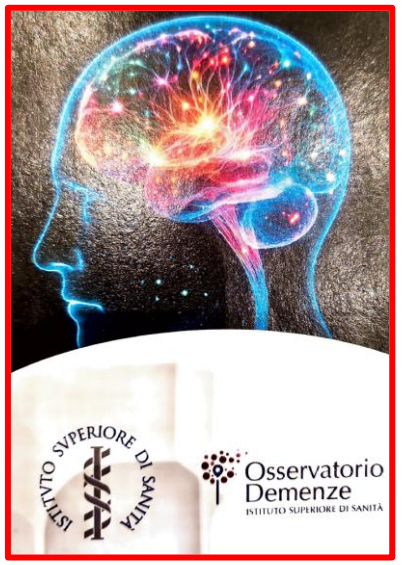
XVIII Convegno

I CENTRI PER I DISTURBI COGNITIVI E LE DEMENZE E LA GESTIONE INTEGRATA DELLA DEMENZA

27 – 28 novembre 2025

Aula Pocchiari, Istituto Superiore di Sanità
Viale Regina Elena 299, Roma



Le prestazioni di telemedicina nei PDTA delle demenze

Il modulo della demenza

Caffarra Paolo
Già responsabile UO Demenze, AOU, Parma
Membro esperto del tavolo Demenze-Ministero della Salute

...la storia

2010: istituzione di un tavolo di lavoro da parte del Ministro pro-tempore Prof. Fazio con successiva creazione dei presupposti abilitanti alla diffusione di servizi di telemedicina...

Ministero della Salute

DIPARTIMENTO DELLA PROGRAMMAZIONE E DELL'ORDINAMENTO
DEL SERVIZIO SANITARIO NAZIONALE
DIREZIONE GENERALE DEL SISTEMA INFORMATIVO
E SATISTICO SANITARIO
Ufficio III ex DGSI
Viale Giorgio Ribotta, 5 - 00144 Roma

Presidenza del Consiglio dei Ministri
CSR 0000372 A-4.23.2.10
del 29/01/2014

8848225

Ministero della Salute
DGSISS
0001147-P-28/01/2014

133584107

Alla Segreteria della Conferenza
Permanente per i rapporti tra lo Stato,
le Regioni e le Province Autonome
Via della Stamperia, 8
00187 ROMA

E.p.c.:

All'Ufficio di Gabinetto
SEDE

Oggetto: Intesa tra il Governo, le regioni e le Province autonome di Trento e di Bolzano sul documento recante "Telemedicina – Linee di indirizzo nazionali".
Intesa ai sensi dell'articolo 8, comma 6, della legge 5 giugno 2003, n. 131.

Art. 4 : invarianza finanziaria

Molte Regioni/PA hanno già avviato numerose esperienze in tal senso, in logica *hub-spoke*, in particolare:

- trasmissione dei tracciati ECG ai centri *hub* cardiologici per refertazione o *second opinion*;
- trasmissione dei parametri vitali rilevati sulle ambulanze alle Unità di Pronto Soccorso per anticipo del monitoraggio paziente;
- trasmissione immagini da Pronto Soccorso a *stroke-unit* per indicazione terapeutica;

Controllo di patologie di particolare rilievo: cardiovascolari, respiratorie, endocrinologiche/metabolismo, autoimmuni, rare, psichiatriche, disabilità, patol.di interesse chirurgico

0018435-17/11/2020-GAB-MDS-A - Allegato Utente 2 (A02)

Allegato A all'Accordo Stato-Regioni

All. A

Ministero della Salute

INDICAZIONI NAZIONALI PER L'EROGAZIONE DI PRESTAZIONI IN TELEMEDICINA

27 ottobre 2020

Versione 4.4

Presidenza del Consiglio dei Ministri

CONFERENZA PERMANENTE PER I RAPPORTI
TRA LO STATO, LE REGIONI E LE PROVINCIE AUTONOME
DI TRENTO E DI BOLZANO

Accordo, ai sensi dell'articolo 4, comma 1, del decreto legislativo 28 agosto 1997, n. 281, sul documento recante "Indicazioni nazionali per l'erogazione di prestazioni in telemedicina".

Repertorio atti n. 215/CSR del 17 dicembre 2020

Le opportunità della Telemedicina

Equità di accesso (?)
Migliore qualità dell'assistenza/continuità della cura
Contenimento della spesa
Prevenzione secondaria (diabete…)
Diagnosi
Riabilitazione
Monitoraggio

Pz cronici in Italia: 40% della popolazione

…avvertenze

- Interazione ridotta con i pazienti più gravi
- Possibile aumento di diseguaglianze sociali nella possibilità di accesso a questi servizi
- Occorre un approccio innovativo per recuperare la quota di familiari e di pz ancora diffidenti (rifiuto delle nuove tecnologie)
- Variabilità dei risultati nella popolazione anziana e con connessione lenta

Documento **ANALITICO** sul modello orientativo di erogazione della **TELEVISITA**

AGGIORNAMENTO 5.3

AGENZIA NAZIONALE
PER I SERVIZI SANITARI REGIONALI

Definizione delle prestazioni erogate

Documento **ANALITICO** sul modello orientativo di erogazione del **TELEMONITORAGGIO** e del **TELECONTROLLO**

AGGIORNAMENTO 5.2

Da tale definizione di Televisita si evidenziano in particolare le seguenti due espressioni ad essa riferite:

