

Parkinson's Disease

Challenges in diagnosing and monitoring

Paul Blyth
Head of Underwriting and Claims Proposition
3rd September 2024

Institute of Actuaries Japan

IAJ Parkinson's Disease

- 01** What is Parkinson's disease?
- 02** What are the existing treatment options?
- 03** What does the future hold for Parkinson's disease?
- 04** Conclusions
- 05** Questions



What is Parkinson's disease?

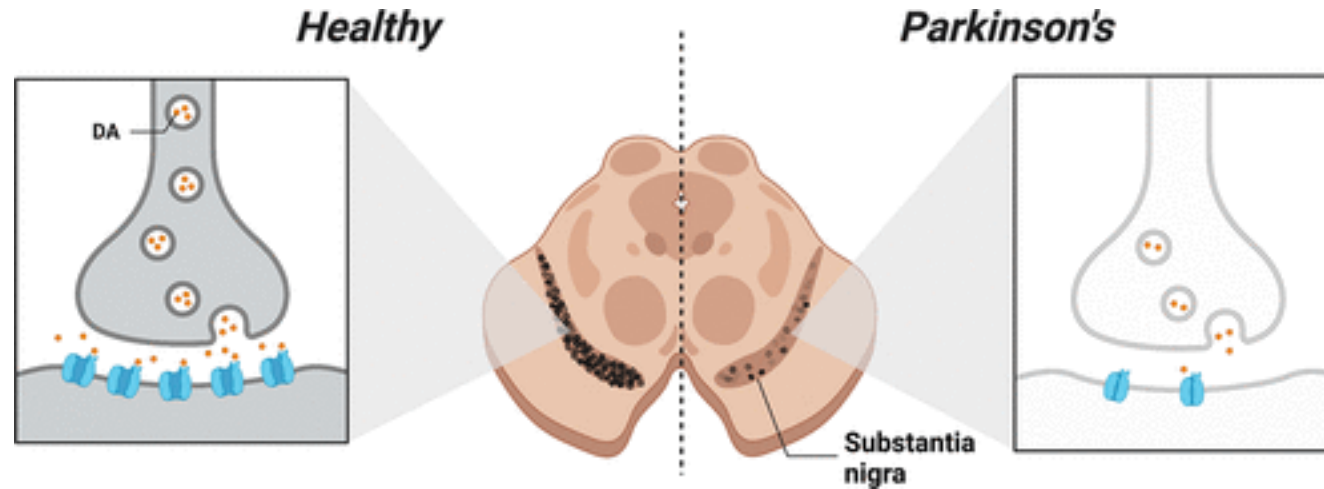
Parkinson's disease

What is it?



A progressive disease of the nervous system caused by a loss of nerve cells in the brain (substantia nigra) causing a reduction in Dopamine.

The lack of Dopamine is responsible for the body being unable to regulate movement. A reduction in dopamine is responsible for many of the symptoms suffered.



Parkinson's disease

Symptoms

Three main symptoms:

Involuntary shaking of particular parts of the body ([tremor](#))

Slow movement (Bradykinesia)

Stiff and inflexible muscles

Accompanying symptoms:

[Depression](#) and [anxiety](#)

Balance problems – this may increase the chance of a [fall](#)

Loss of sense of smell ([anosmia](#))

Problems sleeping ([insomnia](#))

Memory problems

Exactly what causes the loss of nerve cells is unclear. Most experts think that a combination of genetic and environmental factors is responsible.

Parkinsonism Is an Umbrella Term

IPD will look like PK+ syndromes – this because they're characterised by the same symptoms 'Parkinsonism'

