

Comparison of unimpeded magnetic resonance imaging access by Spinal Cord Stimulation manufacturer: A retrospective claims study

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Introduction

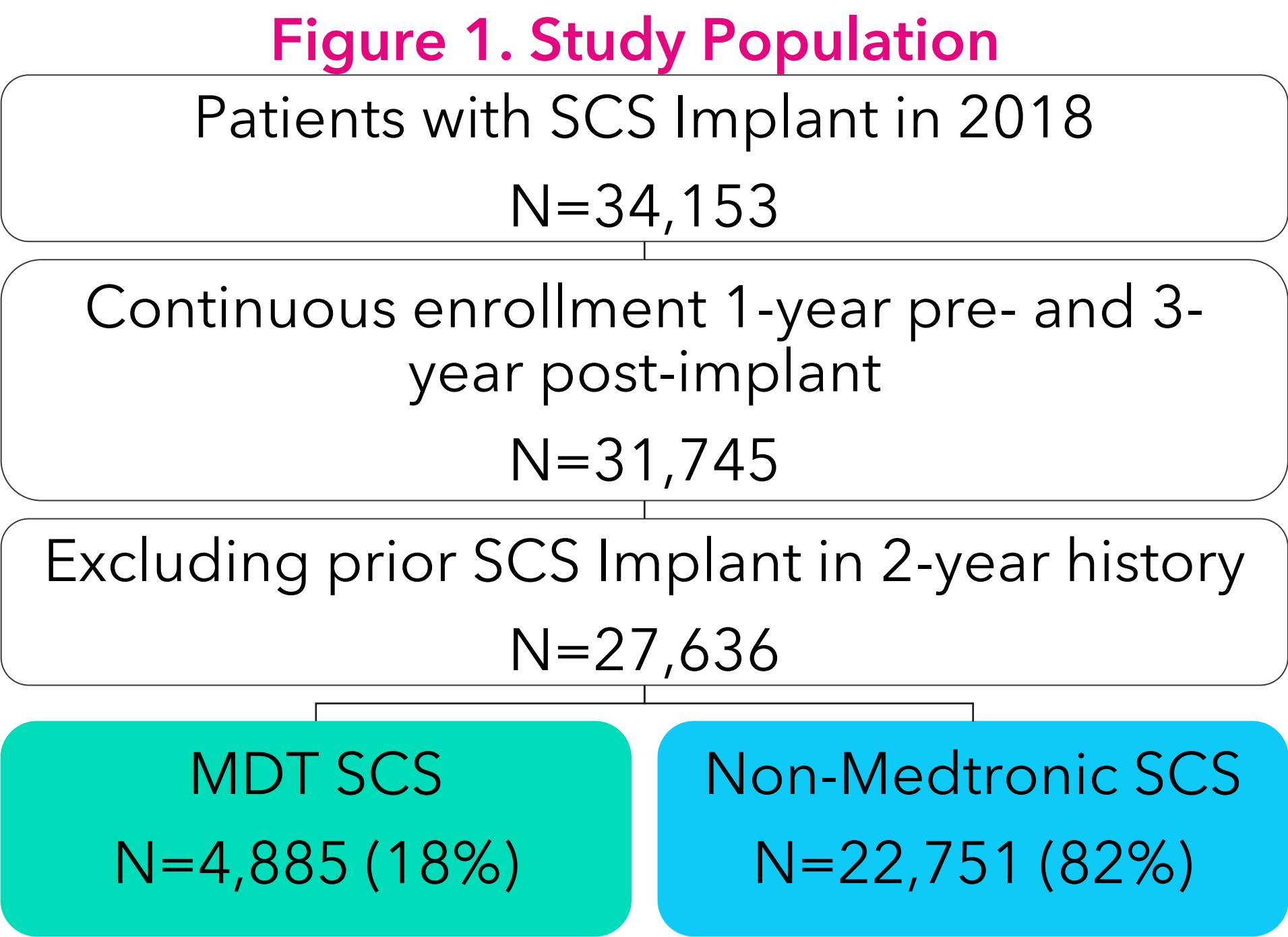
Spinal cord stimulation (SCS) systems have varying degrees of magnetic resonance imaging (MRI) compatibility. While all SCS manufacturers have some level of MRI compatibility, an impedance-independent system enables patients to undergo an MRI with out-of-range lead impedance values.

Objective

Compare the real-world trends in MRI utilization among patients treated with impedance-independent SCS systems that enable MRI access in the presence of out-of-range lead impedance versus all other SCS devices.