- *"... atto medico in cui il professionista interagisce a distanza in tempo reale con il paziente, anche con il supporto di un caregiver".*
- *"... non può essere mai considerata il mezzo per condurre la relazione medico-paziente esclusivamente a distanza, né può essere considerata in modo automatico sostitutiva della prima visita medica in presenza. Il medico è deputato a decidere in quali situazioni e in che misura la Televisita può essere impiegata in favore del paziente".*
- *"... limitata alle attività di controllo di paziente la cui diagnosi sia già stata formulata nel corso di visita in presenza".*

Telecontrollo: viene utilizzato per monitorare a distanza l'andamento di una condizione clinica perlopiù stabile, come tipico delle patologie croniche. Può essere attivato anche senza diagnosi confermata a scopo preventivo. Le responsabilità degli operatori sanitari sono simili a quelle del controllo ambulatoriale, con attività periodiche basate su un piano personalizzato. I dati possono essere raccolti in vari modi, preferibilmente tramite sistemi Internet of Things (IoT) certificati. Il servizio non richiede trasmissione e risposta in tempo reale, poiché le condizioni monitorate non evolvono rapidamente. Il vantaggio operativo del Telecontrollo, oltre a ottimizzare tempi e risorse, è la possibilità di raccogliere più dati utili, migliorando l'oggettività, la precisione delle misurazioni e la valutazione complessiva della condizione clinica e psicosociale del paziente.

Telemonitoraggio: è destinato a patologie già diagnosticate e a rischio di evoluzione rapida. Richiede trasmissione e gestione dei dati in tempo reale e dispositivi digitali in grado di funzionare anche offline per garantire la sicurezza del paziente in ogni circostanza. Il vantaggio operativo del Telemonitoraggio, oltre a diminuire la necessità di spostamento del paziente, consiste nel poter eseguire verifiche della situazione clinica ed erogare conseguenti risposte terapeutiche e assistenziali a distanza, in modo oggettivo e con accuratezza e maggiore tempestività.

Glicemia, PA, ECG/fibrillazione, BPCO/saturazione

Teleconsulto: contatto fra gli specialisti del CDCD e il MMG per valutare sia la sicurezza che l'efficacia della terapia (…*tratto QTc*…).

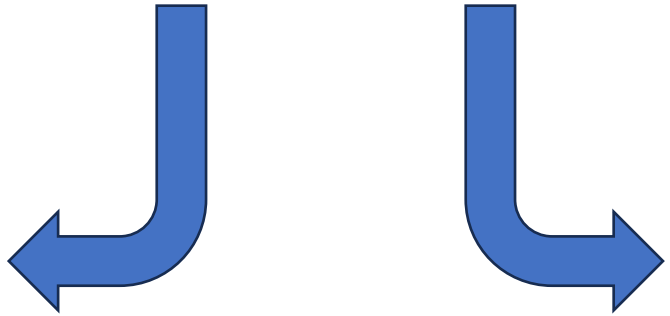
Teleconsulenza: scambio di pareri tra il personale socio-sanitario dell'Assistenza Domiciliare Integrata e gli specialisti del CDCD ed il MMG

Teleassistenza: gestita da infermiere/fisioterapista/logopedista…

Telerefertazione

Telemedicina

teleneurologia



teleneuropsicologia

Home Video Visits: Two-Dimensional View of the Geriatric 5 M's

Lauren R. Moo, MD

J Am Geriatr Soc, 2020

…contro la diffidenza

Telehealth visits: «Patient-Centered approach to care that can reveal things that in-person clinic visits may miss»

"There are additional benefits to the video-to-home format for medication reconciliation. For example, the family does not have to guess the name of a new medication another doctor recently prescribed. They can go grab the pill bottle and read it or hold the label up to the camera"

"…modern version of house calls"

Table 1. The GERIATRIC 5*Ms*

GERIATRIC 5*Ms**	DESCRIPTION
Mind	• Mentation • Dementia • Delirium • Depression
Mobility	• Impaired gait and balance • Fall injury prevention
Medications	• Polypharmacy, deprescribing • Optimal prescribing • Adverse medication effects and medication burden
Multicomplexity	• Multimorbidity • Complex biopsychosocial situations
Matters most	• Each individual's own meaningful health outcome goals and care preferences

*A French version was also developed by José Morais from McGill University in Montreal, Que: *mental, mobilité, médication, multi-pathologie, mes motivations.*
Adapted from Molnar et al.[1]

TELEMEDICINE AND COVID-19 IMPLEMENTATION GUIDE

AMERICAN ACADEMY OF NEUROLOGY®

Updated April 10, 2020

The AAN developed this guidance for clinicians and practices looking to implement telemedicine services amid the COVID-19 crisis. Regulations discussed below have effective dates of March 1, 2020[1], for the duration of the Public Health Emergency as determined by the Department of Health and Human Services (HHS). Because of the unique nature of a Public Health Emergency, some guidance may not align with the AAN's overall Telemedicine Position, which was created in and intended for non-emergency periods.