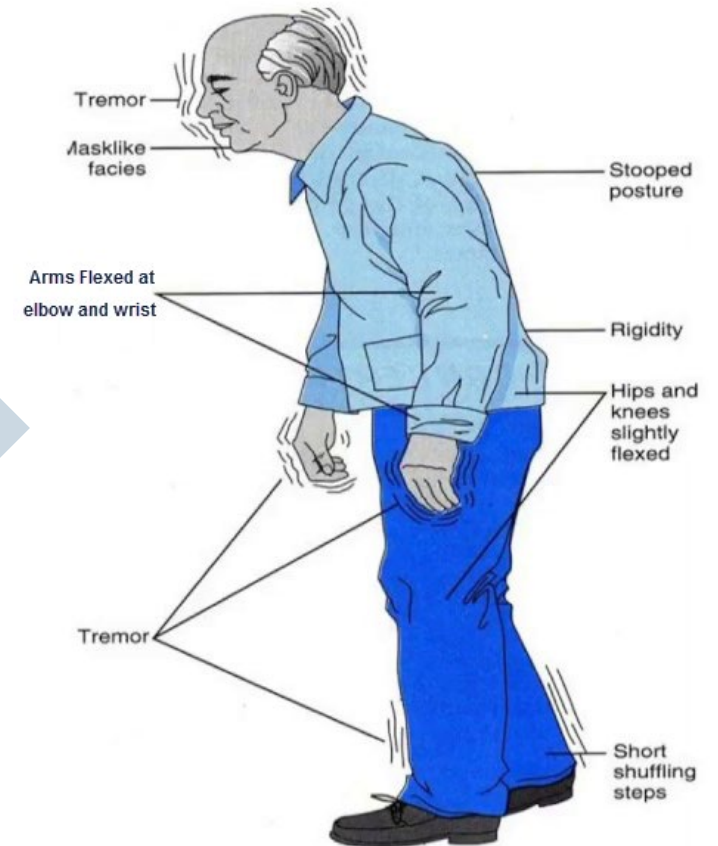
Parkinsonism is a generic term for a group of symptoms that can be seen in someone with **Parkinson's disease** such as tremor, stiffness, and slowness of movement.

Bradykinesia
(slowness/loss
of initiating
voluntary
movement)

Tremor

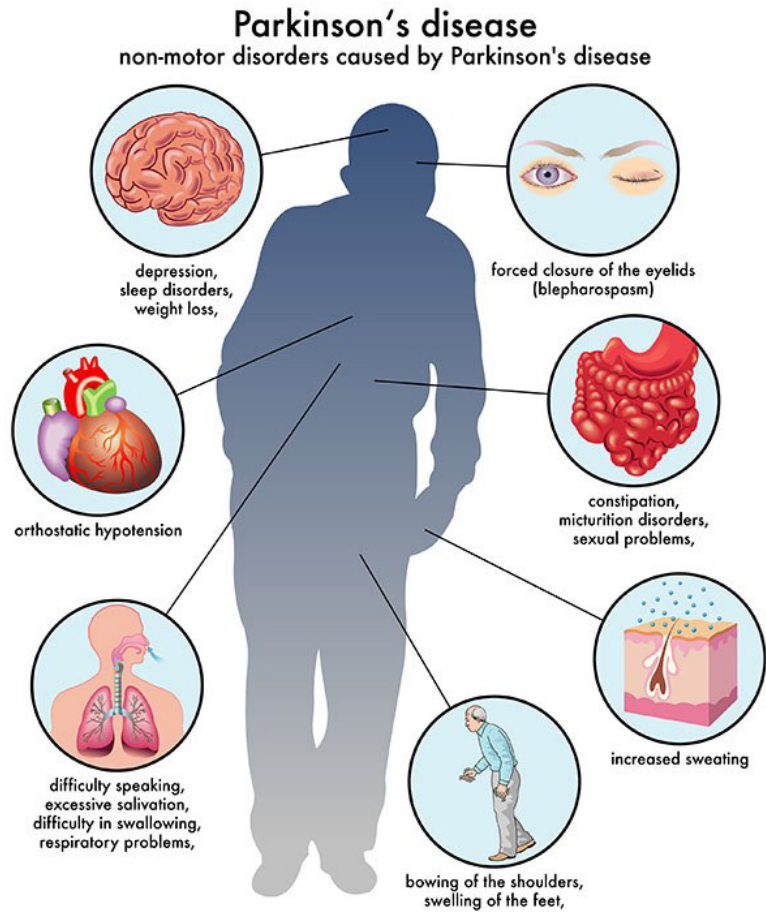
Rigidity

Postural
instability



Parkinson's disease

Classical Symptoms



Early Warning Signs of Parkinson's Disease	
Tremor  Slight shaking in hand, finger, or chin while at rest	Loss of Smell  Inability to smell certain foods, such as bananas, pickles, and licorice
Small Handwriting  May include smaller letters and/or words crowded together	Sleep Problems  Sudden movements during sleep, acting out dreams
Trouble Moving  Stiffness in limbs, body, or shoulders; feet feeling "stuck to the floor"	Constipation  Difficulty moving bowels without straining
Voice Changes  Voice may sound soft or hoarse	Masked Face  Face looks angry, serious, or depressed even when happy
Dizziness  Feel dizzy or faint upon standing	Stooping  Change in posture when you stand, such as stooping or slouching

Parkinson's disease

Who's affected?



