Digital Health Technologies
In Systems Pharmacology

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Tech that measures established quantified clinical variables

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What about cases where clinical assessments are not easy to quantify?

### Unified Parkinson's Disease Rating Scale

**III. Motor Examination**

18. **Speech**
   - 0 = Normal.
   - 1 = Slight loss of expression, diction and/or volume.
   - 2 = Monotone, slurred but understandable; moderately impaired.
   - 3 = Marked impairment, difficult to understand.
   - 4 = Unintelligible.

19. **Facial Expression**
   - 0 = Normal.
   - 1 = Minimal hypomimia; lips parted some of the time.
   - 2 = Mild to moderate. Or moderate in amplitude, but only intermittently present.
   - 3 = Moderate hypomimia; lips parted most of the time.
   - 4 = Marked or fixed facies with severe or complete loss of expression; lips parted 1/2 inch or more.

20. **Tremor at Rest**
   - (head, upper and lower extremities)
   - 0 = Absent.
   - 1 = Slight and infrequently present.
   - 2 = Mild in amplitude and persistent. Or moderate in amplitude, but only intermittently present.
   - 3 = Moderate in amplitude and present most of the time.
   - 4 = Marked in amplitude and present most of the time.

21. **Action or Postural Tremor of Hands**
   - 0 = Absent.
   - 1 = Slight, present with action.
   - 2 = Moderate in amplitude, present with action.
   - 3 = Moderate in amplitude with posture holding as well as action.
   - 4 = Marked in amplitude; interferes with feeding.

22. **Rigidity**
   - (judged on passive movement of major joints with patient relaxed in sitting position. Cogwheeling to be ignored.)
   - 0 = Absent.
   - 1 = Slight or detectable only when activated by mirror or other movements.
   - 2 = Mild to moderate.
   - 3 = Marked, but full range of motion easily achieved.
   - 4 = Severe, range of motion achieved with difficulty.

23. **Finger Taps**
   - (Patient taps thumb with index finger in rapid succession.)
   - 0 = Normal.
   - 1 = Mild slowing and/or reduction in amplitude.
   - 2 = Moderately impaired. Definite and early fatiguing. May have occasional arrests in movement.
   - 3 = Severely impaired. Frequent hesitation in initiating movements or arrests in ongoing movement.
   - 4 = Can barely perform the task.

24. **Hand Movements**
   - (Patient opens and closes hands in rapid succession.)
   - 0 = Normal.
   - 1 = Mild slowing and/or reduction in amplitude.
   - 2 = Moderately impaired. Definite and early fatiguing. May have occasional arrests in movement.
   - 3 = Severely impaired. Frequent hesitation in initiating movements or arrests in ongoing movement.
   - 4 = Can barely perform the task.

25. **Rapid Alternating Movements of Hands**
   - (Patient opens and closes hands in rapid succession.)
   - 0 = Normal.
   - 1 = Mild slowing and/or reduction in amplitude.
   - 2 = Moderately impaired. Definite and early fatiguing. May have occasional arrests in movement.
   - 3 = Severely impaired. Frequent hesitation in initiating movements or arrests in ongoing movement.
   - 4 = Can barely perform the task.

Daily evaluation of L-DOPA effects on finger tapping
Individualized recommendations for patients – clinical monitoring by doctors – public health policy

https://www.airlouisville.com/
Clinical Trials

Precision Medicine

Quality of Life

Real-World Evidence
Research Protocol

Participant’s Life
Research Protocol

Participant’s Life
Truthiness is what you want the facts to be as opposed to what the facts are. What feels like the right answer as opposed to what reality will support.

Stephen Colbert
Show Don’t Tell
