A Multi-Site Survey of Parkinson Disease Deep Brain Stimulation Center Best Practice: Moving Towards a Standard of Care for DBS

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Objectives

To survey how Deep Brain Stimulation (DBS) Centers handle referrals, and peri-operative (surgical and non-surgical) treatment of persons with Parkinson Disease (PD).

Background

- Currently there are no comprehensive consensus recommendations for DBS patient referral, pre- and post-operative evaluation and management.
- A multi-site survey aimed at clarifying real world best practices will be the first step toward the formulation of a standard of care.

Materials and Methods

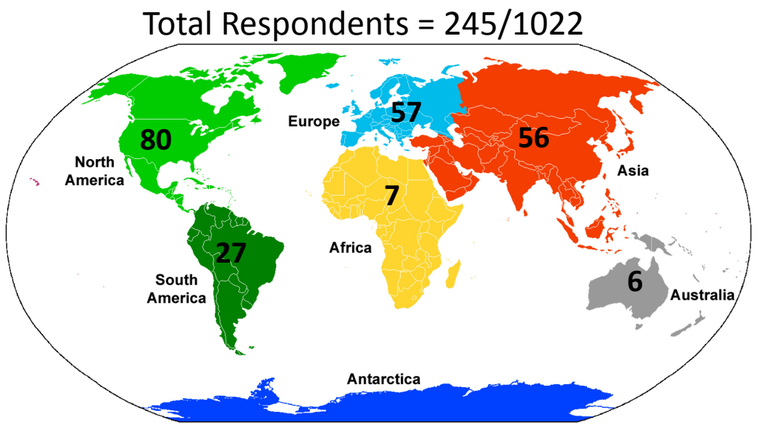
A 58-question web-based survey was developed to ascertain various aspects of the Deep Brain Stimulation referral pathway including (but not limited to): initial referral mechanism, indications considered for DBS aside from PD, adequacy of medication trials, method of Neuropsychiatric and Neuropsychological evaluation, DBS Committee utilization and constitution, implant site selection and intra- and post-operative imaging and post-operative management.

Salient questions regarding DBS referral and peri-operative management were formulated by committee after review of relevant literature. Discrepancies were addressed by consensus discussion among survey authors.

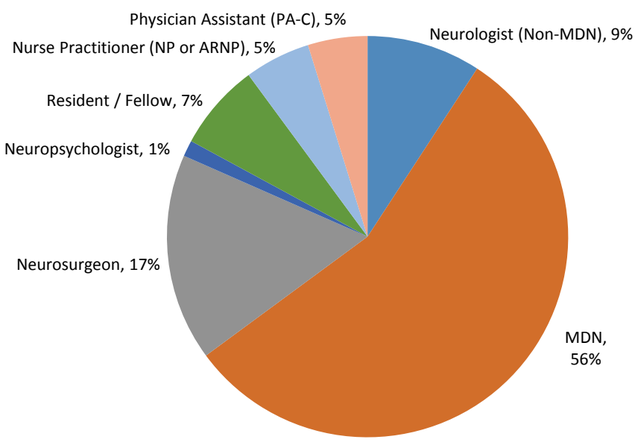
The survey was initially distributed by National Parkinson Foundation to Centers of Excellence in the United States. Subsequently international distribution of the survey is underway by the International Parkinson and Movement Disorders Society. There is also ongoing coordination with the Parkinson Study Group.

Respondent Demographics

Total Respondents = 245/1022



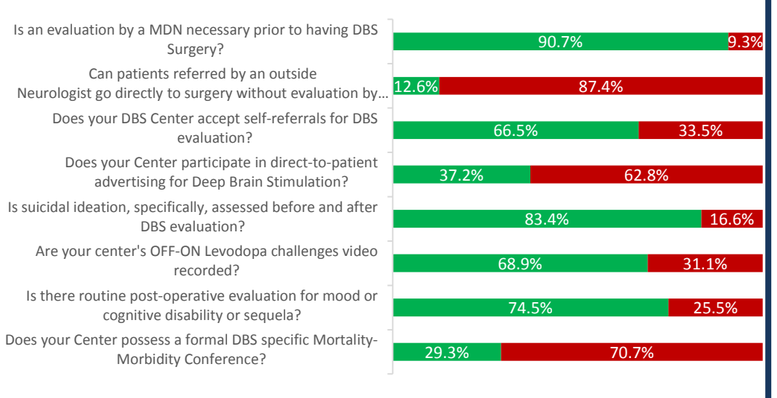
Please indicate your specialty / training