Tips on Performing the Adult Neurologic Exam

- **General appearance:** By inspection via video
- **Vital signs:** The patient can use home equipment, if available, to check blood pressure, pulse and weight
- **Mental status:** While often easy to ascertain, some patients have visual, auditory, and/or cognitive deficits, making the exam more of an observational exercise
- **Speech:** Start by evaluating comprehension (midline commands, appendicular commands, cross midline commands), then naming, repetition
- **Cranial Nerves:**
  - Visual Fields: May be able to evaluate on the screen or with the help of someone with the patient
  - EOM: The assistance of someone with the patient may be helpful
    - Ask patient to look all the way to the left, right, up, and down
    - Have patient fixate on camera and rotate head from side to side for fixation
    - Comment on nystagmus if present
  - Pupils: Some platforms offer zooming options that you can use to examine pupils, if not ask the patient to hold the camera close to their eyes to examine pupils
  - Face: Examine visually by video
  - Hearing: Able to evaluate grossly and can document that it is intact to voice
  - Palate: Some platforms offer zooming options that you can use to examine palate with appropriate lighting. An onsite assistant may be helpful
  - Shoulders: Check shoulder shrug symmetry
  - Tongue: Examine visually by video

- **Motor exam:** May need help of someone with the patient for detailed assessment
  - Strength: Can be examined via nonconfrontational measures by:
    - Arms: using pronator/Digit Quinti sign/Barrel roll/finger taps for subtle signs of weakness
    - Legs: check drift or ask the patient to stand up with arms crossed, crouch then stand, heel walk, toe walk (when possible)
    - Using the assistance of someone with the patient; for complex peripheral cases you can instruct the assistant how to examine the different roots, branches of the brachial and lumbar plexus and individual nerves
  - Tone: may be difficult to examine, but can look for bradykinesia by inspection
  - Tremors can be easily seen on camera
- **Sensory exam:** Need help of someone with the patient

  - May ask for difference between left/right/different dermatomes if examiner is skilled
  - May check for extinction with double stimulation by instructing examiner how to do it

- **Cerebellar:** May need help of someone with the patient
  - Ask the patient to extend arm all the way out, then touch their own nose (finger to nose maneuver)
  - Can instruct heel to shin easily
  - Gait and station testing assists in testing for ataxia
- **Reflexes:** May be difficult to examine without a skilled examiner, but can instruct someone with the patient how to look for the Babinski response

Post-stroke
Logoterapia
M. Di Parkinson
Epilessia
Riabilitazione

Inter-rater agreement

+++

r. Plantare (in collaborazione), motilità facciale, cammino, equilibrio, linguaggio, tremore, bradicinesia

++

MOE, ROT, tapping…

https://www.aan.com/tools-and-resources/practicing-neurologists-administrators/telemedicine-and-remote-care

Youtube: Neurological exam
by Jennifer Robblee M.D.

American Headache Society

…il giudizio degli utenti

Using Teleneurology to Deliver Chronic Neurologic Care to Rural Veterans: Analysis of the First 1,100 Patient Visits

Davis et al, Telemed J E Health,2019

N: 1100

Risposte: 64%

Percezione di buona assistenza e comunicazione: 90%-91%

Soluzione conveniente: 88%

Continuità dell'approccio in remoto: 87%

Risparmio (tempo, costi diretti..): favorevole il 96%

Teleneuropsicologia

…gli strumenti

- I risultati nei test verbali sono paragonabili a quelli classici
- Alta variabilità (e performance inferiori) per MMSE e Clock drawing test *(forse per la componente motoria)*
- Spesso i test telematici non sono standardizzati e validati per cui occorre informare il pz che ci potranno essere margini di errore

The Clinical Neuropsychologist, 2012, 26 (2), 177–196
http://www.psypress.com/tcn
ISSN: 1385-4046 print/1744-4144 online
http://dx.doi.org/10.1080/13854046.2012.663001

Psychology Press
Taylor & Francis Group

Computerized Neuropsychological Assessment Devices: Joint Position Paper of the American Academy of Clinical Neuropsychology and the National Academy of Neuropsychology†

Russell M. Bauer[1,7], Grant L. Iverson[2,8], Alison N. Cernich[3,7], Laurence M. Binder[4,8], Ronald M. Ruff[5,8], and Richard I. Naugle[6,7]

- Un test tradizionale adattato al PC **diventa un altro test**
- Molti CNAD (Computerized neuropsychological assessment device) sono venduti senza licenza
- Interpretazione dei risultati (contatto visivo preliminare, refertazione…)
- Aspetti tecnici: processore, risoluzione dello schermo, memoria, …

InterOrganizational Practice Committee Recommendations/Guidance for Teleneuropsychology (TeleNP) in Response to the COVID-19 Pandemic

https://iopc.squarespace.com/teleneuropsychology-research

Neuropsychology Toolkit

Boston Naming test
Brief memory test
California Verbal Learning
Clock drawing test
Kaplan proverb tests
Digit span
Hopkins verbal learning test-revised
Independent Living Scale
Mattis dementia (memory subtest)
Rey-Osterrieth Complex Figure
Oral Trail Making Test (parte A e B)
Trail Making Test (parte A e B)
Verbal fluency (semantic, phonemic)
Wechsler Memory Scale (IV ed)

Where Face-to-Face and Remote Tend to Be Equivalent

Research shows strong equivalence in:

- memory tests (word lists, story recall),
- language assessments,
- most executive function measures,
- orientation and basic attention tasks,
- many neuropsychological screening tests (e.g., modified MoCA, MMSE variants).
- For high-states evaluations: FACE TO FACE

Journal of *Personalized Medicine*

MDPI

Review

Tele-Neuropsychological Assessment of Alzheimer's Disease

Anna Carotenuto [1], Enea Traini [1], Angiola Maria Fasanaro [1], Gopi Battineni [1,*] and Francesco Amenta [1,2]

[1] Centre for Clinical Research, Telemedicine and Telepharmacy, University of Camerino, Via Madonna delle Carceri 9, 62032 Camerino, Italy; annacarotenuto@gmail.com (A.C.); enea.traini@unicam.it (E.T.); angiolamfasanaro@gmail.com (A.M.F.); francesco.amenta@unicam.it (F.A.)

