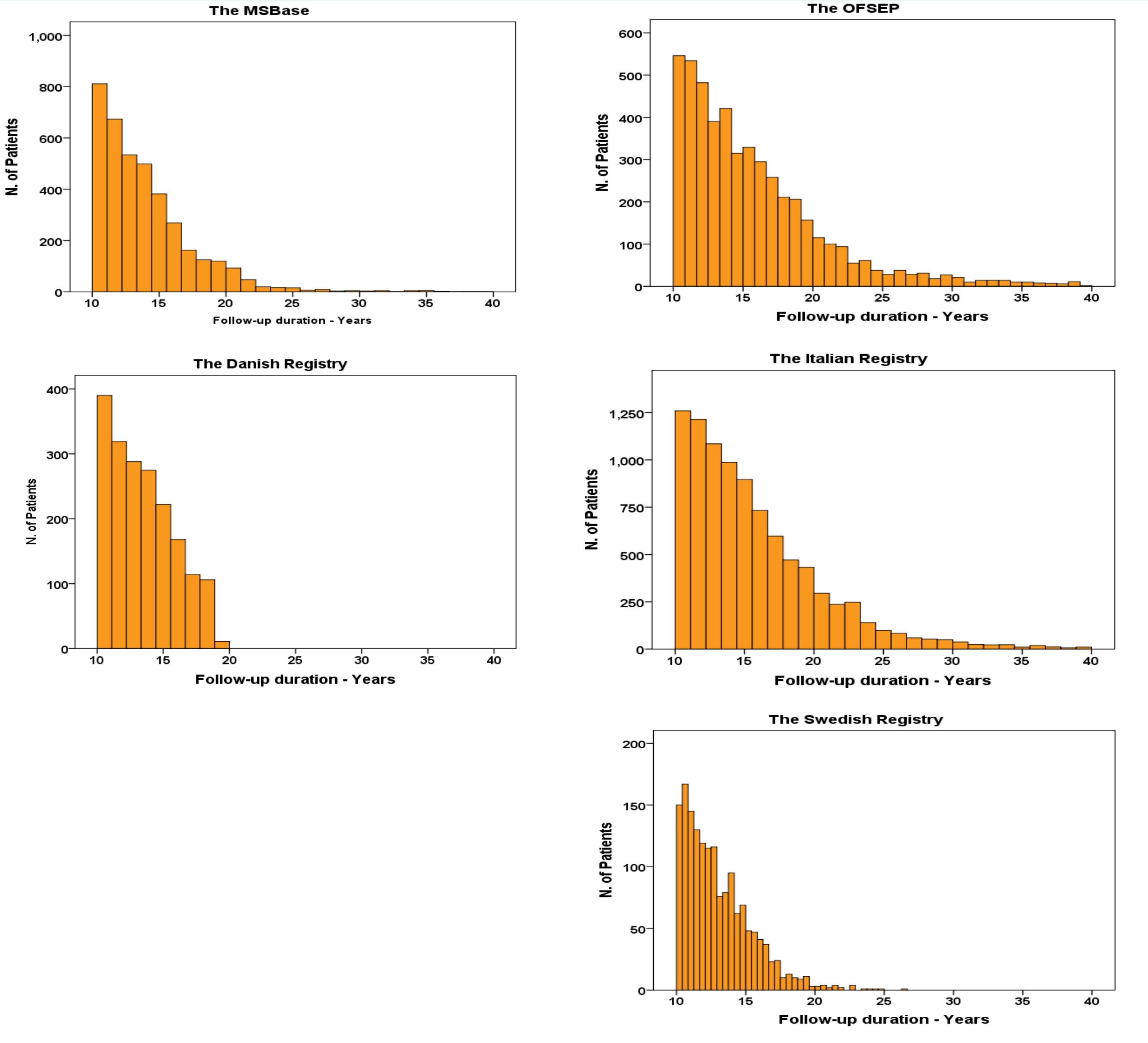
At least 3 EDSS evaluations available

Table 1. Main characteristics of the cohort extracted stratified by registry.

	Italy	Sweden	Denmark	OFSEP	MSBase **	Total
Total cohort *	38,433	16,502	8,991	54,066	31,644	149,636
Patients with ≥ 10 years follow-up + at least 3 EDSS evaluations	9,133	1,623	1,894	4,941	3,819	21,410
Treated patients	8,217	1,487	1,894	3,225	3,452	18,275
Untreated patients	916	136	0	1,716	367	3,135
Total number of EDSS score evaluations	230,401	20,795	40,925	87,126	93,076	472,323
mean (SD)	25.2 (17.0)	12.8 (6.6)	21.6 (6.9)	17.6 (13.4)	24.4 (17.6)	
median (min - max)	21 (3-109)	11 (3-46)	21 (4-52)	15 (3-127)	18 (3-162)	

* As reported ar September 2016; ** Excluding Italian Participating Centers

Figure 3. Follow-up distribution by each registry.



Conclusions

The BMSD network will allow pooling of MS data at a scale that raises MS research to a new level, with the ultimate aim of lessening the future burden of the disease for MS patients. BMSD will overcome major unmet scientific needs in MS requiring large long-term longitudinal data.

Acknowledgements and Disclosures: This project was supported by Biogen International (Zug, Switzerland).

Pietro Iaffaldano has served on scientific advisory boards for Biogen Idec and Novartis, and has received funding for travel and/or speaker honoraria from Genzyme, Biogen Idec, Merck-serono, Teva and Novartis.
Helmut Butzkueven reports Research support from Biogen, Novartis, Merck. Advisory Board and Speaker fees from Roche, Biogen, Novartis, Merck, Teva, Medscape, Oxford Pharmagenesis.
Jan Hillert has received honoraria for serving on advisory boards for Biogen, Sanofi-Genzyme and Novartis and speaker's fees from Biogen, Novartis, Merck-Serono, Bayer-Schering, Teva and Sanofi-Genzyme. He has served as P.I. for projects, or received unrestricted research support from, BiogenIdec, Merck-Serono, TEVA, Sanofi-Genzyme and Bayer-Schering. His MS research is funded by the Swedish Research Council and the Swedish Brain foundation.
Robert Hyde is employed by Biogen and holds stock in Biogen.
Melinda Magyari has served on scientific advisory board for Biogen Idec and Novartis, Merck, Sanofi, has received honoraria for lecturing from Biogen Idec, Merck, Novartis, Genzyme, has received support for congress participation from Biogen Idec, Novartis, Genzyme, Teva.
Maria Trojano has received honoraria for consultancy or speaking from Biogen, Sanofi-Aventis, Merck Serono and Bayer-Schering and research grants from Merck Serono, Biogen and Novartis.
Sandra Vukusic has received consultancy fees, speaker fees, research grants (non-personal) or honoraria from Biogen, Geneuro, Genzyme-Sanofi, Medday, Merck-Serono, Novartis, Roche and Teva.
Tim Spelman received honoraria for consultancy, funding for travel and compensation for serving on scientific advisory boards from Biogen Idec Inc; speaker honoraria from Novartis.