56% of respondents were Movement Disorders Neurologists, followed by Neurosurgeons at 17%

Results

Select Questions from DBS Survey

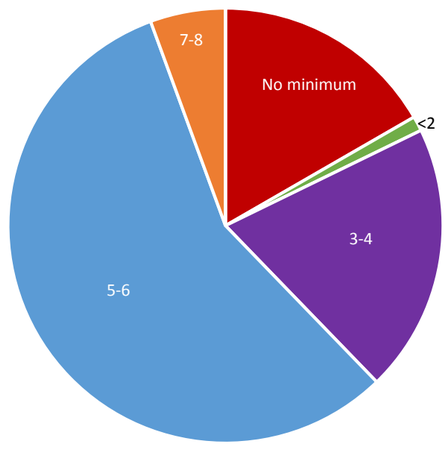


More than 85% of centers agree that evaluation by an in-house MDN is necessary prior to DBS. Approximately 1/3 of centers participate in patient advertising and do not accept self-referrals for DBS. >74% respondents report routine post-operative cognitive and mood evaluation. Only 29% of respondents have a DBS Specific Mortality-Morbidity Conference.

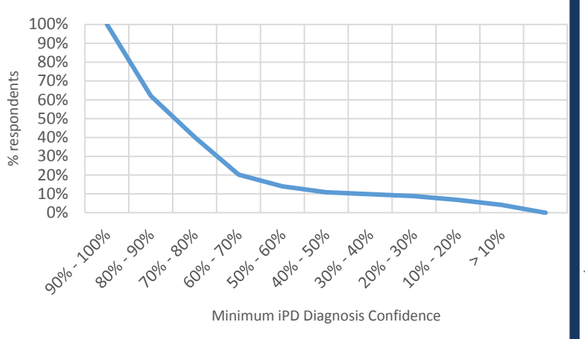
	Average (SDEV)	*Median*	*Range*
Monthly **DBS Referrals** for PD	7.7 (7.0)	5	0-42
Monthly **DBS Surgeries** for PD	3.6 (3.6)	2	0-18
Ratio of referrals to surgeries	2.4 (2.5)	2	0-20

Results

What is the minimum duration of Parkinson Disease (years) before DBS should be considered?

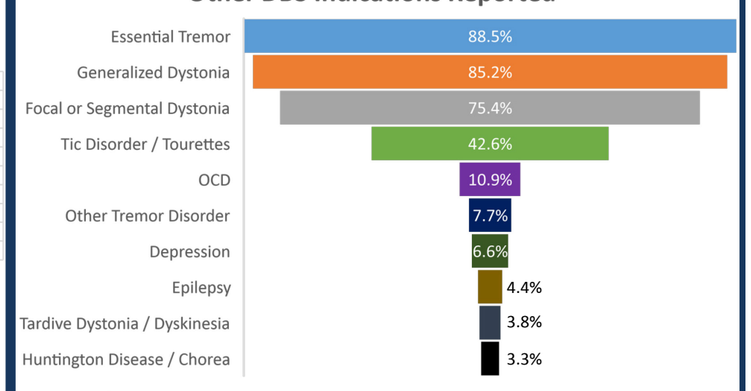


Fraction of Centers peforming DBS v. Diagnostic Confidence



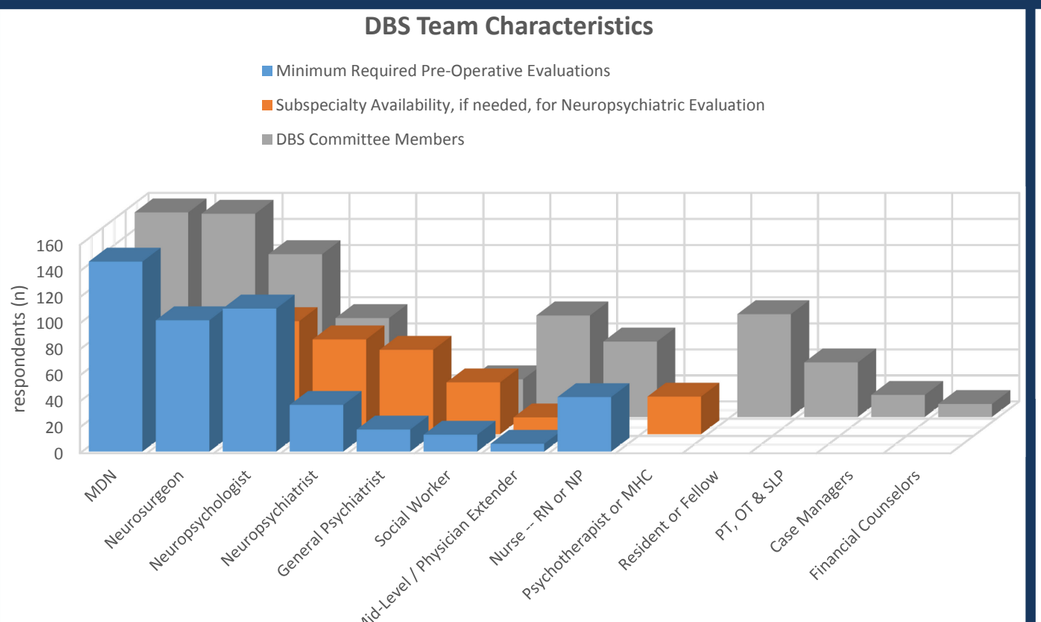
More than 65% of respondents felt the minimum duration of disease prior to DBS should be 5-6 years and 62% felt the lowest confidence in diagnosis of iPD should be 80% before DBS