[2] Research Department, International Radio Medical Centre (C.I.R.M.), Via dell'Architettura 41, 00144 Roma, Italy

* Correspondence: gopi.battineni@unicam.it; Tel.: +39-333-172-8206

2021

Abstract: Background: Because of the new pandemic caused by the novel coronavirus disease (COVID-19), the demand for telemedicine and telemonitoring solutions has been exponentially raised. Because of its special advantage to treat patients in an emergency without physical presence at a hospital via video conferencing, telemedicine has been used to overcome distance barriers and to improve access to special domains like neurology. In these pandemic times, telemedicine has been also employed as a support for the diagnosis and treatment of adult-onset dementia disorders including Alzheimer's disease. Objective: In this study, we carried out a systematic literature analysis to clarify if the neuropsychological tests traditionally employed in face-to-face (FTF) contexts are reliable via telemedicine. Methods: A systematic literature search for the past 20 years (2001–2020) was carried out through the medical databases PubMed (Medline) and the Cumulative Index to Nursing and Allied Health Literature (CINAHL). The quality assessment was conducted by adopting the Newcastle Ottawa Scale (NOS) and only studies with a NOS $\geq$ 7 were included in this review. Results: The Mini-Mental State Examination (MMSE) results do not differ when tests are administered in the traditional FTF modality or by videoconference, and only negligible minor changes in the scoring system were noticeable. Other neuropsychological tests used to support the diagnosis of AD and dementia such as the Token Test, the Comprehension of Words and Phrases (ACWP), the Controlled Oral Word Association Test showed high reliability between the two modalities considered. No differences in the reliability concerning the living setting or education of the subjects were reported. Conclusions: The MMSE, which is the main screening test for dementia, can be administered via telemedicine with minor adaptation in the scoring system. Telemedicine use for other neuropsychological tests also resulted in general reliability and enough accuracy. Cognitive assessment by videoconference is accepted and appreciated and therefore can be used for dementia diagnosis in case of difficulties to performing FTF assessments. This approach can be useful given a personalized medicine approach for the treatment of adult-onset dementia disorders.

FTF vs Telemedicine

Clock drawing test
Digit Span backwards
Oral Trails B
Hopkins Verbal Learning Test-Revised
Verbal and category fluency
Digit Span Forward
Oral Trails A
Boston Naming Test total
MMSE

D.E. Marra et al, 2020: aggiunge MoCA

Teleneuropsychology clinic development and patient satisfaction

Appleman et al, Cl. Neuropsychol, 2021

Grado di soddisfazione

In presenza (98%)
In remoto (90%)

Neurological Sciences (2022) 43:125–138
https://doi.org/10.1007/s10072-021-05719-9

REVIEW ARTICLE

Tele-neuropsychological assessment tools in Italy: a systematic review on psychometric properties and usability

Elia Zanin[1] · Edoardo Nicolò Aiello[2,3] · Lorenzo Diana[2,3] · Giulia Fusi[4] · Mario Bonato[5] · Aida Niang[6] · Francesca Ognibene[7] · Alessia Corvaglia[8] · Carmen De Caro[7] · Simona Cintoli[9] · Giulia Marchetti[5] · Alec Vestri[10] · for the Italian working group on tele-neuropsychology (TELA)

Table 1 Summary of primary and secondary outcomes of studies on psychometrics properties

Authors, year	Study type	N	Demographic data	Test modality	Cognitive/behavioural aspect investigated	Task/test	I/II level tool	Validity	Reliability	Sensitivity	Specificity	Other psychometric properties investigated
Metitieri et al. [18]	Cohort-based Cross-sectional No control group	104 demented patients (AD, VaD, FTD)	Age: 77.2 ± 8.1 Education: 5.2 ± 2.3 M/F: 24/76%	Telephone	Global cognitive efficiency	Itel-MMSE (0–22)	I	Convergent validity (MMSE): $r = .85$	Inter-rater reliability: $r = .82–.9$ Test-retest reliability: $r = .9–.95$	–	–	Sensitivity to severity of cognitive impairment
Vanacore et al. [19]	Cohort-based No control group	107 HPs	Age: 64 ± 1.6 Education: 10.6 ± 4.3 M/F: 31.8/68.2%	Telephone	Global cognitive efficiency	Itel-MMSE (0–22)	I	Convergent validity (MMSE): $r = .26$	Internal consistency: Cronbach's $\alpha = .37$	23–75%	61–76%	*r:* Age:. 203 Education: .29; visuo-spatial: .24; Attention: .54;
Dal Forno et al. [20]	Cohort based Cross-sectional Control group	45 AD patients; 64 HPs	AD: Age: 73.9 ± 8.8 Education: 7.9 ± 3.9 M/F: 38/62% HPs: Age: 74.4 ± 8.1 Education: 7.5 ± 4.2 M/F: 36/64%	Telephone	Global cognitive efficiency	I-TICS	I	Convergent validity: $r = .9$	Internal consistency: Cronbach's $\alpha = .91$ Inter-rater reliability: Cohen's k (MMSE) = .72 Test-retest reliability: intra-class correlation = .73	84%	86%	Sensitivity to changes in cognitive impairment severity over time
Timpano et al. [21]	Cohort based Control group	207 suspected cognitive impairment patients; 135 HPs	Suspected cognitive impairment: Age: 76.5 ± 8.0 Education: 6.3 ± 3.7 M/F: 34.3/65.7% HPs: Age: 65.7 ± 10.2 Education: 8.7 ± 4.1 M/F: 46.7/53.3%	Video-conference	Global cognitive efficiency	VMMSE (0–28)	I	–	Inter-rater reliability: .94 Test-retest reliability: Intra-class correlation = T1:.94 T2:.85 T3:.93	87%	97%	Positive predictive value = .97 Negative predictive value = .83 Accuracy = .96, 95% CI [.94 .98]

