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## Appendix 5: Details of the German and Italian national registries

- The German Registry is composed of a network of approximately 170 Centres in Germany delivering care to MS patients across a mixed care setting that includes outpatient clinics, in-patient care and rehabilitation centres. The registry has a harmonised common data set. Healthcare professionals (HCPs; doctors, nurses or clinic and rehabilitation centre staff) enter data into the patient's medical record in the course of clinical care. To facilitate data entry into the MS Registry, a web-based system has been developed. Each individual patient record is provided with a pseudonym to ensure there is no duplication of data across the care settings. Owing to data protection regulations, it is only possible currently on a project basis to link the registry externally, for example, to healthcare insurance databases. There is no specified frequency for data upload to the national registry although generally updates must be completed before the end of the year (based on contract agreement). For inclusion of patient reported outcomes (PROs), the registry conducted a feasibility study using the MSIS-29 questionnaire to measure quality of life.

There is no financial incentive for MS Centres to contribute data but as the national MS registry is held in high regard, there is professional prestige associated with contributing to it. MS Society certification for HCPs undertaking registry activities is also an incentive. Doctors do not have direct access to the entire Registry data set but can access the data on their own patients facilitating local audits and providing a longitudinal picture of care. For clinicians conducting a research project, an application must be made to the advisory board to undertake analyses using the entire data set.

The German registry works with a custodian who handles the identifying patient data details. Quality assurance is predominantly software driven. For example there are pop-up messages, mandatory fields, and alerts if data are out of range for a particular field. Data may be corrected at centre level if a mistake is found at national level (central Query management). Quality is enhanced by HCP training. The Registry uses an audit trail to record the person and the changes made to individual datasets. There is limited source data verification and audit.

- The Italian Registry is composed of 138 clinical centres (across 19 regions), 62 of which have been authorised (Ethics Committee approval) to contribute to the centralised data. The remaining 76 centres are awaiting ethics approval to contribute data centrally. The individual centres have agreed a minimum data set and this information is uploaded quarterly to a dedicated centralised



platform. At present, the database holds more than 45,000 MS patient records, of which 20,000 have 5 years of follow-up and 12,000 have 10 years of follow-up. Patients do not have access to the database. A separate database of 2000 patients is part of a pilot project to record PROs. Adverse drug reaction recording is not mandatory and is not included within the minimum data set. The registry aims to expand data collection, including paediatrics and pregnancy information.

The governance of the registry includes an Executive and a Scientific Committee which approves requests for access to centralised data.

Quality assurance occurs at several levels and includes, for example, software checks that raise alerts if numerical values are out of range. There are also mandatory data fields. Checks for patient duplication are performed by cross-checking against tax codes which also provides a mechanism for externally linking to other data sources such as mortality data. The registry monitors the performance of each centre against several metrics and has a network of 12 research assistants who work with low performing centres or those with specific problems. This has proven an effective in improving data quality.

The Italian registry is part of the Big MS data network which includes the five national MS Registries (Italian, Swedish, Danish, French and MSBase). There is no single harmonised registry platform across the Big MS group. Data are shared on a project by project basis.