Parkinson's affects up to 150,000 people in Japan.

Parkinson's is the second-most common neurodegenerative disease after Alzheimer's disease.

This is projected to double by 2040, primarily because of population ageing

Diagnosis between 50-60 is considered 'early' onset

Diagnosis before 50 is considered 'young' onset (M J Fox was 29!)

Men aged 50 to 89 are 1.4 times more likely to be diagnosed with Parkinson's than women

Age estimates	Number estimates
50 to 59	9,000
60 to 69	28,300
70 to 79	62,400
80 to 89	43,600
90+	8,300

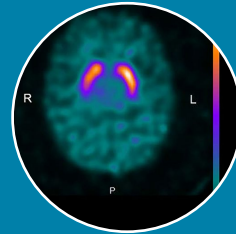
Parkinson's disease

Diagnosis

Investigation:



MRI or CT scan – used to rule out other causes. A normal result is usual in Parkinson's



DAT Scan – will show a loss of dopamine producing cells



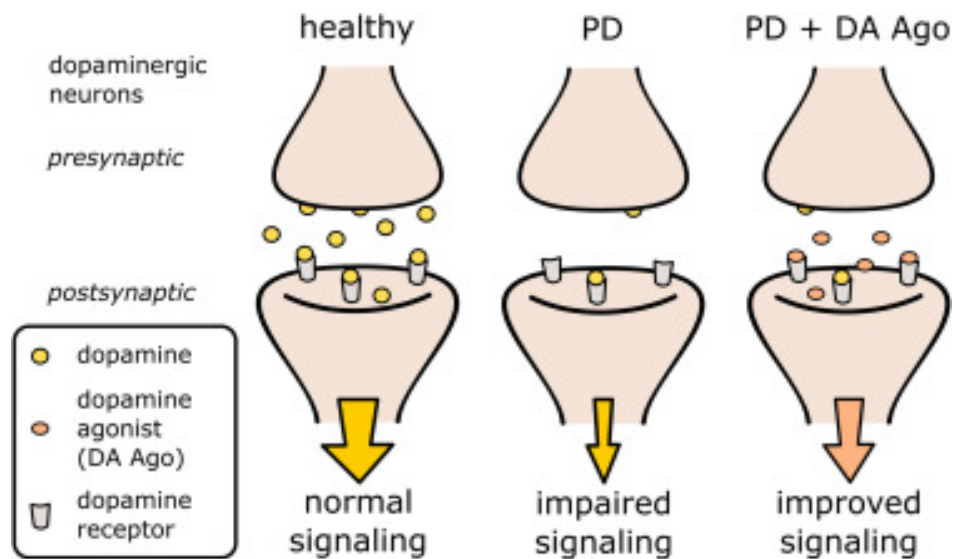
An abnormal DaTSCAN result can't give a definitive diagnosis of Parkinson's in isolation!



Parkinson's disease

Diagnosis

Medication:

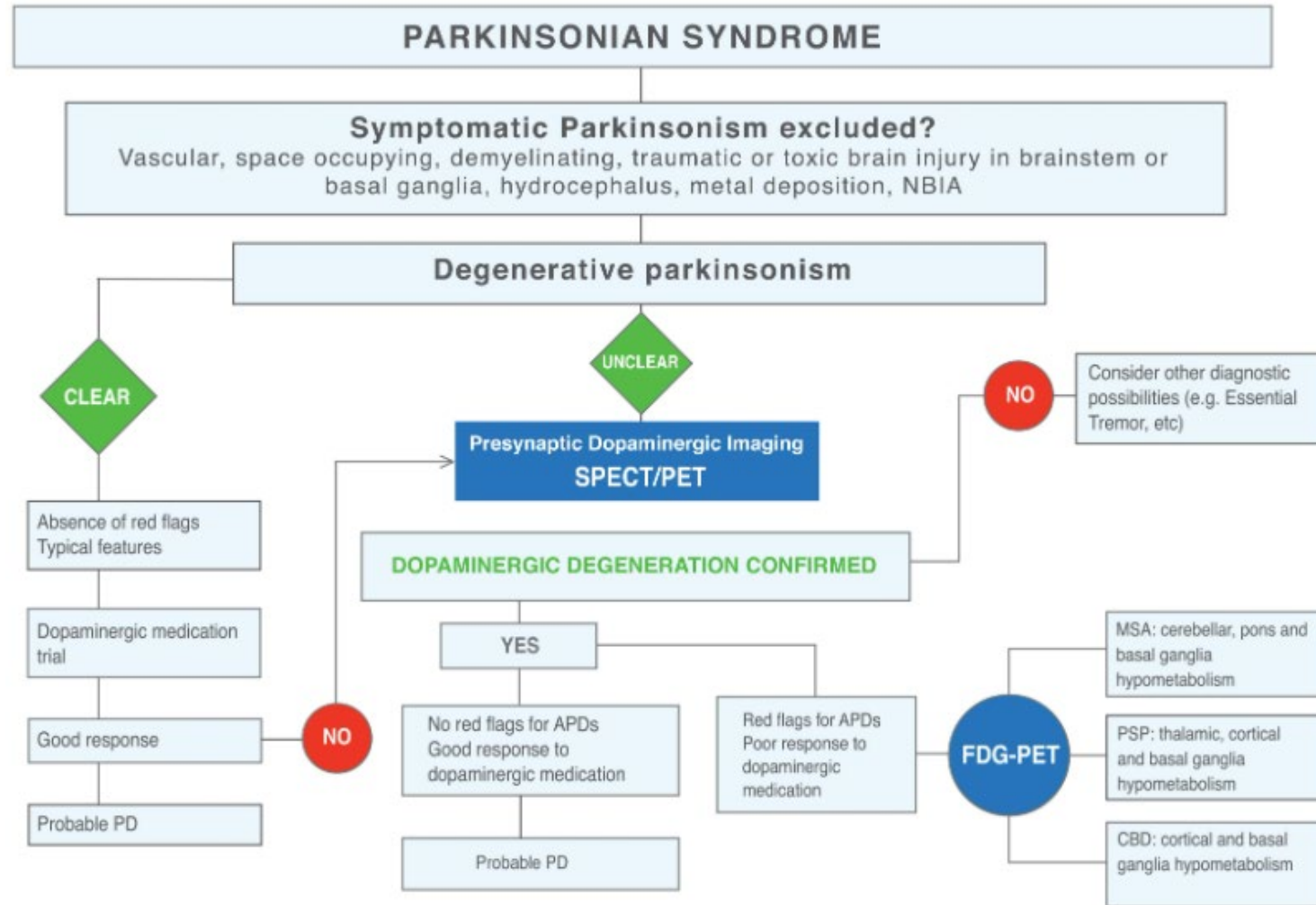


Trial of medication (Dopamine) to assess any response

A Parkinsonism may show initial response, but true PD continues to improve symptoms

Parkinson's disease

Diagnostic Criteria



Parkinson-plus syndromes

Group of neurodegenerative diseases that cause symptoms like Parkinson's disease as well as other symptoms

The Important 4:

Multiple system atrophy (MSA)

Progressive supranuclear palsy (PSP)

Dementia with lewy bodies (DLB)

Corticobasal degeneration (CBD)

Characterised by:

More rapidly progressive than PD

Early postural instability

Poor or transient response to therapy

Additional Features

supranuclear gaze palsy

early autonomic failure, cerebellar features, alien limb, apraxia (motor speech disorder)

Why Important!?

Prognosis, treatment, counselling and support

Paying a claim too early detrimental to the individuals mental health?

Parkinson's disease definition

Definitions



1999 & 2004 – Parkinson's disease [before age x].

Confirmation by a Consultant Neurologist of a definite diagnosis of Parkinson's disease [before age X].
Parkinson's disease secondary to alcohol or drug misuse is not covered.

2006 – Parkinson's disease [before age x] - *resulting in permanent symptoms.*

A definite diagnosis of Parkinson's disease [before age x] by a Consultant Neurologist.
There must be permanent clinical impairment of motor function with associated tremor, rigidity of movement and postural instability.

For the above definition the following are not covered:

- Parkinson's disease secondary to drug abuse

Parkinson's disease

Definitions



2011 – Parkinson's disease [before age x] - resulting in permanent symptoms.

A definite diagnosis of Parkinson's disease [before age x] by a Consultant Neurologist. There must be permanent clinical impairment of motor function with associated tremor, muscle rigidity and postural instability.

For the above definition the following are not covered:

- Parkinson's disease secondary to drug abuse.
- Other Parkinsonian syndromes

2014 - Parkinson's disease [before age x] - resulting in permanent symptoms.

A definite diagnosis of Parkinson's disease [before age x] by a Consultant Neurologist. There must be permanent clinical impairment of motor function with associated tremor and muscle rigidity.

