

Remote Neurological Evaluations

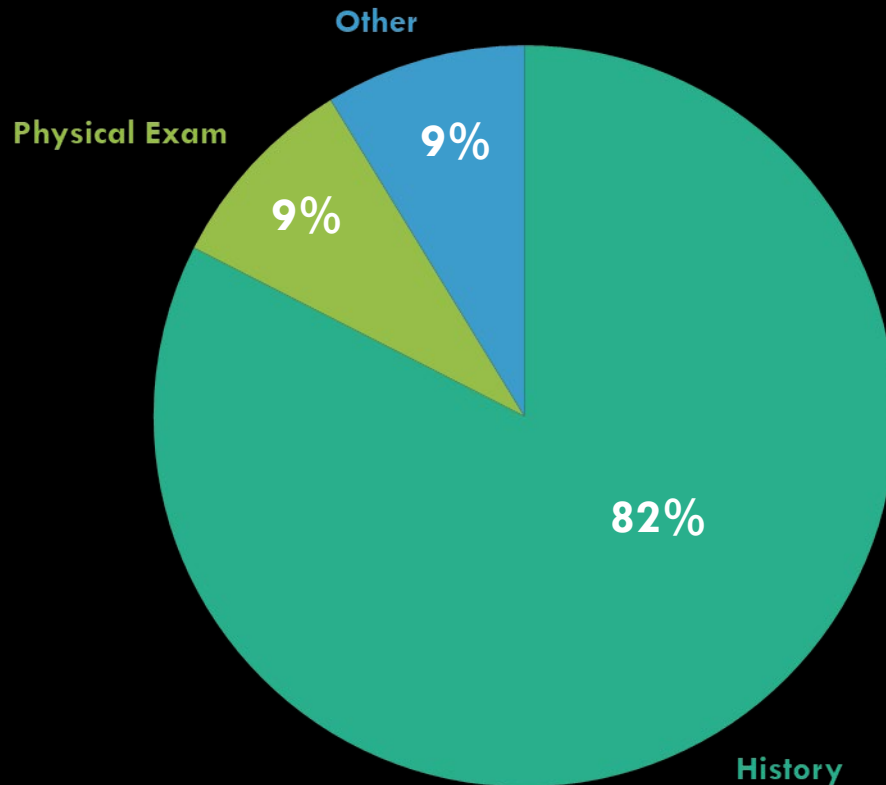
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Outline

- How diagnoses are made
- The Parkinson's example
- Other neurological conditions

Most medical diagnoses are based on history

Relative Contributions of History-taking, Physical Examination, and Laboratory Investigation to Diagnosis and Management of Medical Outpatients