Table 1 (continued)

Authors, year	Study type	N	Demographic data	Test modality	Cognitive/behavioural aspect investigated	Task/test	I/II level tool	Validity	Reliability	Sensitivity	Specificity	Other psychometric properties investigated
De Leo et al. [22]	Cohort-based Cross-sectional Longitudinal Control group	574 HPs	Age: 76.8 Education: *M range* 3.7–4.8 M/F: 14/86%	Telephone	Global cognitive efficiency, mood	Ad hoc questionnaire	I	–	Internal consistency: global cognition: Cronbach's $\alpha = .91$; Mood: Cronbach's $\alpha = .89$	–	–	–
Carotenuto et al. [23]	Cohort-based Cross-sectional Longitudinal No control group	28 AD patients	Age: M: 73.88 ± 7.45 F: 76.0 ± 5.4Education: 7.6 ± 4.1M/F: 28.6/71.4%	Video-conference	Global cognitive efficiency	VCB MMSE (0–30); VCB ADAS-Cog	I	MMSE ≈ VCB MMSE; ADAS-Cog ≈ VCB ADAS-Cog	–	–	–	–
Di Girolamo et al. [24]	Cohort-based Control group	285 HPs	Age: 26.4 ± 7.0 M/F: 21.4/78.6%	Web	Social cognition	TAS-20; RME-T	II	Convergent validity: TAS-20-QCAE: $r = -.27$	Internal consistency: TAS-20: Cronbach's $\alpha = .85$; RME-T: Cronbach's $\alpha = .32$	–	–	–
Lassandro et al. [25]	Cohort-based Control group	191 ITP patients (and 248 caregivers)	ITP: Age: 11.2 ± 3.8 M/F: 46/54% Caregivers: M/F: 42/58%	Web	Fatigue	PedsQL MFS	I	–	Internal consistency: Cronbach's $\alpha = .89$	–	–	–

AD Alzheimer's disease, *VaD* vascular dementia, *FTD* frontotemporal dementia, *Itel-MMSE* Italian telephone Mini-Mental State Examination, *MMSE* Mini-Mental State Examination, *VMMSE* videoconference-based MMSE, *HPs* healthy participants, *I-TICS* Italian version of the Telephone Interview for Cognitive Status, *VCB* videoconference-based, *ADAS-Cog* Alzheimer's Disease Assessment Scale-Cognitive Subscale, *TAS-20* Toronto Alexithymia Scale-20 items, *RME-T* Reading the Mind in the Eyes Test, *QCAE* Questionnaire of Cognitive and Affective Empathy, *ITP* immune thrombocytopenia, *PedsQL MFS* Paediatric Quality of Life Inventory Multidimensional Fatigue Scale

AGENAS Protocollo n. 2024/0015317 del 20/12/2024

Telemedicina nella gestione della persona con demenza (versione del 22.11.24)

In particolare, si segnala che:

1) Una **televisita** con le persone inviate dal MMG per un sospetto decadimento cognitivo utilizzando lo strumento SATURN (*Self-Administered Tasks Uncovering Risk of Neurodegeneration*) utilizzabile in remoto con una validazione in corso su popolazione italiana. In alternativa, può essere utilizzato nell'ambito della televisita il Mini-Mental State Examination (MMSE) telefonico in corso di validazione.

Normative study of SATURN: a digital, self-administered, open-source cognitive assessment tool for Italians aged 50–80

Francesco Giaquinto[1]*, Sara Assecondi[2], Giuliana Leccese[3], Daniele Luigi Romano[4] and Paola Angelelli[3]

[1]Laboratory of Applied Psychology and Intervention, Department of Human and Social Sciences, University of Salento, Lecce, Italy, [2]Center for Mind/Brain Sciences – CIMeC, University of Trento, Rovereto, Italy, [3]Laboratory of Applied Psychology and Intervention, Department of Medicine, University of Salento, Lecce, Italy, [4]Department of Psychology and Milan Center for Neuroscience (NeuroMi), University of Milano-Bicocca, Milan, Italy

Introduction: This study aimed to establish normative data for the Self-Administered Tasks Uncovering Risk of Neurodegeneration (SATURN), a brief computer-based test for global cognitive assessment through accuracy and response times on tasks related to memory, attention, temporal orientation, visuo-constructional abilities, math (calculation), executive functions, and reading speed.

Methods: A sample of 323 Italian individuals with Montreal Cognitive Assessment (MoCA) equivalent score ≥1 (180 females; average age: 61.33 years; average education: 11.32 years), stratified by age, education, and sex, completed SATURN using PsychoPy, and a paper-and-pencil protocol consisting of Mini-Mental State Examination (MMSE) and MoCA. Data analyses included: (i) correlations between the total accuracy scores of SATURN and those of MMSE and MoCA; (ii) multiple regressions to determine the impact of sex, age, and education, along with the computation of adjusted scores; (iii) the calculation of inner and outer tolerance limits, equivalent scores, and the development of correction grids.

frontiers | Frontiers in Psychology

TYPE Original Research
PUBLISHED 30 October 2024
DOI 10.3389/fpsyg.2024.1456619

Results: The mean total time on tasks was 6.72 ± 3.24 min. Age and education significantly influence the SATURN total accuracy, while sex influences the total time on tasks. Specific sociodemographic characteristics influence subdomain accuracies and times on task differently. For the adjusted SATURN total score, the outer limit corresponds to 16.56 out of 29.00 (cut-off), while the inner limit is 18.57. SATURN significantly correlates with MMSE and MoCA.

