REMOTE MONITORING FOR PARKINSON’S DISEASE

Many remote monitoring devices on the market:
• Mobile phones
• Wearables
• Embedables
• Wireless sensors
• Smart Clothes
• More...

Commercial grade devices
• Apple Watch
• Android Wear
• FitBit

Research Grade Devices
• PD-specific with 510K Clearance:
  • Global Kinetics Corporation
  • Great Lakes Neurotechnologies
• Investigational: Empatica, Google Watch, APDM, MC10 patches
WEARABLE AND SENSOR ISSUES

• Performance and availability of device (passive vs active)
• Range of data collected by the device
• Capability to manage data and make data available to PPMI and publicly available
• Prior data in older healthy subjects and PD subjects
  • Test retest reliability
  • Cross-sectional change in PD
  • Change in treatment
  • Early change in Prodromal subjects
  • Longitudinal change in PD
• Device - Manufacturing and Distribution provide the device
• Available data in preliminary studies
• Storage and Accessibility of Sensor Data
• Quality Control
• Support & Training
• Flexibility

RESULTS
12 Proposals Submitted
2 were approved
GOAL TO EVALUATE DISEASE PROGRESSION IN ALL COHORTS

• Who should be included
• Duration/Scope of assessment
• What are meaningful outcomes
• Managing the data output
Wearable/Sensor challenges/opportunities

• Implementing widely in PPMI
• Integration into clinic visit
• Retention and compliance
• Multiple cohorts
• Managing data
• Open source data

• Developing Key goals
  • Assess prodromal PD cohorts
  • Assess progression
  • Assess drug response
  • Comparison with in clinic visit
Wearable/Sensor 2018

**Verily**
- Watch
- Passive collection of Data
- US based
- Shared data

**Roche**
- Phone Ap
- Passive and Active collection of Data
- EU based
- Shared Data

### Active Tests
- **Phonation**
- **Tremor**
- **Dexterity**
- **Stability and Lower Body Bradykinesia**

### Passive Monitoring
- **Motor behavior in everyday life**
- **Gait**
- **Mobility**

Provided phone

Daily assessment suite and activity monitoring

Automatic data transfer via wifi
PPMI – Long-term f/u

- **FOUND** -
  - Goal for all subjects to enroll
  - Opportunity to continue to communicate with subjects and acquire follow-up information
  - Environmental questionnaire

- **Path core**
  - Goal for all subjects to enroll
  - Path core will continue contact subjects to plan for post-mortem

- **Novel assessments**
  - Wearables/Sensors
  - Ongoing phone/home visits