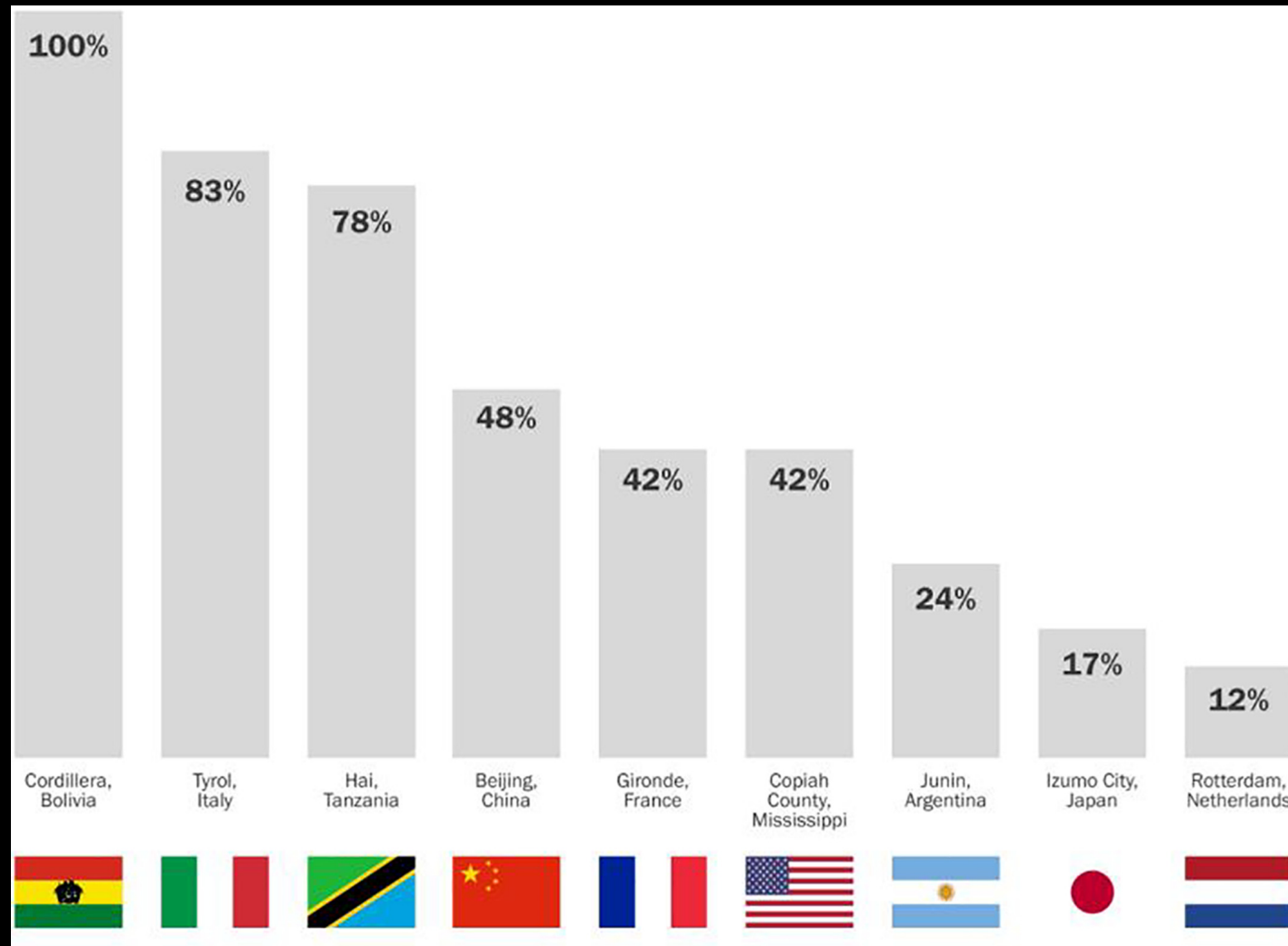


“By the medical history, physicians garner 60–80% of the information that is relevant for a diagnosis and the history alone can lead to the final diagnosis in 76%.”