Discussion: In conclusion, SATURN is the first open-source digital tool for initial cognitive assessment in Italy, showing potential for self-administration in primary care, and remote administration. Future studies need to assess its sensitivity and specificity in detecting pathological cognitive decline.

Test non ancora validato

Neurological Sciences
https://doi.org/10.1007/s10072-024-07863-4

ORIGINAL ARTICLE

Itel MMSE: a short phone screening test for cognitive decline. Italian Validation study by the SINdem Neuropsychology Working Group

Davide Quaranta[1,2,3] · Federica L'Abbate[4] · Annalisa Pelosi[5] · Andrea Arighi[6] · Gesuina Asoni[7] · Chiara Bagattini[8,9,10] · Valentina Bessi[11,12] · Laura Bonanni[13] · Marta Bortoletto[8] · Amalia Cecilia Bruni[14] · Annachiara Cagnin[15] · Stefano F. Cappa[16,17] · Franco Giubilei[18] · Maria Guarino[19] · Alessandro Iavarone[20] · Valeria Isella[21] · Antonina Luca[22] · Roberto Monastero[23] · Francesca Ferrari Pellegrini[24] · Marta Perini[25] · Tommaso Piccoli[23] · Innocenzo Rainero[26] · Gioacchino Tedeschi[27] · Camillo Marra[3,4] · Paolo Caffarra[14]

Received: 6 June 2024 / Accepted: 29 October 2024

Abstract

Introduction The Italian telephone-based Mini-Mental State Examination (Itel-MMSE) is considered a very easy tool for screening individuals with dementia, gained importance during COVID-19, but lacks validation and faces a ceiling effect.

Aim In the present study, we conducted a study standardizing and validating it, establishing cut-off values for two versions.

Methods Across 24 Italian sites, 707 healthy individuals (50–89 years, men: 268, women: 439) with diverse educational levels (3–24 years) were recruited. Subjects met criteria for normal conditions investigated through a semi-structured interview covering neurological, psychiatric, general medical, and psychopharmacological history. Two test versions were created to assess test–retest reliability at 45-day intervals. We also enrolled 187 subjects with Mild Cognitive Impairment (MCI) and 181 with Alzheimer's Disease (AD) for validation. The raw scores obtained on both versions of Itel-MMSE were set as dependent variables in linear regression models that included age, education, and gender as independent variables.

Results Mean raw Itel-MMSE1 score was 20.82 (range: 13–22). Multiple linear regression demonstrated significant effects of sociodemographic variables for age and education, establishing a new cut-off ≥ 18.49. Mean raw Itel-MMSE2 score was 20.97 (range: 10–22), with a new cut-off ≥ 18.45. Validation showed high informative values, with areas under the curve (AUCs) for MCI and AD conditions and both versions (Itel-MMSE1: MCI AUC = 0.801, AD AUC = 0.907; Itel-MMSE2: MCI AUC = 0.827, AD AUC = 0.977).

Conclusion The Itel-MMSE proves valuable as a screening method for detecting and monitoring dementia in remote phone screenings, with different cut-offs aiding MCI patient identification in clinical settings.

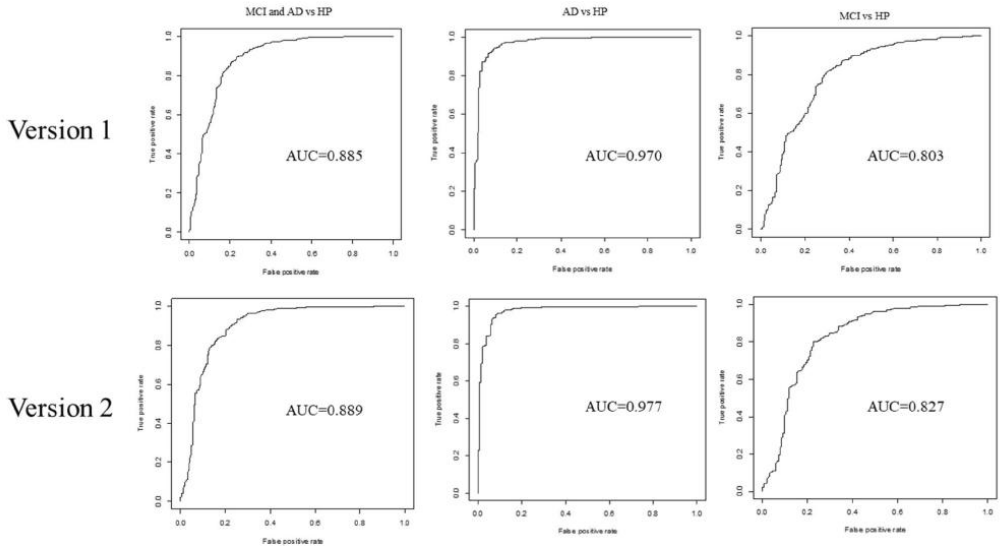


Fig. 4 ROC curves of Itel-MMSE version 1 and 2 for the diagnosis of MCI + AD, AD, and MCI. HP: Healthy Participants