Other DBS Indications Reported

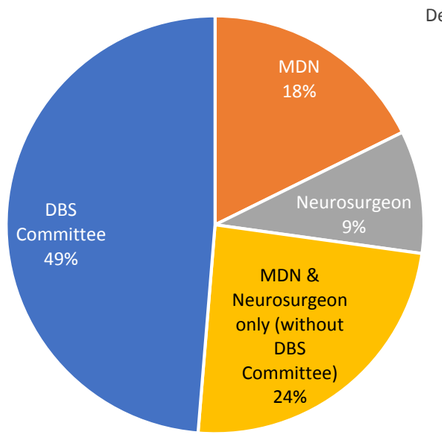


Aside from PD and the indications above, respondent centers are investigating DBS in (descending frequency, <3%): Pain, Gait Disorders, Atypical PD, Cerebral Palsy, Myoclonus, Traumatic Brain Injury, Headaches, Anorexia, Dementia and Narcolepsy

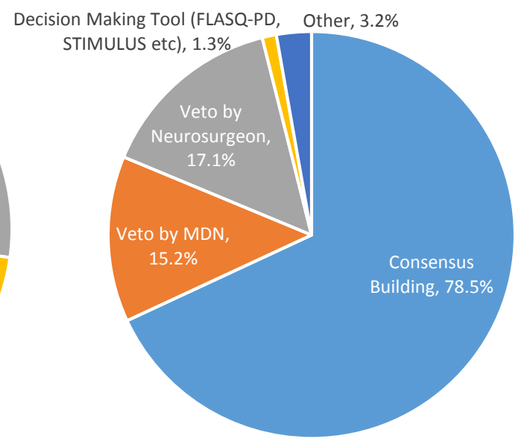
DBS Team Characteristics



Who ultimately Determines Candidacy for DBS?



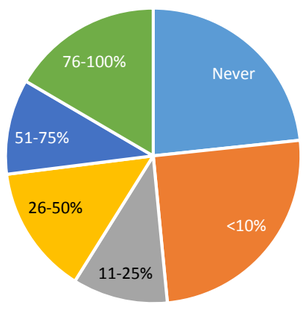
How is the decision to proceed with DBS established?



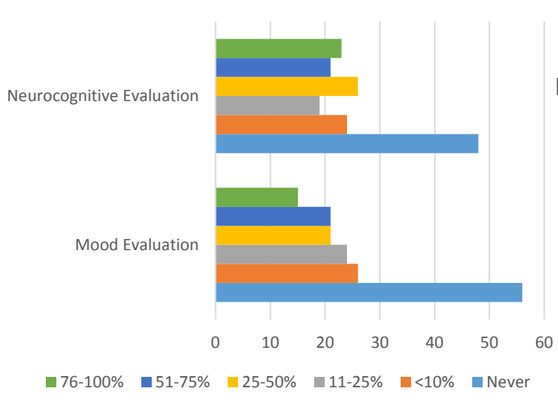
The majority of respondents indicated MDNs, Neurosurgeons and Neuropsychologists constitute the core DBS team. Availability of Psychiatrists, Mental Health Counselors (MHC), Case Managers and Financial Counseling was variable. Only 49% of respondents indicated a DBS Committee determined DBS candidacy though consensus building, rather than veto (or structured decision making tools) were utilized 78% of the time.

