**Problem:** Most neuromodulation studies are either small case series at a single site or company-sponsored device trials. As a result, it can be difficult to generate new generalizable knowledge.

**Goal:** The broad goal of the International Neuromodulation Registry is to enable large population health studies that enable us to better predict who will respond to neuromodulation therapy and the best treatment strategy. This will be done using a novel combination of data integration and computational modeling.

**Disorders:** Parkinson’s Disease, Essential Tremor, Dystonia, Treatment Resistant Depression, Tourette Syndrome, Obsessive-Compulsive Disorder

**Neuromodulation Techniques:** Deep brain stimulation (DBS); cortical stimulation (CS); transcranial magnetic stimulation (TMS)

---

**Data Collected in the Neuromodulation Registry**

**Medical Imaging**

<table>
<thead>
<tr>
<th>Pre-Operative</th>
<th>Post-Operative</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRI</td>
<td>MRI</td>
</tr>
<tr>
<td>MRI</td>
<td>MRI</td>
</tr>
<tr>
<td>DWI/Tractography</td>
<td>CT</td>
</tr>
</tbody>
</table>

Medical imaging, including pre- and post-operative MRI, diffusion-weighted MRI (DWI), and post-operative CT, are collected through the Nuance PowerShare Network and then anonymized and stored in the Extensible Neuroimaging Archive Toolkit (XNAT).

**Pre- and Post-Operative Clinical Data**

- Demographics
- History of Disorder
- Stimulation Parameters
- Brain Target
- Clinical Rating Scale Scores
- Outcomes

Patient clinical data are stored in REsearch Electronic Data Capture (REDCap) and can be queried and downloaded for analysis.

**Example: Tourette Association of America**

Based on outcomes from prior patients, can we predict the response of future patients based on stimulation type and location?

Tourette Syndrome (TS) is a complex neuropsychiatric disorder characterized by motor and phonic tics, or repetitive movements and vocal outbursts. DBS has been used experimentally to treat TS in a limited population of patients, but outcomes are varied across targeted brain regions.

**Acknowledgments:** NIH P41 GM103545 Center for Integrative Biomedical Computing