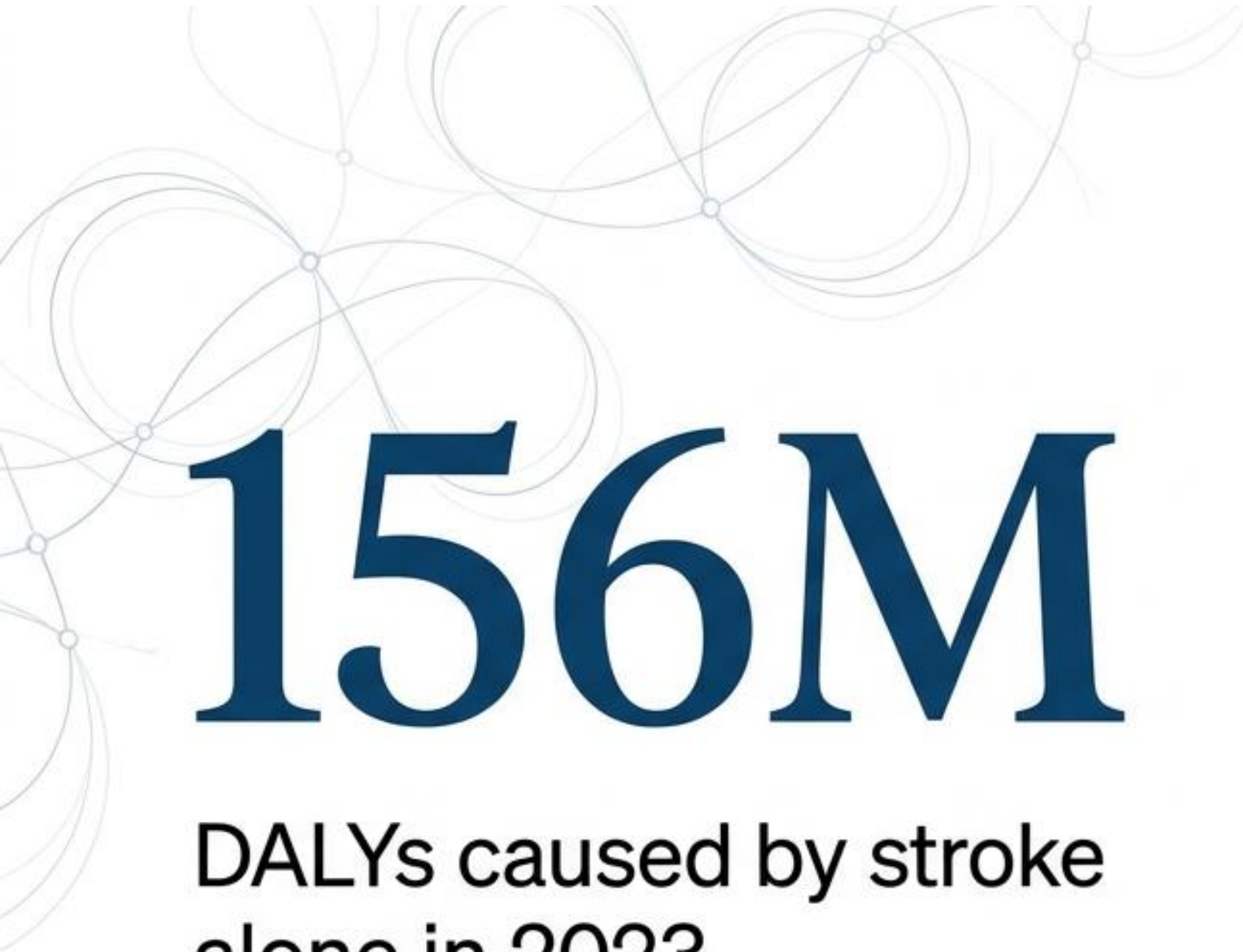


Telemedicine and Digital Health in Neurorehabilitation

Expanding access, enhancing outcomes

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156M

DALYs caused by stroke