Methods

- Medicare Research Identifiable File (RIF) administrative claims data (2016-2021) were used to identify patients.
- Patients with an initial SCS implant during 2018 were selected, with a one-year baseline and three-year follow-up.
- Linkage of claims data with Medtronic (MDT) device registration was used to identify patients implanted with MDT impedance-independent systems (MDT-SCS) vs. other SCS devices (non-MDT SCS)
- Rates of MRI in follow-up for MDT-SCS vs. non-MDT SCS were calculated for the overall study population, among explants only and adjusted using Cox Proportional Hazards Ratio model with covariates for sex, age group, race and CCI score.



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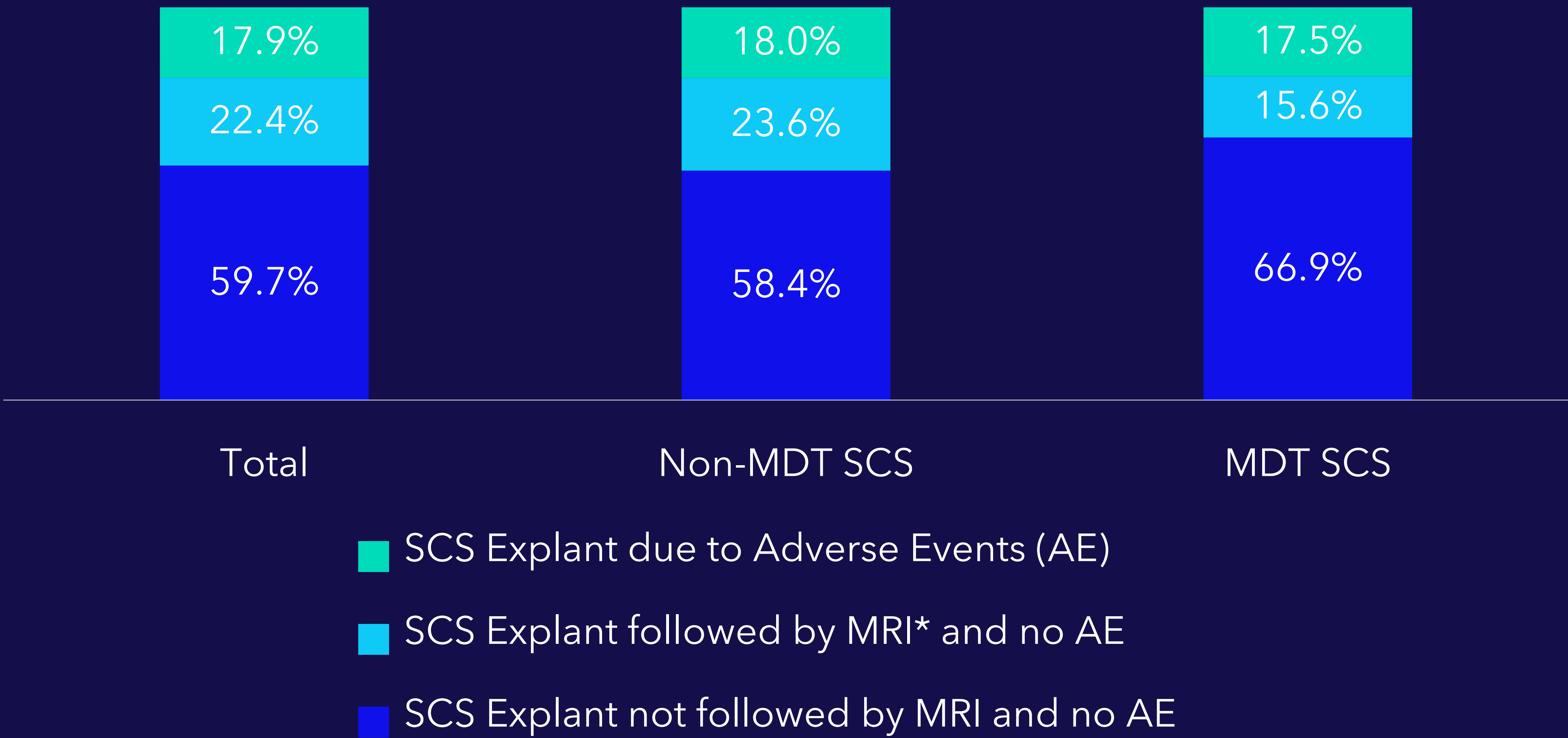
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Main Results

- Patients with an MDT SCS system had a 13.3% higher rate of MRI utilization post-implant than non-MDT system. Nearly half (46.6-47.8%) of the MRI were for non-spine locations with nearly 1 in 10 for emergency reasons.
- Significantly more explants followed by MRI observed among non-MDT SCS than MDT SCS (23.6% vs. 15.6%, $p<.001$)

Figure 2. Rates of Explant in 3-Year Follow-up



*Within 120 days of SCS device explant procedure.