Does your center use a "default" brain target for DBS?

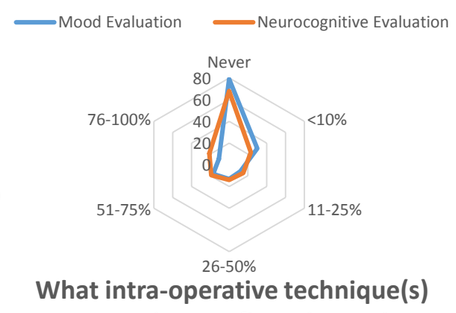
How often are DBS procedures staged?



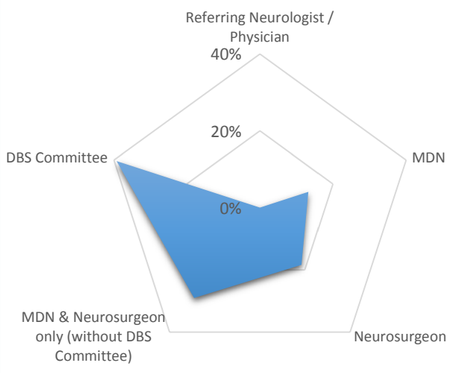
How often is the target selection affected by



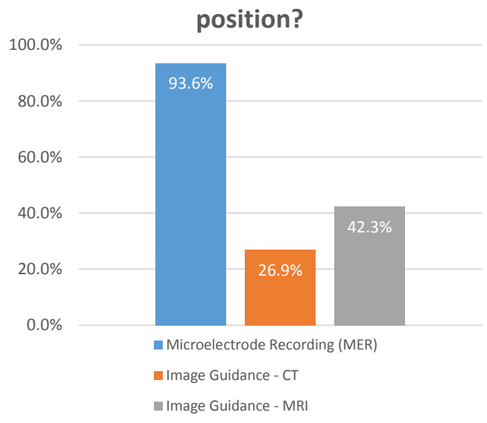
How often are bilateral DBS procedures staged due to



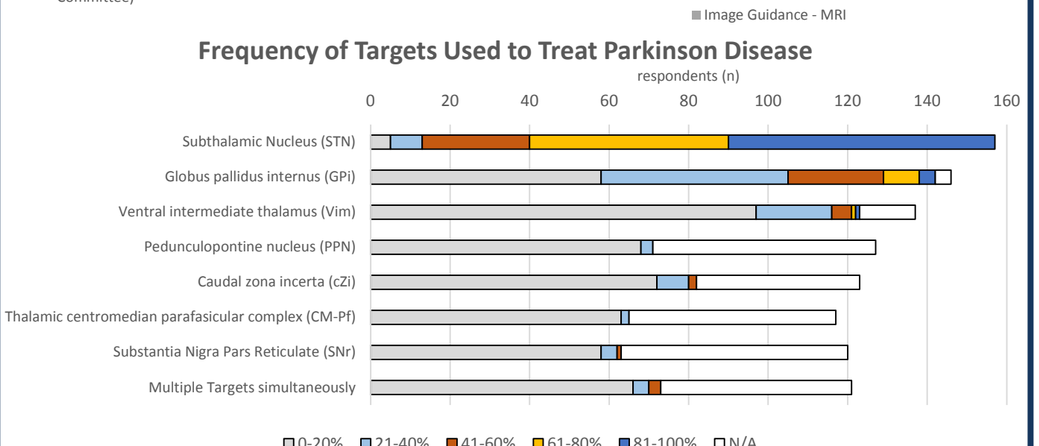
Who, ultimately, determines the brain target and procedure type (if options exist)?



What intra-operative technique(s) are used to confirm electrode position?

