Big Multiple Sclerosis Data Network

13th Progress Report – June 2026

Introduction

The Big Multiple Sclerosis Data (BMSD) Network was initiated in 2014 and currently comprises six national registries—representing the Czech Republic, Denmark, France, Germany, Italy, and Sweden, alongside the international MSBase registry. This collaborative initiative aims at providing robust, real-world datasets for researchers, marketing authorization holders, and regulatory bodies. Together, the pooled data from these registries forms an exceptionally rich combined dataset exceeding 400,000 patient records.

From 2019 to 2023, the Karolinska Institutet (representing the Swedish MS Registry) coordinated the BMSD Network. In December 2023, The BMSD Steering Committee introduced a three-year rotating coordination model, appointing the Italian MS Registry (RISM) as the new coordinating center from January 2025.

The RISM coordinating group comprises personnel from both the University of Bari "Aldo Moro" and the Italian Multiple Sclerosis Foundation (FISM), a non-profit organization serving as RISM's legal representative.

This report outlines the activities carried out within the Network in the first half of 2026.

Activities and Current Topics

a) Support from Pharmaceutical Companies

Over the years, the coordination of the BMSD Network has benefitted from financial contributions by several pharmaceutical companies, including Alexion, Biogen, BMS, Juvisè, Merck, Novartis, Roche, and Sanofi. In 2026, Sandoz confirmed a financial contribution.

b) Inclusion of the German MS Register

In 2025, the Network finalized a set of criteria for the inclusion of new data sources, based on factors such as registry structure, national coverage, data quality, technical capabilities, and ethical compliance. The first applicant that successfully fulfilled all Network requirements and that demonstrated the Common Data Model (CDM) worked well in the Registry was the German MS Register, which officially joined the group in February and currently participates in the Network's monthly meetings alongside the other members. The Finnish MS Registry is currently working on the implementation of the CDM and is expected to finalize the work during the summer of 2026.

c) BMSD Annual Meeting 2026

As the previous year, the BMSD Annual Meeting will be organized in 2026. Specifically, it will take place on 25 and 26 September in Genoa, at the headquarters of the Italian MS Foundation (FISM). Network members and pharmaceutical representatives will gather to review key network milestones, such as the latest updates regarding the EMA QO application and the ongoing harmonization of the BMSD CDM. A significant portion of the agenda will be dedicated to advancing

collaborative research projects and addressing specific scientific initiatives, including comparative strategies for the collection of Neuromyelitis Optica Spectrum Disorder (NMOSD) and MOG Antibody-Associated Disease (MOGAD) data, as well as methods to optimize Patient-Reported Outcome Measures (PROMs) data collection. Finally, attendees will finalize the logistics and presentation strategies for the dedicated BMSD booth at the joint ACTRIMS/ECTRIMS Congress in Toronto this October.

d) Status of Activities Related to the European Medicines Agency

I. Qualification Opinion by EMA

Following a QO submission to the EMA in 2021, the BMSD Network received Scientific Advice and a Letter of Support outlining the methodology under evaluation, which the EMA subsequently published in January 2022. While recognising the Network's value and encouraging its validation, the EMA indicated that a feasibility study was required to evaluate each registry's capacity to capture safety data, alongside a harmonised approach to enhance quality assurance. Primarily aiming to receive an EMA QO for PASS, BMSD successfully submitted a renewed application package in October 2025. This updated submission addressed the key criteria necessary to demonstrate the Network's potential for conducting real-world safety studies. In early 2026, the EMA requested clarifications, which the Network addressed between February and March. Additionally, a lifecycle management plan was drafted to demonstrate the capacity to maintain qualification status once granted. A draft of the QO is expected for review during summer 2026, which will be followed by a public consultation period prior to the final decision.

II. Common Data Model (CDM)

During the reporting period, the activities of the BMSD Network related to **the CDM** progressed substantially, consolidating the CDM as a core infrastructure for data harmonization and for enabling reproducible multi-registry analyses.

The CDM was designed to capture the main domains of multiple sclerosis research, including demographics, disease history, relapses, treatment exposure, comorbidities, disability outcomes, magnetic resonance imaging, paraclinical results, and laboratory data, for a total of approximately 120 standardized variables (Figure 1).