Cut-off

Itel-MMSE1: >= 18.49
Itel-MMSE2: >=18.45

MODELLO ORGANIZZATIVO

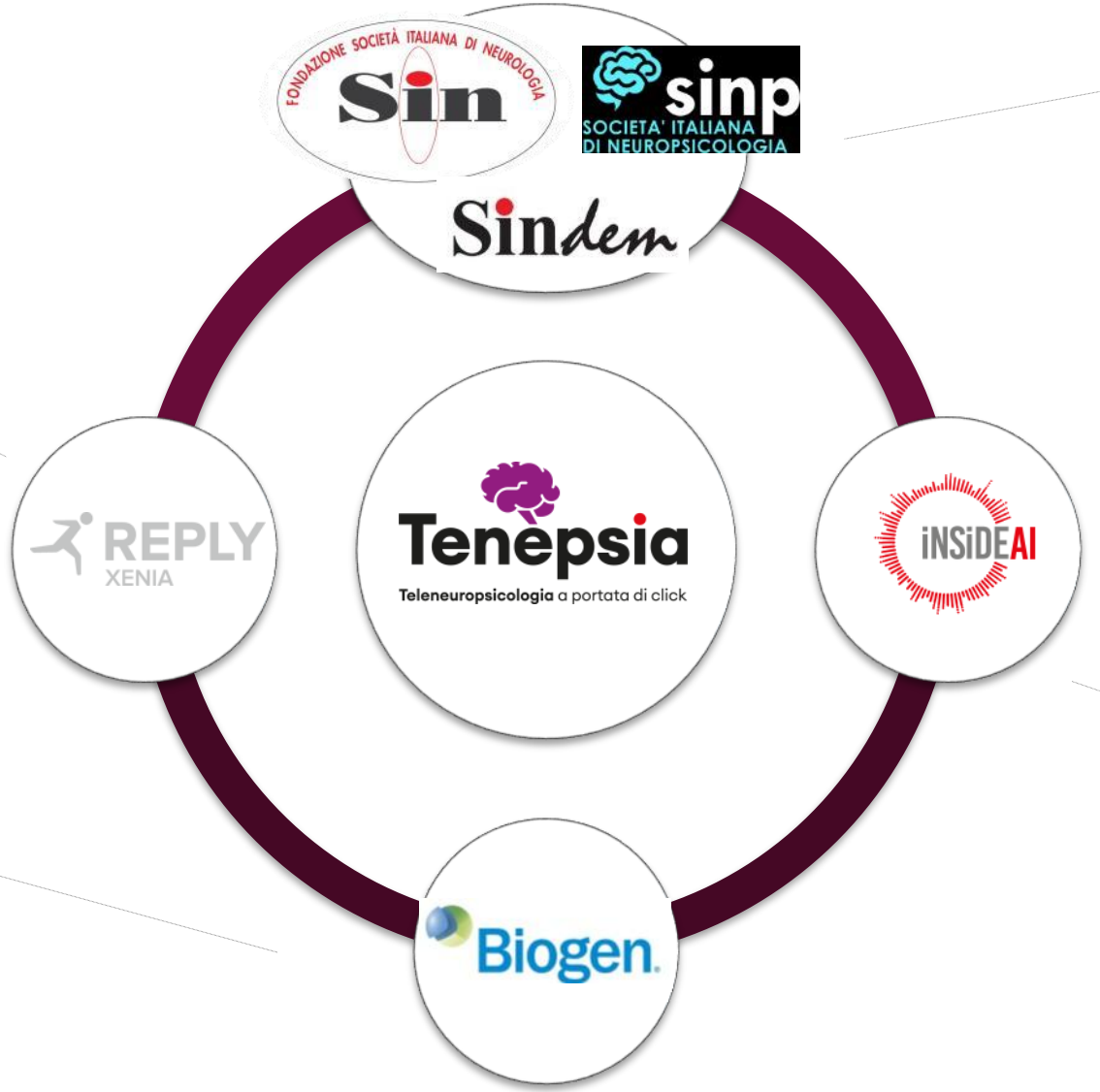
Overall collaboration

Scientific & Medical Know-How

Platform, Digital Health and Tech Expertiese

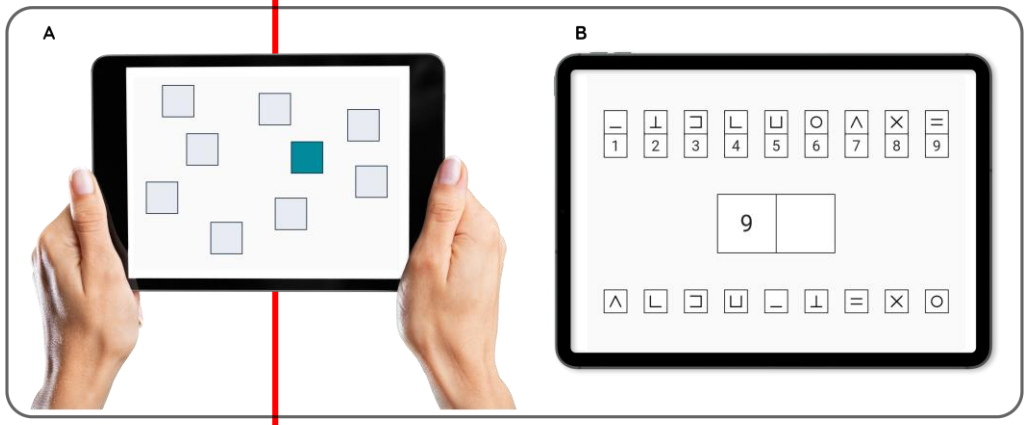
Digital, Regulatory & Medical Expertise

In Silico Innovative Approach Test & Certification



Batteria di test

- ❑ Free and Cued Selective Reminding Test (FCSRT)
- ❑ Supra-span spaziale
- ❑ Figura complessa di Rey-Osterrieth – copia e richiamo
- ❑ Fluenza verbale e semantica
- ❑ Eloquio spontaneo
- ❑ Denominazione
- ❑ Copia di pentagoni
- ❑ Test del disegno dell'orologio
- ❑ Digit Symbol Test
- ❑ Test di Stroop
- ❑ Test di riconoscimento emotivo