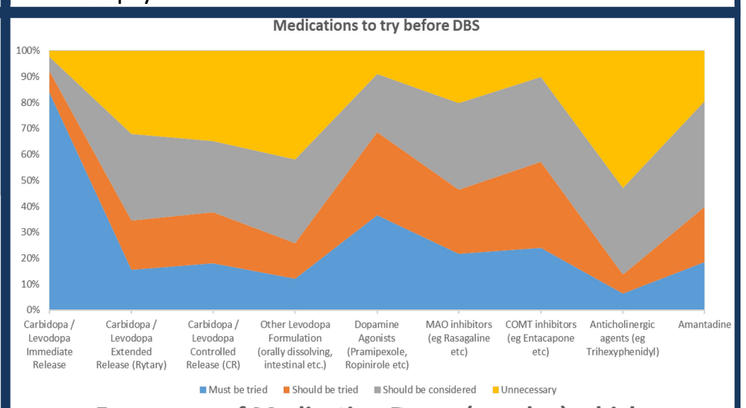


Frequency of Targets Used to Treat Parkinson Disease

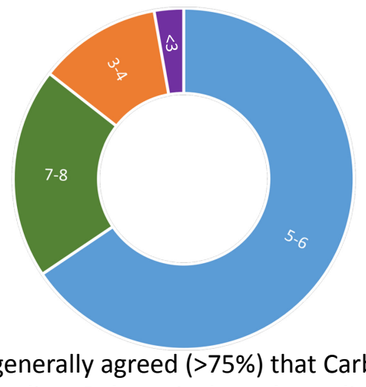


The majority of respondents do not utilize a "default target." More than 50% of respondents indicated that DBS procedures are rarely (<25% of the time) staged. Mood and neurocognitive evaluations infrequently affect DBS staging. Target selection was reported to be made primarily by DBS Committee or by the MND and Neurosurgeon. MER remains the dominant technique to confirm electrode position. STN is used more commonly than GPi for PD DBS. Few centers use alternative targets for Deep Brain Stimulation.

Medications to try before DBS

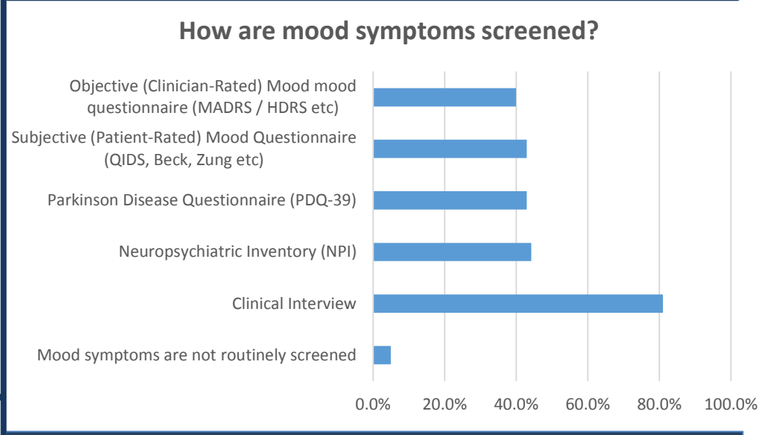


Frequency of Medication Doses (per day) which warrants DBS



Respondents generally agreed (>75%) that Carbidopa / Levodopa Immediate Release is the only medication which *must* be tried before DBS. Additionally, the majority (67%) agreed if fluctuations are present despite dosing more than 5-6 daily, DBS should be considered.

How are mood symptoms screened?



Discussion and Conclusion

Historically, candidacy for DBS for PD has largely depended upon motor symptom response during structured OFF-ON evaluation, patient report of motor fluctuations, or the presence of medically intractable tremor. However, there is significant heterogeneity in current referral pathways and peri-operative management. Multidisciplinary DBS Committees have been widely, but not uniformly, utilized to evaluate candidacy for DBS for PD [1] and ET[2]. Their impact on long-term patient outcome and quality of life remains uncertain. Recent publications suggest that concerns raised during multidisciplinary pre-operative evaluation may have correlated with post-surgical complications[3] and DBS outcomes[4]. Given international variability in DBS evaluation, further study is crucial to ascertain core determinants impacting appropriate patient selection criteria and factors predictive of superior patient outcomes. This study provides data to facilitate future such work ultimately geared toward the development of DBS consensus recommendations.

References

1. Morishita T. et al., DBS candidates that fall short on a levodopa challenge test: alternative and important indications.Neurologist. 2011 Sep;17(5):263-8.
2. Shah N. et al., A suggested minimum standard deep brain stimulation evaluation for essential tremor. J Neurol Sci. 2016 Mar 15;362:165-8.
3. Higuchi MA, et al., Impact of an Interdisciplinary Deep Brain Stimulation Screening Model on Post-Surgical Complications in Essential Tremor Patients. PLoS One. 2015 Dec 28;10(12)
4. Higuchi MA, et al., Interdisciplinary Parkinson's Disease Deep Brain Stimulation Screening and the Relationship to Unintended Hospitalizations and Quality of Life. PLoS One. 2016 May 9;11(5)

Link to Survey

Data Collection is **still underway**. If you'd like to contribute, please use the Link or QR Code below:
https://www.surveymonkey.com/r/DBS_Survey_MDS