Figure 1 BMSD Common Data Model structure Jiri Drahota

Participating registries mapped their local datasets to the common variable definitions and transformed the data into the CDM format using reproducible R-based pipelines (Figure 2). The transformation process generated automated validation and data quality reports, allowing systematic monitoring of mapping success and information integrity. All participating registries successfully completed the transformation of their datasets into the CDM, achieving high levels of information retention, ranging from 98% to 100% (Table 1).

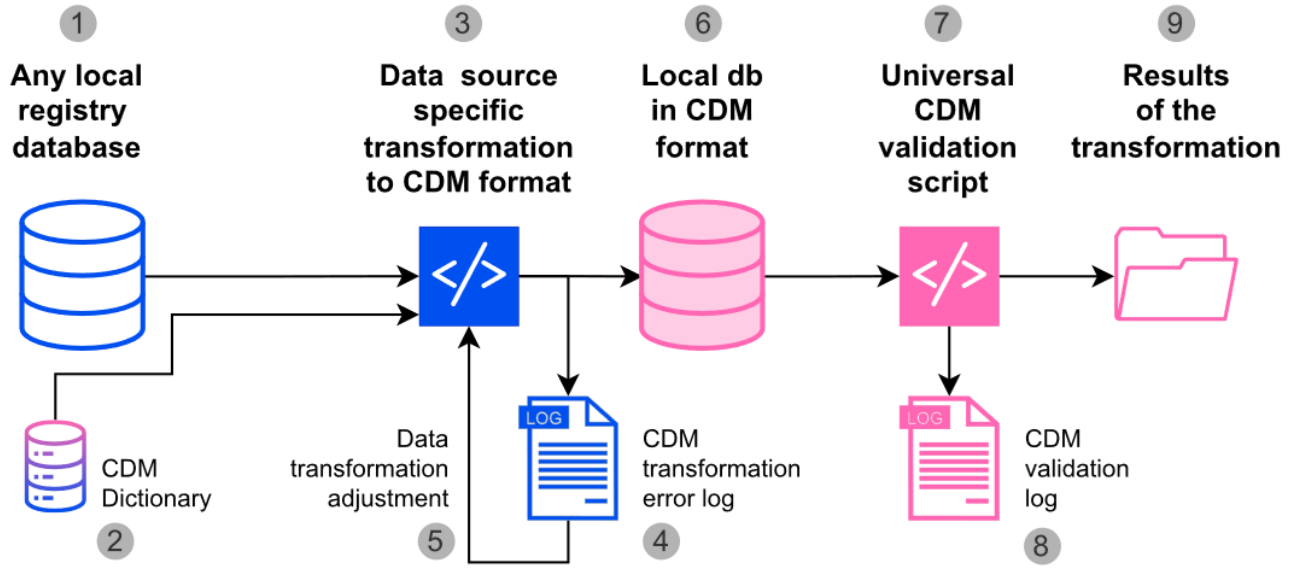

Figure 2 General Common Data Model concept Jiri Drahota

Variable groups						MSBase
PATIENTS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
PATIENTS EXTRAS	98.74%	NA	100.0%	51.55%	100.0%	97.04%
VISITS	100.0%	100.0%	100.0%	100.0%	100.0%	99.68%
RELAPSES	100.0%	100.0%	100.0%	99.98%	100.0%	96.75%
MEDICAL CONDITIONS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
CSF	99.9%	99.89%	99.89%	99.96%	100.0%	93.82%
TREATMENTS	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
MRI	99.53%	100.0%	100.0%	100.0%	100.0%	71.23%
DIAGNOSTIC RESULTS	99.82%	NA	NA	100.0%	100.0%	98.66%
PREGNANCY	100.0%	NA	NA	100.0%	100.0%	100.0%

Table 1 CDM transformation success rate among participating registries [1]