For the above definition the following are not covered:

- Parkinsonian syndromes/Parkinsonism

Parkinson-plus syndromes

Definitions

Parkinson Plus Syndromes – resulting in permanent symptoms

A definite diagnosis by a **Consultant** Neurologist of one of the following Parkinson Plus syndromes:

- Multiple System Atrophy
- Progressive Supranuclear Palsy
- Parkinsonism-Dementia-Amyotrophic lateral sclerosis complex
- Corticobasal Ganglionic degeneration
- Diffuse Lewy Body disease.

There must also be **permanent** clinical impairment of at least one of the following:

- Motor function; or
- Eye movement disorder; or
- Postural instability; or
- Dementia; or
- Bladder control and postural hypotension.

Terminal Illness

Definitions

We'll pay the full amount of Life Protection, Critical Illness Protection or Combined Life and Critical Illness Protection covered if:

- You're diagnosed as being terminally ill and, in the opinion of your attending UK Consultant, your illness is expected to lead to your death within 12 months.

We'll pay the full amount of Life Protection covered if:

- You have a definite diagnosis by a UK Consultant of any illness that satisfies one of the following:

- **Parkinson-plus syndromes:** A definite diagnosis by a UK Consultant Neurologist or Geriatrician of one of the following Parkinson-plus syndromes:

- Multiple system atrophy
- Progressive supranuclear palsy
- Parkinsonism-dementia-amyotrophic lateral sclerosis complex
- Corticobasal ganglionic degeneration
- Diffuse Lewy body disease

There must also be permanent clinical impairment of at least one of the following:

- Motor function
- Eye movement disorder
- Dementia

A blurred background image showing a person in a blue shirt performing a physical therapy exercise on a balance beam. The person is leaning forward, and the beam is supported by a stand. The background is out of focus, showing what appears to be a gym or clinic setting with other people and equipment.

**What are the existing
treatment options?**

Parkinson's treatment options

Medication

Aim to increase the level of dopamine that reaches the brain and stimulate the parts of the brain where dopamine works..

Levodopa – chemical building block that your body converts into Dopamine

Dopamine agonists – act like Dopamine to stimulate nerve cells

Mao-B inhibitors – help nerve cells make better use of the Dopamine it does have, by blocking an enzyme that breaks down dopamine in your brain

COMT inhibitors – used in combination with Levodopa to block an enzyme that breaks the Levodopa down, making it more effective

Glutamate antagonists – may affect how the brain reacts to certain chemicals



Treatment options – Supportive treatments



Occupational therapy – coping strategies, time planning, gentle exercise and relaxation tips, strategies for anxiety



Physiotherapy – keeping you fit, helping to maintain independence and keep mobile, prevent/manage falls, provide pain relief, improve breathing and circulation problems



Speech and language therapy – maintaining communication ability, alternative ways of communication, recommend helpful technology



Dietary therapy – help with swallowing, constipation, food preparation, adapted cutlery/cups, choosing nutritious foods.



Complimentary therapies – Acupuncture, Alexander technique, aromatherapy, art therapy, Ayurveda, bower technique, chiropractic, kinesiology, osteopathy, reflexology, Reiki etc etc



Parkinson's Treatment Options

Deep Brain Stimulation

Currently no cure for Parkinson's Disease

Aim to reduce symptoms and maintain quality of life for as long as possible

Mainly used for those who don't respond to medication. involves implanting very fine wires with electrodes at their tips into the brain.

These are connected to extensions that are tunnelled under the skin behind the ear and down the neck. They are connected to a pulse generator (a device like a pacemaker), which is placed under the skin around the chest or stomach area.

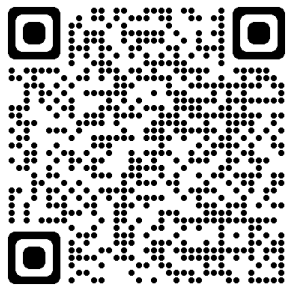
When the device is switched on, the electrodes deliver high frequency stimulation to the targeted area. This stimulation changes some of the electrical signals in the brain that cause the symptoms of Parkinson's.



What does the future hold for Parkinson's disease?

The future of Parkinson's disease

Detection and Treatment



PARKINSON'S DISEASE – CHALLENGES IN DIAGNOSIS AND MONITORING

SCORacle Newsletter - April 2024 Edition

SHARE 



As with most neurological disorders, making an accurate diagnosis of Parkinson's disease (PD) is often complicated. The standard diagnosis of PD is clinical, meaning there's no test, such as a blood test, that can give a conclusive result. Instead, certain physical symptoms need to be present to qualify a diagnosis of PD.