alone in 2023

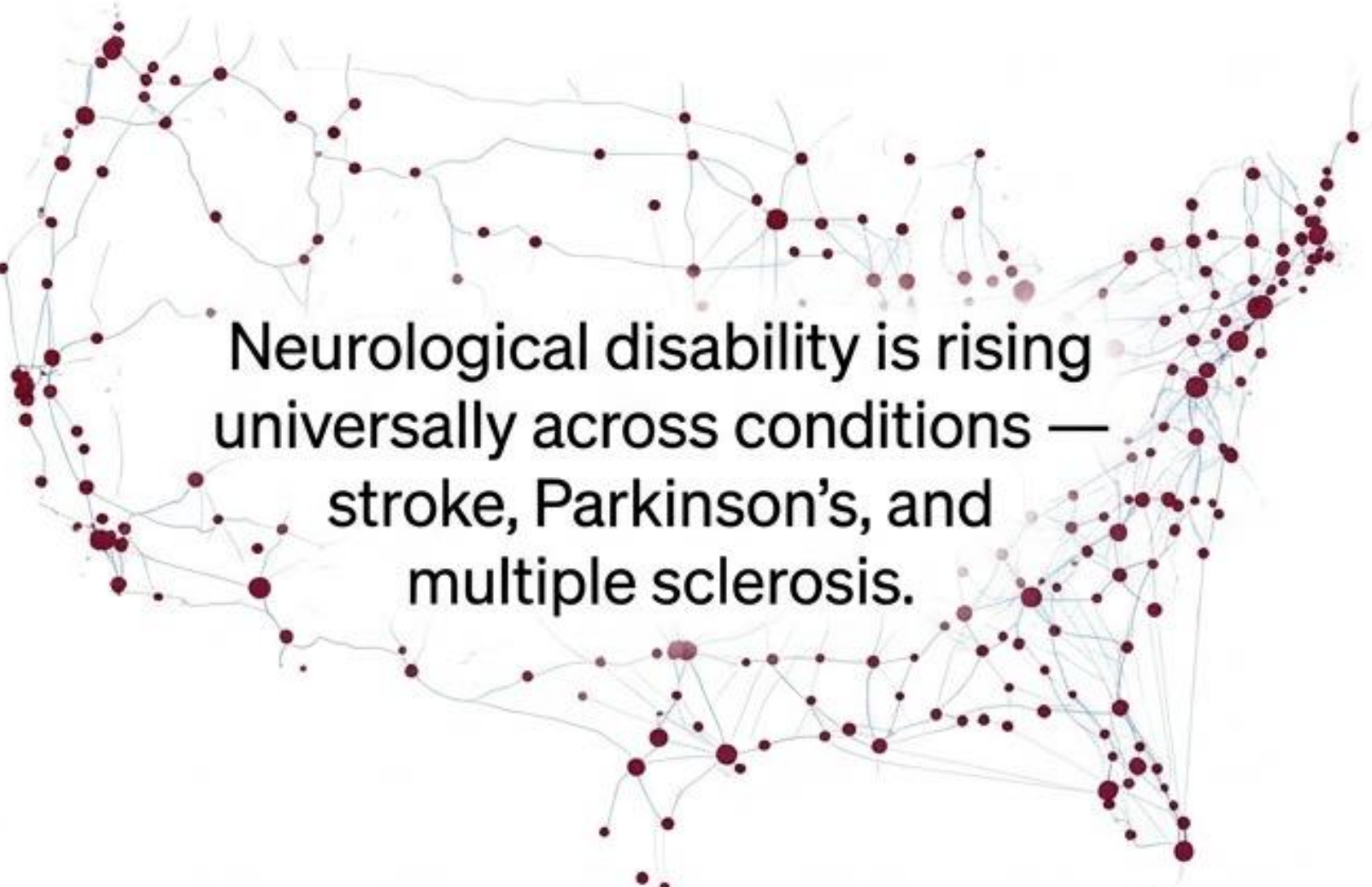
The 3rd leading cause of global disease burden.

+274%

Rise in global Parkinson's
disease prevalence, 1990–2021

Exploding from 3.15M to 11.77M cases.

