



Ministero della Salute – Direzione Generale della Ricerca e dell’Innovazione in Sanità

Rendiconto 5 per mille ANNO 2023

Contributo percepito € 2.058.872,63 In data 2 ottobre 2024

Ente della Ricerca Sanitaria

Denominazione Ente: Fondazione Italiana Sclerosi Multipla ETS

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BTTMLB54T29D969Z Domiciliato per la carica presso la sede legale di cui sopra

**Titolo del progetto: FASE PILOTA Progetto BRAIN-KIDS:
Behavioral and Rehabilitative Assessment and Intervention
for Key Impairments in Demyelinating Syndromes**

Data di inizio progetto: 01/11/2025	Data di fine progetto: 31/10/2027
Fondi 5 per mille assegnati al progetto: € 100.000,00	Di cui: Quota sostenuta entro l’anno di rendicontazione: € Quota accantonata, da sostenere, per progetti pluriennali (durata massima tre anni): € 100.000,00

VOCI DI SPESA	Quota sostenuta entro l'anno di rendicontazione	Quota accantonata, da sostenere, per progetti pluriennali (durata massima tre anni)
Personale di ricerca (borsista, a contratto e di ruolo in quota parte)		€ 90.000,00
Apparecchiature (ammortamento, canone di locazione/leasing)		
Materiale d'uso destinato alla ricerca (per laboratori di ricerca, acquisto farmaci ecc.)		
Spese di organizzazione (manifestazioni e convegni, viaggi e missioni ecc.)		€ 10.000,00
Elaborazione dati		
Spese amministrative		
Altro (indicare quali)		
TOTALE		€ 100.000,00

Data
15 luglio 2025

Il Responsabile del Progetto

Il Legale Rappresentante



Si autorizza al trattamento dei dati ai sensi del d.lgs. 196/2003

Il Legale Rappresentante



FASE PILOTA Progetto BRAIN-KIDS: Behavioral and Rehabilitative Assessment and Intervention for Key Impairments in Demyelinating Syndromes

Pediatric-onset multiple sclerosis (POMS), neuromyelitis optica spectrum disorder (NMOSD), and MOG antibody-associated disease (MOGAD) are rare autoimmune demyelinating conditions affecting children and adolescents. Cognitive impairment is a frequent but under-addressed consequence in POMS (30-50%) and has recently been reported in pediatric NMOSD and MOGAD, with adverse impacts on academic performance, psychosocial development, and quality of life. There is a critical need for accessible, engaging, and age-appropriate tools to support cognitive screening and rehabilitation in this population.

BRAIN-KIDS is a pilot project aiming to adapt and test two digital solutions-DIGICOG-MS and COGNITRACK-originally developed and validated for adults with MS, to meet the cognitive assessment and rehabilitation needs of children and adolescents aged 8-18 years with POMS, NMOSD, or MOGAD.

DIGICOG-MS is a mobile health application (app) designed for remote, self-administered cognitive assessment in people with MS. It includes short, interactive tasks targeting visuospatial memory, verbal memory, semantic fluency, and information processing speed. In a recent validation study involving 92 adults with MS, strong correlations were observed between DIGICOG-MS scores and traditional paper-based neuropsychological tests (Pearson's $r = 0.58-0.78$; $p < 0.001$), with excellent test-retest reliability (intraclass correlation coefficients > 0.80) and high usability (SUS = 84.5; MAUQ = 104). DIGICOG-MS is accessible via smartphones and tablets and incorporates a speech-recognition AI algorithm for verbal tasks. For pediatric use, DIGICOG-MS will be redesigned with gamified visuals, adaptive timing, and child-friendly instructions, ensuring both usability and developmental appropriateness.

COGNITRACK is a desktop-based cognitive rehabilitation platform developed to provide home-based, adaptive training in memory and attention. The system allows neuropsychologists to configure individualized treatment protocols based on baseline cognitive assessments. It employs automatic difficulty adjustment algorithms, ensuring real-time adaptation to the patient's performance. In a randomized pilot trial involving 28 adults with MS, participants undergoing adaptive training with COGNITRACK showed significant improvements in verbal memory, delayed recall, semantic fluency, attention, and processing speed compared to those in the non-adaptive control group. The study reported an adherence rate of 84% and high perceived usability. For BRAIN-KIDS, COGNITRACK will be redeveloped as a web-based application with gamified modules, simplified navigation, and integration with DIGICOG-MS for real-time monitoring and AI-based personalization.

Study Design

The pilot will be conducted in a specialized pediatric neurology and rehabilitation center in Italy. A total of 30 children and adolescents with POMS, NMOSD, or MOGAD will be enrolled (15 per site). Participants will complete a 6-week program involving weekly DIGICOG-MS selfassessments and five weekly COGNITRACK training sessions. Outcome measures will include cognitive performance (SDMT-C, CVLT-C, BRIEF-2), usability and adherence rates. DIGICOG-MS will also generate longitudinal cognitive profiles to inform the optimization of COGNITRACK training protocols.

Expected Outcomes

We expect high feasibility (>80% adherence), high usability scores, and post-intervention improvements in memory, attention, and processing speed. DIGICOG-MS will enable timely detection of cognitive decline, while COGNITRACK will offer accessible, effective rehabilitation tailored to the needs of pediatric patients with demyelinating disorders. Innovation and Impact BRAIN-KIDS will be the first integrated, digital, AI-enhanced platform for cognitive care in pediatric demyelinating conditions. The solution is scalable, home-based, and developmentally sensitive, reducing geographic and logistic barriers to care while promoting autonomy and early intervention