-- Keifenheim et al. 2015

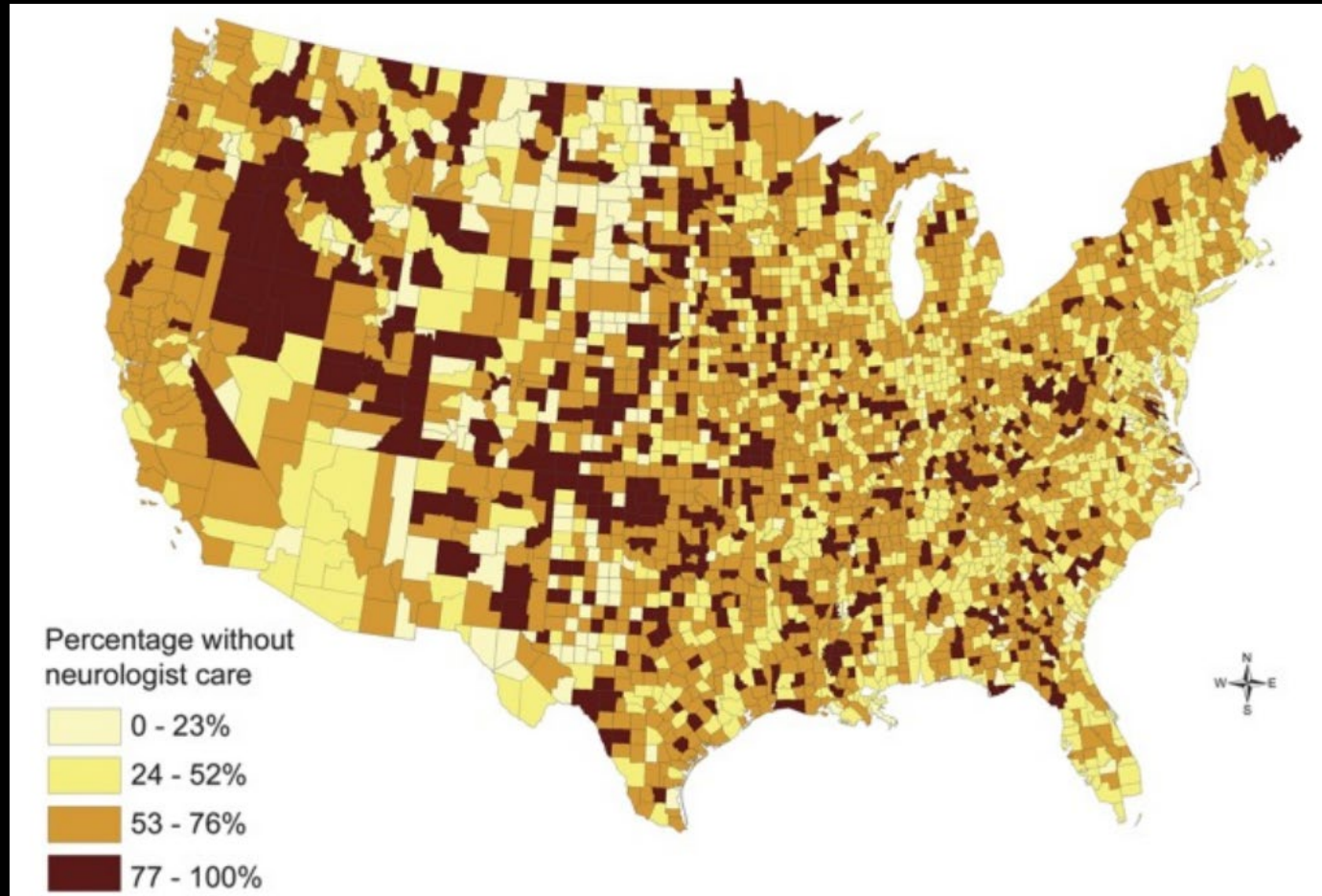
Many conditions are underdiagnosed

Proportion of people with Parkinson's disease who are not diagnosed by geography



Sources: *Movement Disorders 2020*;35; *Ending Parkinson's Disease*

A large proportion of people do not have access to specialists

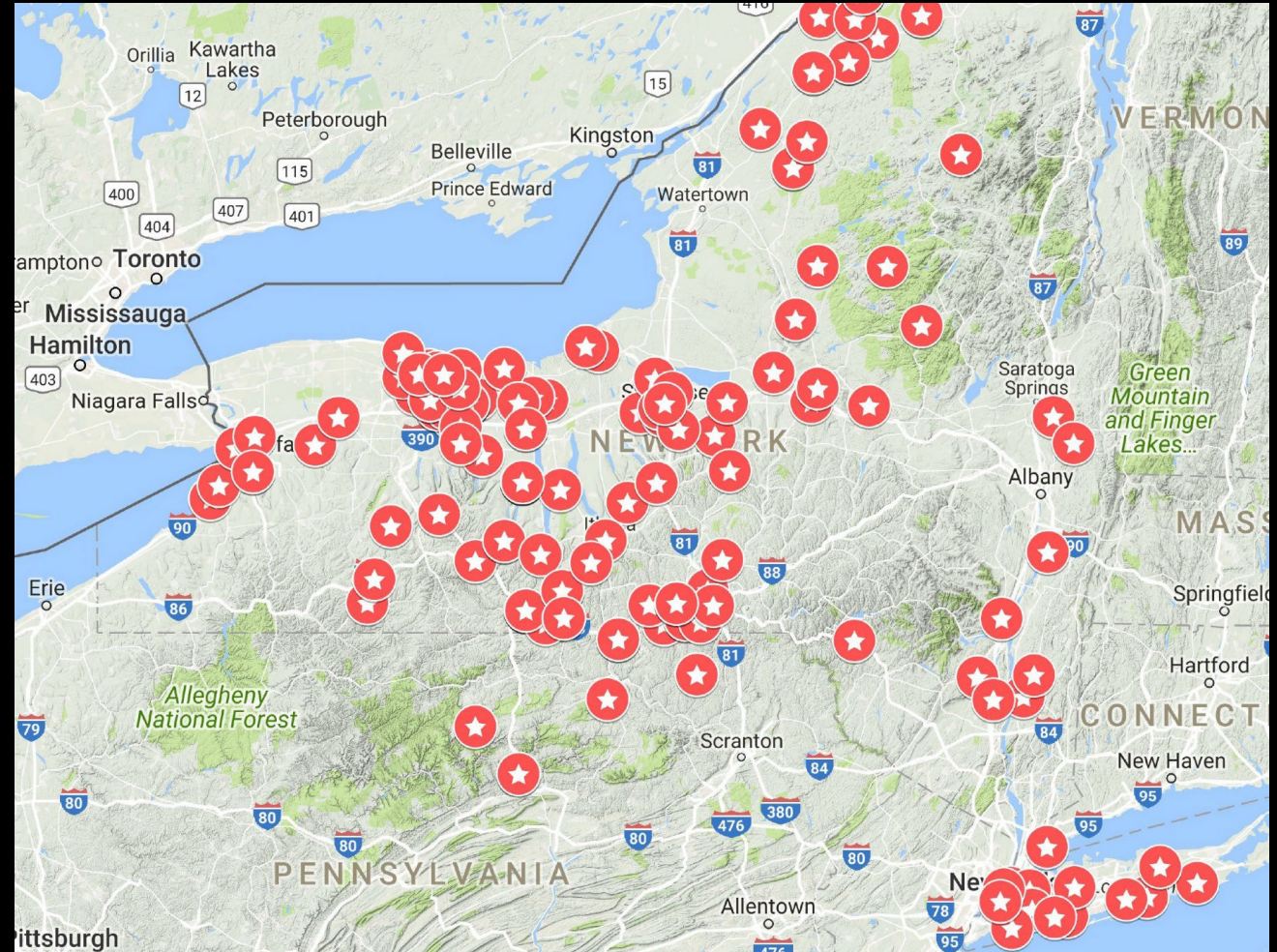


Over 40% of Medicare beneficiaries with Parkinson's disease are not seen by a neurologist within four years of diagnosis

Telemedicine brings specialists to patients

The Parkinson's Experience

- Years: 2007 – present
- Patients seen: ~5-10,000
- States: 5
- Settings: nursing homes, satellite clinics, patients' homes, parking lots, hotels
- Randomized controlled trials: 3
- Observational studies: ~5
- Proportion requiring in-person evaluation: <5%



The remote neurological exam is feasible but not as good as in person

Mental status	• Orientation: State date. • Language and recent memory: Ask a question about recent events (e.g., pandemic). Assess fluency of speech and any obvious receptive or expressive aphasia or confusion. • Attention: Count backward from 100 by 7's.
Cranial nerves	• Pupils: Observe for symmetry then reaction to light by having the patient cover and uncover each eye independently. • Eye movements: Look in the nine cardinal positions of gaze with brief pause at each position. • Saccades: Alternate gaze between upper right and left corner of screen, and then just above and below the screen. • Facial strength: Lift eyebrows, squeeze eyes shut, show teeth, and purse their lips, observing for any asymmetry. • Speech: Comment on dysarthria or dysphonia. • Neck flexion: Turn head right and left and then shrug shoulders. • Tongue: Observe the tongue at rest for bulk and fasciculations, then stick out tongue and move side to side.