The Demand



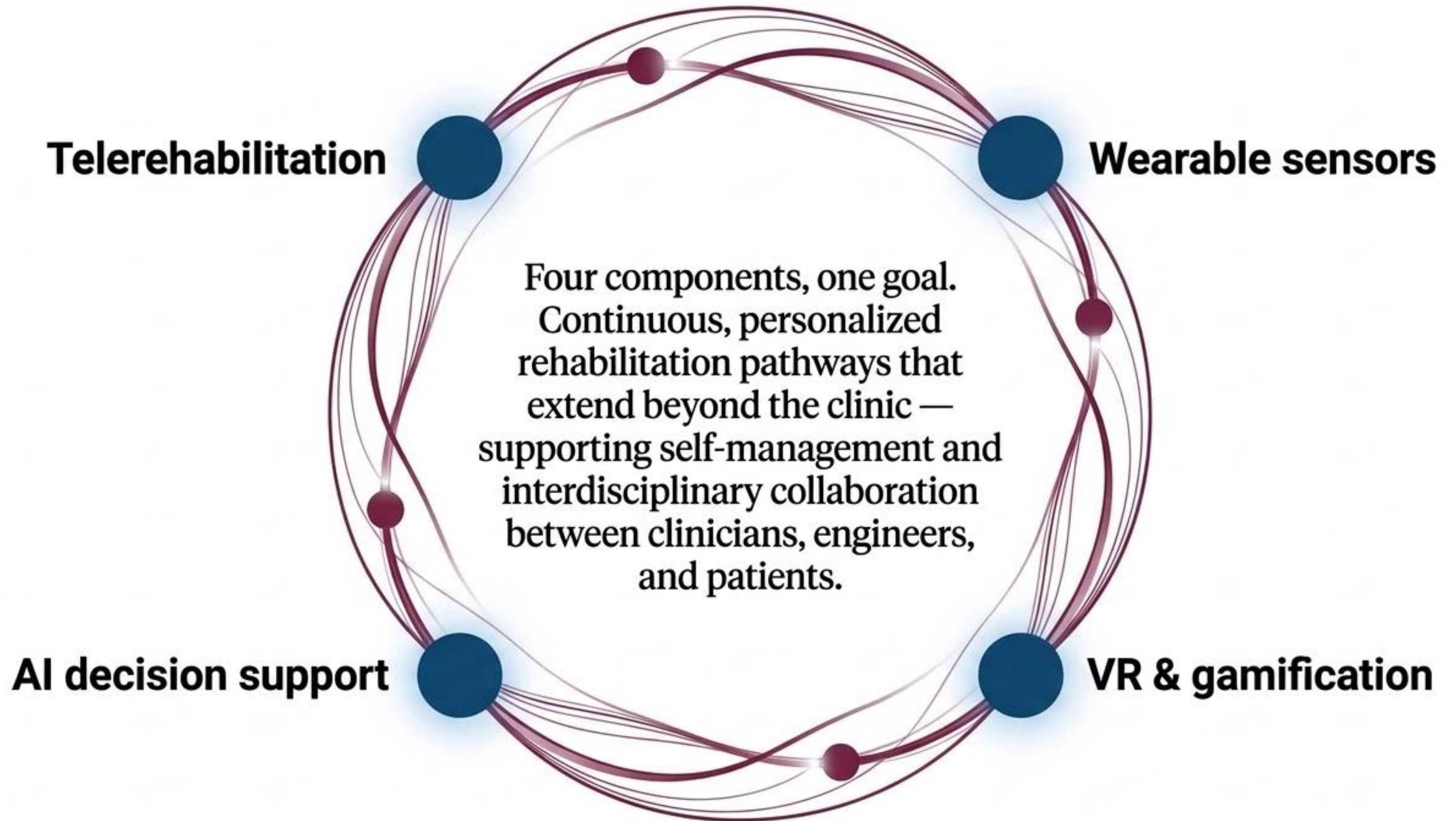
Neurological disability is rising universally across conditions — stroke, Parkinson's, and multiple sclerosis.

The Supply



Specialist rehabilitation remains concentrated in urban, well-resourced centers.

The gap between widespread need and concentrated care demands a new infrastructure.



Evidence Profile: Effectiveness Across Clinical Domains

Outcome Domain	Certainty (GRADE)	Representative Gains vs. Conventional Therapy
Upper-limb motor function	 Moderate	Fugl-Meyer score up to +11 points
Balance and gait	 Moderate	Berg Balance Scale +5 to +8 points
Activities of daily living	 Low	
Cognition & engagement	 Low	
Usability & adherence	 Very low	



Stroke

Intervention:

AI-adaptive VR therapy.

Outcome:

Significant gains across all motor outcomes.

Barthel Index improved ~25 points. (Bai et al., 2022).



Parkinson's disease

Intervention:

Gamified VR balance training.

Outcome:

Improved balance and quality of life vs. conventional therapy.

Berg Balance Scale improved by 5.8 points. (Ali et al., 2023).



