



Magnetic resonance imaging (MRI) reports supplied to clinicians who treat patients with Multiple Sclerosis (MS) vary in structure, content & quality. Understanding & quantifying the impact of MRI report variability on MS Specialist Neurologists (MSNs) clinical decision making and healthcare utilization has not been fully explored.

OBJECTIVE

decisions based on standard of care MRI reports.

METHODS & ANALYSES

- 90 de-identified MS subjects with 2 MRI exams (median 1 year apart) were retrospectively enrolled from the University Hospital Basel.
- 3 board-certified neuroradiologists (NRs) interpreted images to provide standard of care reports.
- Reports were randomized so each MSN received 90 patients equally balanced across NRs (Figure 1).
- To measure intra-rater variability, 30 cases were repeated within each set to total 120 reports.
- To measure inter-rater variability, 6 MSNs were randomly assigned to 3 groups, each group receiving matching reports.
- MSNs reviewed each MRI report & brief clinical summary to answer a survey of their clinical impressions & decisions.
- 6 questions rated the quality of the MRI report, including: overall satisfaction & utility, if the report was easy to understand, if they could quickly find the information they needed, & if all information expected for a high-quality MRI report was present.
- 15 questions measured clinical impressions & decisions, including: patient's disease status, level of concern for the patient, if the MSN would change the overall treatment plan, when the next MRI should be scheduled, and when the next in-person visit should be scheduled.
- Agreement was evaluated using Cohen's Kappa statistic (observer agreement %, K).
- Results from 5 MSNs were complete at the time of this analysis.

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Substantial Variability of Neurologist Decision-Making Based on MRI Reports

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BACKGROUND

To measure the intra- & inter-rater variability of MSNs clinical impressions and



Figure 1. Study design diagram describing the generation of standard-of-care structured MRI reports by 3 Neuroradiologists.

CONCLUSIONS

There is substantial variability among MSNs evaluation of standard-of-care MRI reports & resulting clinical decisions. Variation in satisfaction & confidence in the report implies that MRI report quality may contribute to variability seen across MSNs. Future research will examine whether structured, quantitative MRI reports reduce variability in MSN impressions and clinical decisions.

RESULTS

- Intra-rater agreement of MRI report satisfaction widely ranged from slight to substantial (50.0-96.7%, K= -0.06-0.77).
- "Neurologist's level of concern" was moderate (62.7%, K=0.58) across MSNs. (Figure 2)
- Inter-rater reliability between MSN pairs varied for MRI report satisfaction [slight to moderate (7.8-66.7%, K=0.01-0.48)].
- Inter-rater agreement for clinical decision making questions ranged from slight to substantial within pairs. Inter-rater agreement varied between pairs, e.g. for "Neurologist's level of concern" one pair had fair agreement (30.0%, K=0.25), while a second pair had moderate agreement (58.9%, K=0.56).



Figure 2. Distribution of MSN responses on MRI report satisfaction.



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Intra-rater agreement for clinical decision making ranged from slight to almost perfect (50.0-100.0%, K=0.01-1.00).