[1] Drahota J, Forsberg L, Pontieri L, et al. **MS Research Without Borders – Accelerating Collaboration with a BMSD Common Data Model**. In: Proceedings of the European Committee for Treatment and Research in Multiple Sclerosis (ECTRIMS) Congress; 2025 Sep; Barcelona, Spain. Poster presentation. Mult Scler J. 2025;31(3 Suppl):136–762. doi:10.1177/13524585251358344

Overall, the first implementation of the CDM enabled the harmonization of data from 348,371 patients with multiple sclerosis *(CZE 23,401; DNK 19,097; FRA 77,463; ITA 92,851; SWE 23,832; MSB 111,727)*. Standardized validation produced demographic and clinical distributions consistent with current epidemiological knowledge, confirming the robustness and reliability of the model *(e.g., mean age at MS onset: CZE 33.1, DNK 35.4, FRA 33.6, ITA 32.2, SWE 34.2, MSB 31.8 years; ~70% female).* In addition, the CDM was used as the basis for a pilot application within a federated learning framework, demonstrating the feasibility of performing distributed statistical analyses without

sharing patient-level data. These results confirm the CDM as a mature and operational framework to support international observational research, regulatory initiatives, and future real-world evidence activities within the BMSD Network.

III. Feasibility Study

The **feasibility study** evaluated adverse event (AE) collection procedures across the BMSD registries and examined the comparability of serious AE incidence rates among participating countries. The study was made up of three sections listed below:

1. Adverse event collection routines
2. Comparison between MS registry collected adverse events and events captured in public healthcare databases
3. Comparisons between BMSD registries

In the absence of absolute reference SAE rates, the study exploited the ability of the Swedish and Danish multiple sclerosis registries to link patient-level data with national healthcare databases, including cancer registries, hospitalization records, and outpatient specialist care. Using data derived from ongoing PASS and external cohort comparison studies, the incidence of malignancies and serious infections was assessed through both direct comparisons between registry-based and healthcare database–based estimates and indirect comparisons across BMSD registries. Crude and standardized incidence rates were calculated, with standardization applied to account for differences in age and sex distributions across registry populations. Overall, the results indicated that SAE information is effectively captured across all participating registries, either through structured registry-based data collection systems or via linkage to national healthcare databases. Despite heterogeneity in organizational processes and data capture workflows, SAE incidence rates are largely comparable across countries, supporting the fitness-for-purpose of the BMSD registries for PASS and reinforcing confidence in the robustness of registry-based pharmacovigilance data.

IV. Registration of the BMSD Network in the HMA-EMA Catalogues of Real-world Data Sources and Studies

In response to EMA's invitation, the Network finalized its registration in the **HMA-EMA Catalogues of real-world data sources and studies** (https://catalogues.ema.europa.eu/network/1000000867), a publicly available online resource that collects metadata on real-world data (RWD) sources and studies. The catalogue will enhance the Network's visibility and transparency, in line with EMA's recommendations encouraging the registration of all real-world data sources and studies.

e) Communications

The **BMSD website** (https://bigmsdata.org/) has been updated throughout 2026. In the public area, information regarding the description and the organizational structure of the Network were revised. The reserved area for Network members is constantly updated with the most recent documents.

From 21 to 23 October 2026, representatives of the Network will attend the 10th Joint ACTRIMS-ECTRIMS Meeting in Toronto, Canada. The BMSD Network will organize an exhibition booth, alongside national MS registries, to showcase the initiative. Additionally, posters are being prepared to highlight the Network's organizational structure, the quality criteria for new registries wishing to join the group, and the updated status of the EMA QO submission.

f) TC Meetings

Regular monthly Network meetings were held throughout 2026. Key topics discussed included updates on the status of the EMA QO, the registration of BMSD and national registries in the RWD Catalogues, ongoing collaborative projects, and the organization of the 2026 Annual Meeting.

Conclusion

The Network has successfully continued to advance its objectives in 2026, driven by the ongoing commitment and collaborative efforts of all members. A key milestone this year is the expansion of the Network from six to seven members, reflecting our dedication to promoting scientific collaboration among European registries. We extend our sincere gratitude to our sponsors for their previous and ongoing support, which remains crucial to sustaining the Network's core activities.

June, 2026

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BMSD Coordination Leaders