Because there is no conclusive screening or test, those affected with very early PD may not meet the clinical diagnosis criteria. This lack of specificity means that a diagnosis of PD can be made which over time is changed to another condition that mimics PD and studies suggest that misdiagnosis of PD occurs in 1 in 4 cases. Therefore, from an underwriting and claims assessor's perspective, PD can be particularly challenging. There are, however, some fascinating

The future of Parkinson's disease

The digital revolution



The future of Parkinson's disease

Remote Digital Measurement Opportunities

fēnix® 7 – Standard Edition



Health & Wellness Monitoring

WRIST-BASED HEART RATE (CONSTANT, EVERY SECOND)	✓
DAILY RESTING HEART RATE	✓
ABNORMAL HEART RATE ALERTS	Yes (high and low)
RESPIRATION RATE (24X7)	✓
FITNESS AGE	Yes (in app)
BODY BATTERY™ ENERGY MONITOR	✓
ALL-DAY STRESS	✓
RELAXATION BREATHING TIMER	✓
BREATHWORK	✓
SLEEP	Yes (Advanced)
NAP DETECTION	✓
HYDRATION	Yes (in Garmin Connect™ and optional Connect IQ™ widget)
WOMEN'S HEALTH	Yes (in Garmin Connect™ and optional Connect IQ™ widget)
HEALTH SNAPSHOT	✓
SKIN TEMPERATURE	✓
JET LAG ADVISER	✓

Activity Profiles

GYM	Strength, HIIT, Cardio and Elliptical Training, Stair Stepping, Floor Climbing, Indoor rowing
MULTISPORT	Triathlon, Swimming/Running
WELLNESS	Walking, Pilates, Yoga
INDOOR RUNNING	Treadmill Running, Indoor Track Running
OUTDOOR RUNNING	Running, Outdoor Track Running, Trail Running, Ultra Running, Obstacle Course
OUTDOOR RECREATION	Hiking, Indoor Climbing, Bouldering, Climbing, Hunting, Horseback Riding, Golfing, Disc Golf, Archery
CYCLING	Biking, Road biking, Mountain Biking, Gravel biking, Bike commuting, Bike touring, eBiking, eMountain Biking, Indoor Biking, Cyclocross, BMX
SWIM	Pool Swimming, Open Water Swimming
ON THE WATER	Stand Up Paddleboarding, Rowing, Kayaking, Surfing, Kiteboarding, Windsurfing, Fishing, Boating, Sailing, Sail Racing, Water Skiing, Wakeboarding, Wakesurfing, Tubing, Sailing Expedition, Whitewater, Snorkeling
MOTOR SPORTS	Motorcycling, Overlanding, Motorcycling, ATVing, Snowmobile
RACKET SPORTS	Tennis, Pickleball, Badminton, Squash, Table Tennis, Padel, Platform Tennis, Racquetball
SNOW & WINTER	Skiing, Snowboarding, Backcountry Snowboarding, XC Classic Skiing, Backcountry Skiing, Ice Skating, Snowshoeing
SPORT PROFILES	Basketball, Volleyball, Field Hockey, Ice Hockey, Soccer, Football, Lacrosse, Rugby, Ultimate Disc, Cricket, Softball, Baseball

Activity tracking features

STEP COUNTER	✓
MOVE ALERTS (DISPLAYS ON DEVICE AFTER A PERIOD OF INACTIVITY; WALK FOR A COUPLE OF MINUTES TO RESET IT)	✓
AUTO GOAL (LEARNS YOUR ACTIVITY LEVEL AND ASSIGNS A DAILY STEP GOAL)	✓
CALORIES BURNED	✓
FLOORS CLIMBED	✓
DISTANCE TRAVELLED	✓
INTENSITY MINUTES	✓
TRUEUP™	✓
MOVE IQ™	✓
GARMIN CONNECT™ CHALLENGES APP	Yes (optional Connect IQ app)