Motor exam	• Assess muscle bulk in upper and lower limbs • Observe for abnormal movements in the limbs • Assess for pronator drift and forearm rolling • As a basic assessment of symmetric antigravity power, have the patient move through a full range of motion in both upper and lower limbs • Perform 10 body-weight squats and unilateral heel raises (can be performed with gait assessment)
Sensory	• Specific regions to test depend on reason for referral and sensory complaints (e.g., assessing a specific peripheral nerve distribution). As a general screen: Ask the patient to compare light touch (or cold using ice) on the index fingers of both hands and the top of the big toes.
Coordination	• Rapid-alternating, finger-to-nose (or finger-to-object), and heel-to-shin movements • Bradykinesia testing with finger tapping and opening/closing fist
Gait	• Observe stance and ability to stand with feet together • Observe gait, and ability to walk in tandem

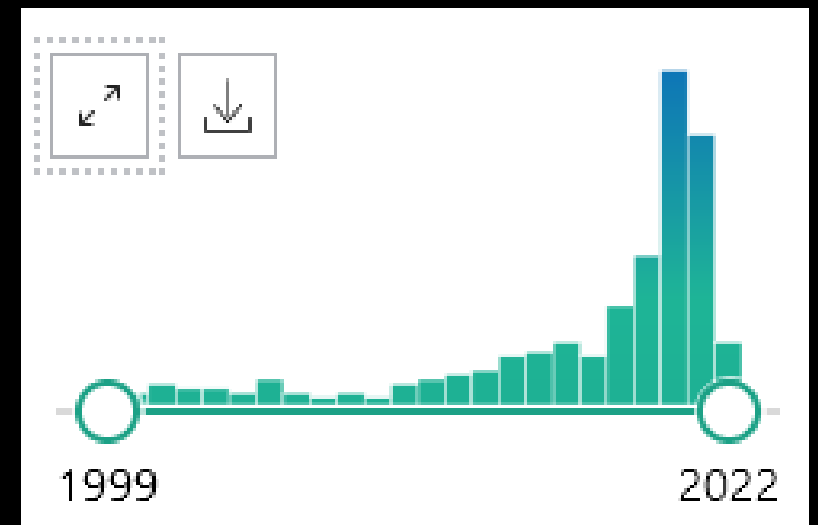
Despite the limitations, telemedicine has transformed acute stroke care since 1999



Teleneurology has since spread across ~all subspecialties especially since COVID-19

Subspecialty	Studies
Concussion/traumatic brain injury	74
Dementia	233
Epilepsy/status epilepticus	101
Headache	33
Inpatient	17
Movement	177
Multiple Sclerosis	73
Neuromuscular	45

Teleneurology studies, 1999 – 2022



Telemedicine offers many benefits that are applicable to disability evaluations