Multiple sclerosis

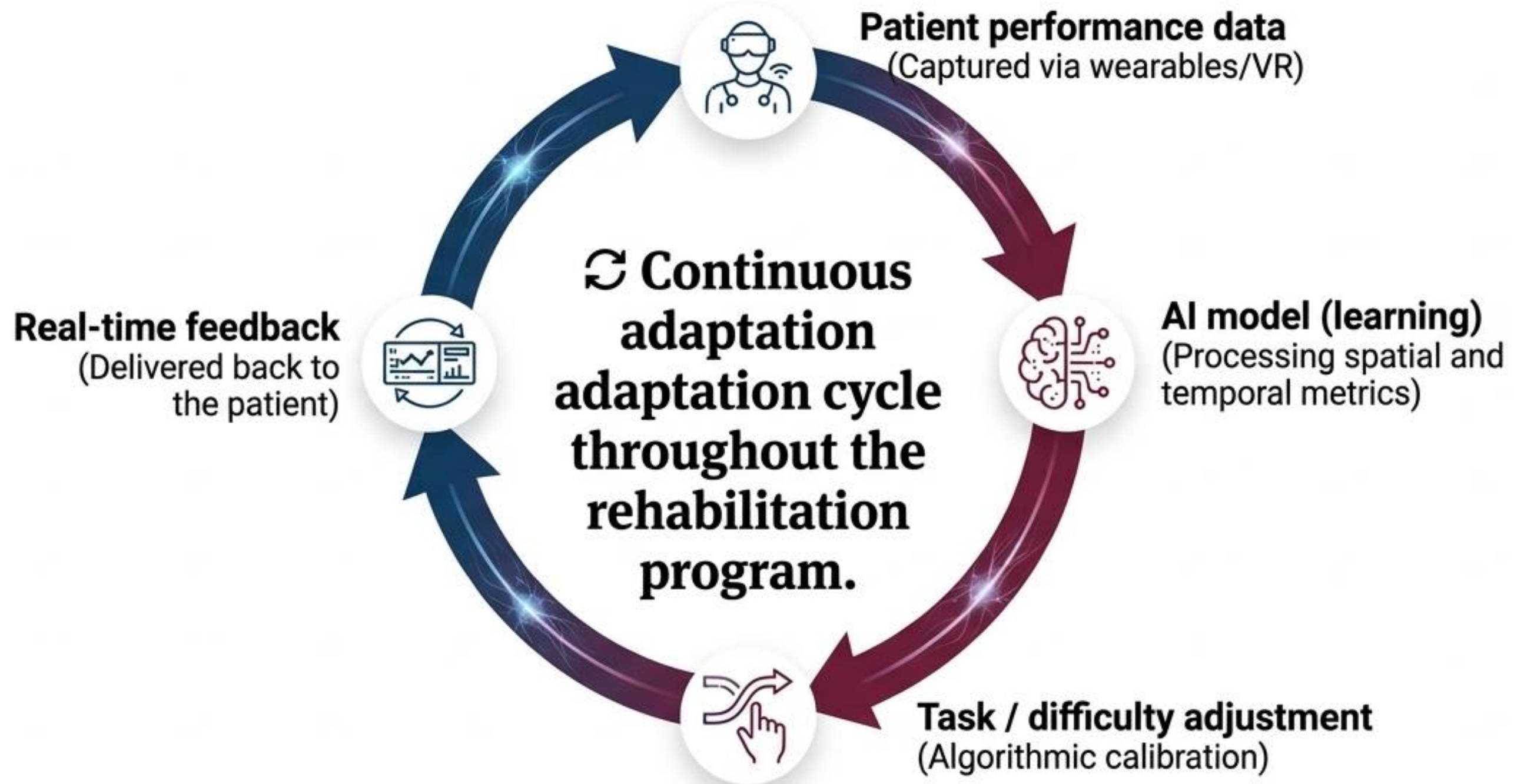
Intervention:

VR-based cognitive telerehabilitation.

Outcome:

Highly significant cognitive and mood benefits.

Mental quality-of-life scores raised by 20.5 points ($p < 0.001$). (Maggio et al., 2023).



Chen et al. (2024): A GAN-based difficulty engine correlated strongly with real patient data ($r = 0.74$), enabling automated task calibration.

Pelosi et al. (2024): A reinforcement-learning model adapted reaching tasks in real time based on patient spatial performance.

“Equity as a design requirement, not an add-on: a telehealth solution that assumes reliable broadband or a capable device simply fails the patients who need it most.”

— WHO/Europe, Regional Digital Health Action Plan (2026)



Broadband & device access

Hardware ownership and high-speed network availability.



Digital confidence and training

Particularly critical for older patient demographics.



Socioeconomic disparities

Cost barriers to remote care ecosystems.



Rural / geographic isolation

The paradox of digital care missing the most remote patients.

The Systemic Challenge: Scaling Beyond Borders

For technology leaders, fragmented regulation is not only a compliance issue — it is a scalability risk that shapes deployment timelines and market entry.

Data privacy & security

Patient-generated data from wearables and remote monitoring raises massive consent, storage, and cross-border transfer questions.