The future of Parkinson's disease

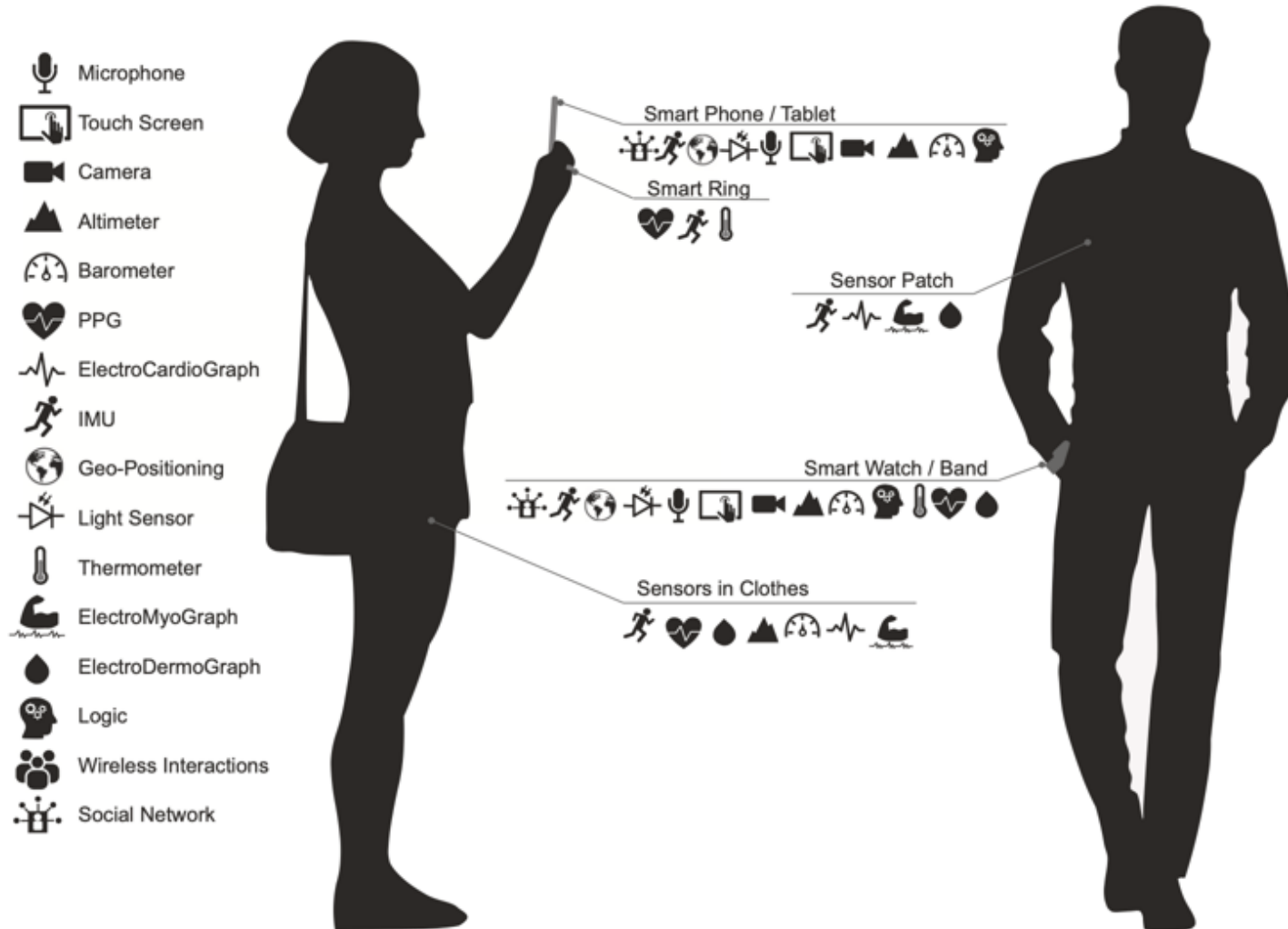
Wearable tech and digital biomarkers



Scalable
Ecologically valid
At-home remote monitoring
Suitable across diverse populations

The future of Parkinson's disease

Remote Digital Measurement Opportunities




Summary

There is a need to replace low accuracy qualitative legacy tests



Digital approaches can provide higher sensitivity and specificity and capture real world data at scale



More accurate diagnosis permits better care



Conclusions

Conclusions

Most movement disorders will have features of Parkinsonism

Most Neurologist's treat on a 'working diagnosis' – so be certain the evidence suggests a definite diagnosis