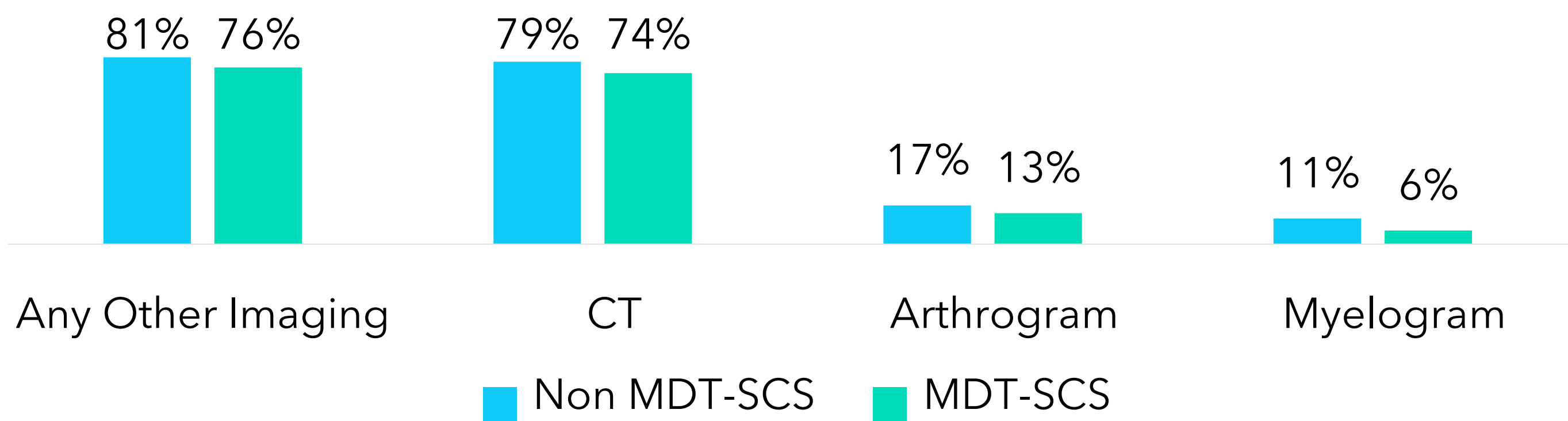
Results (cont'd)

- 27,636 patients met cohort selection criteria, 4,885 (18%) of which had MDT SCS devices and 22,751 (82%) with other SCS devices implanted in 2018 (Figure 1).
- The likelihood of getting an MRI in follow-up was 71.6% higher among MDT SCS patients compared to non-MDT patients ($p<0.001$).
- MDT SCS had lower utilization of other imaging procedures (computed tomography scans, arthrograms, and myelograms) compared to non-MDT patients (76.4% vs. 80.8%, $p<0.001$).

Table 1. New diagnoses within 30 days following MRI

	Overall		Non-MDT SCS		MDT SCS		P-value
Total Sample Size	27,636	100%	22,751	100%	4,885	100%	
Total with MRI	7,368	26.7%	5,532	24.3%	1,836	37.6%	<.001
ER-related MRI	689	9.4%	514	2.3%	175	3.6%	0.04
Specific New Diagnoses							
Non-VCF							
Injury/Fractures	446	6.1%	340	1.5%	106	2.2%	<.001
Cancer	413	5.6%	312	1.4%	101	2.1%	<.001
with start of Chemo	98	0.4%	69	0.3%	29	0.6%	0.18
VCF	39	0.5%	24	0.1%	15	0.3%	<.001
Biliary Tract Disease	108	1.5%	70	0.3%	38	0.8%	<.001
Osteoarthritis	502	6.8%	367	1.6%	135	2.8%	<.001
Stroke	353	4.8%	274	1.2%	79	1.6%	0.02

Figure 3. Rates of Other Imaging among the total population in follow-up



Discussion

Given these findings, it is important clinicians factor in the patient-level risk of needing a future MRI when choosing an SCS system which may have differing MR conditionality and access.

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