Licensure & workflow integration

Cross-jurisdiction licensure and integration into existing, rigid clinical workflows remain leading barriers to scale.

Reimbursement uncertainty

Inconsistent reimbursement models slow adoption even where clinical effectiveness is fully established.

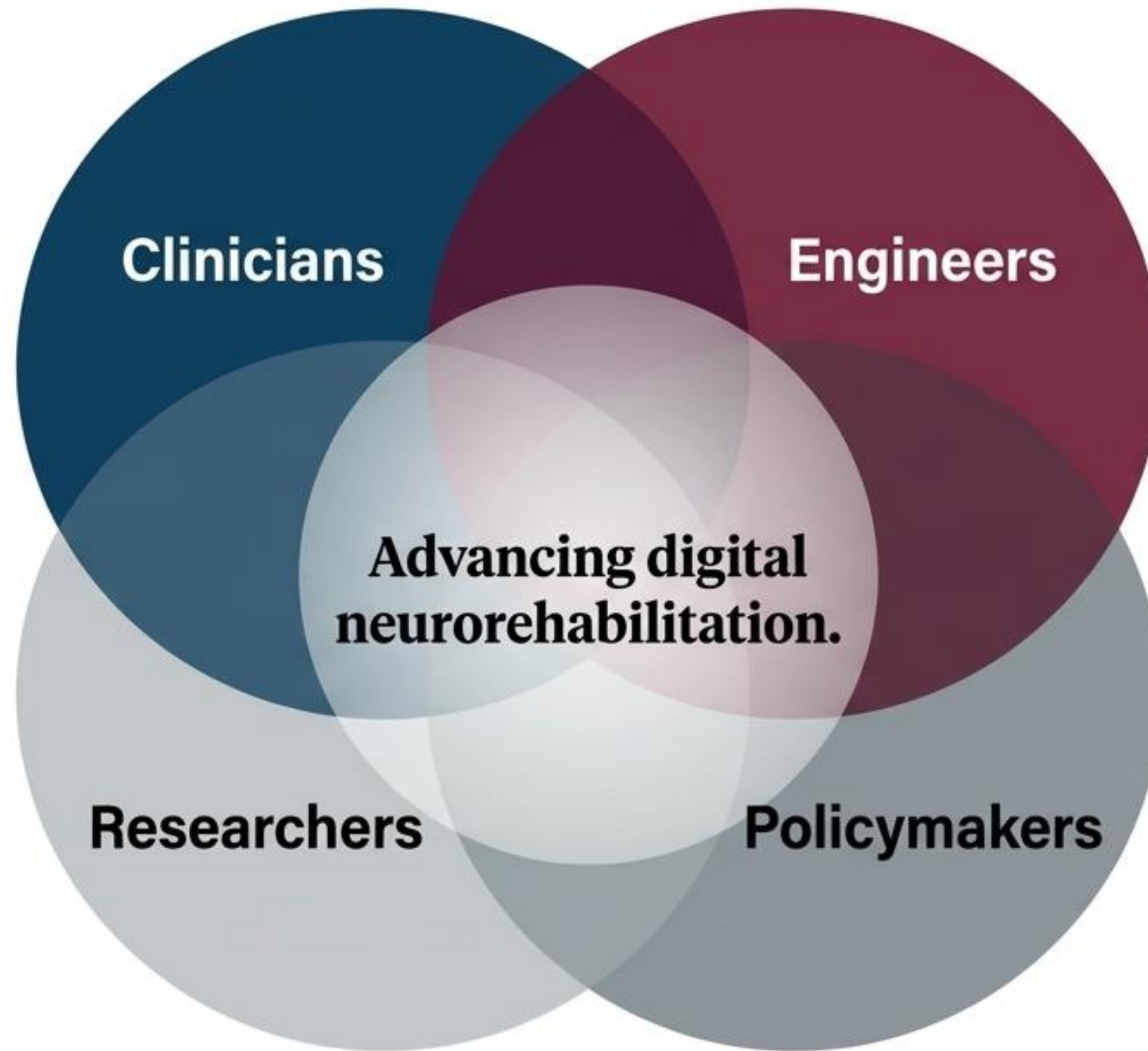
Fragmented regulation

Lack of harmonized global standards for AI-driven clinical software.



Seamless data exchange

Integrated systems that connect clinic, home, and analytics can transform patient-generated data into actionable clinical insight — supporting more accessible, patient-centered, and data-driven rehabilitation at scale.



Advancing digital neurorehabilitation requires collaboration, not isolation.
Reaping the rewards from intelligent, sustainable networks demands every voice in this room.

Thank You / Discussion

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