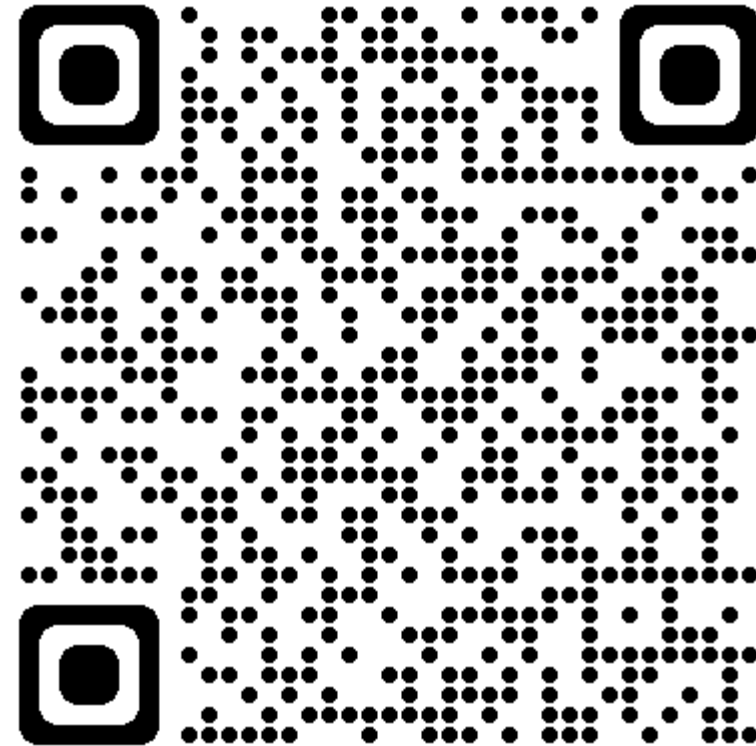
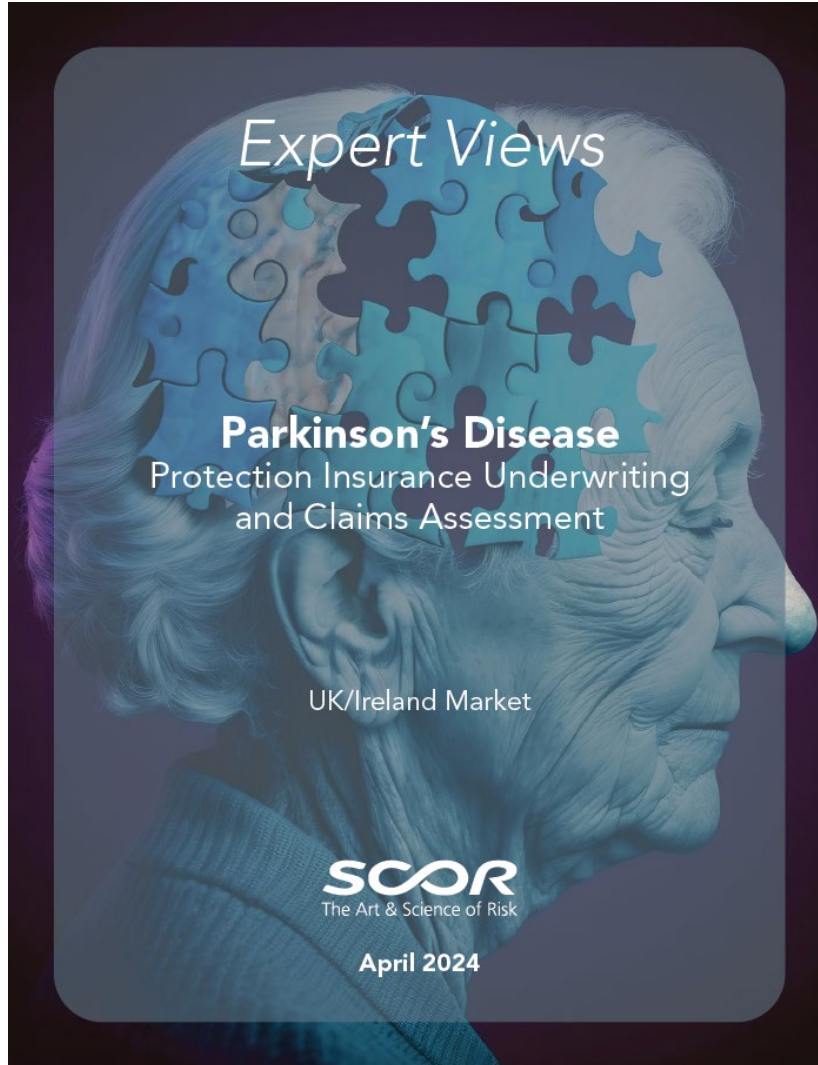
PD is differentiated to a Parkinson-plus based on the response to treatment

Being started on dopamine is not enough – this is part of the working process of elimination

Has treatment been prescribed long enough to say this was poor or transient?

Don't forget to use a CMO if unsure!

Expert Views Parkinson's disease



Thank You
Questions?