Campione totale soggetti sani (N = 177)

Campione totale soggetti patologici (N = 48)

RADIO NEWS

25 Cents
April
1924
Over 200 Illustrations

Edited by H. GERNSBACK

THE RADIO DOCTOR—*Maybe!*

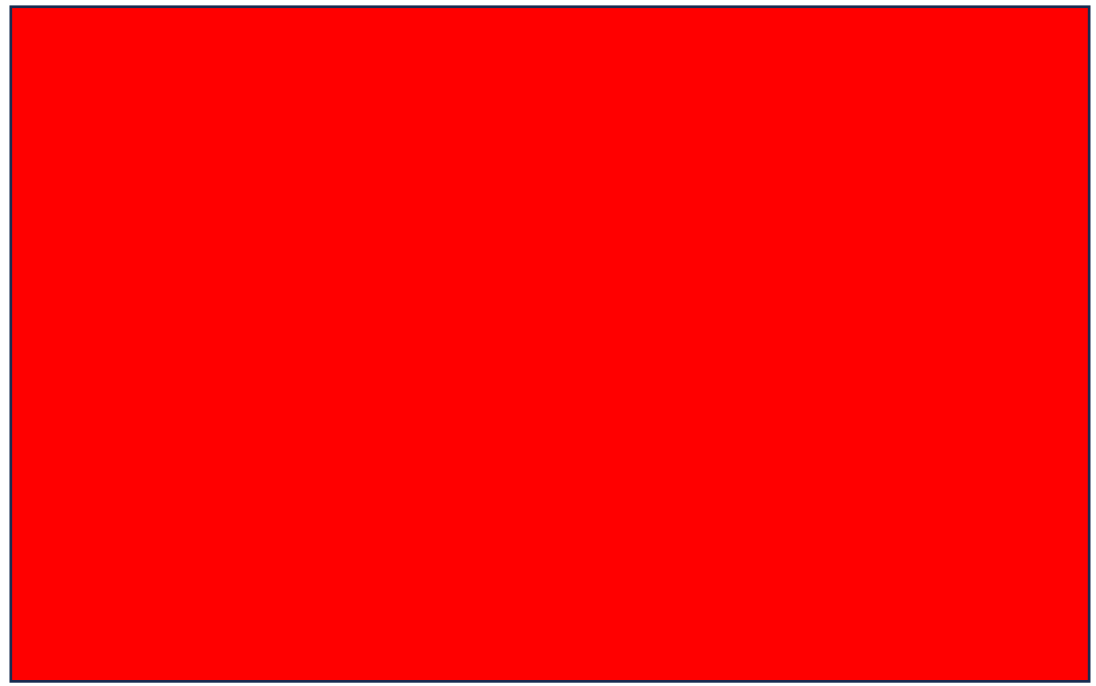
See Page 1404

IN THIS ISSUE:

Sir Oliver Lodge, F.R.S.
Dr. J. A. Fleming, F.R.S.
F. W. Dunmore and
F. H. Engel of
Bureau of Standards
Howard S. Pyle
Brainard Foote

THE 100% RADIO MAGAZINE

IN A[illegible]THER RADIO PUBLICATI[illegible]



…le prestazioni differiscono?

Neuropsychol Rev (2017) 27:174–186
DOI 10.1007/s11065-017-9349-1

REVIEW

Neuropsychological Test Administration by Videoconference: A Systematic Review and Meta-Analysis

Timothy W. Brearly[1,2,3] · Robert D. Shura[1,2,3] · Sarah L. Martindale[1,2,3] · Rory A. Lazowski[4] · David D. Luxton[5] · Brian V. Shenal[6,7] · Jared A. Rowland[1,3,8,9]

Nel 32,91% i punteggi medi dei test erano superiori nella condizione «in video»

Nel 60.76% i punteggi medi dei test erano superiori nella condizione «in presenza»

Nel 6.33% erano equivalenti

ELSEVIER

Check for updates

Alzheimer's & Dementia: Diagnosis, Assessment & Disease Monitoring 10 (2018) 764-772

Alzheimer's & Dementia

Cognitive & Behavioral Assessment

Utility of the NIH Toolbox for assessment of prodromal Alzheimer's disease and dementia

Katherine Hackett[a,*], Robert Krikorian[b], Tania Giovannetti[a], Josefina Melendez-Cabrero[c], Aneela Rahman[f], Emily E. Caesar[d], Jaclyn L. Chen[e], Hollie Hristov[f], Alon Seifan[g], Lisa Mosconi[f], Richard S. Isaacson[f]

[a]*Department of Psychology, Temple University, Philadelphia, PA, USA*
[b]*Department of Psychiatry and Behavioral Neuroscience, University of Cincinnati College of Medicine, Cincinnati, OH, USA*
[c]*Department of Neurology, Weill Cornell Medicine, San Juan, PR, USA*
[d]*Loyola-Stritch School of Medicine, Chicago, IL, USA*
[e]*Stony Brook University School of Medicine, New York, NY, USA*
[f]*Department of Neurology, Weill Cornell Medicine and NewYork-Presbyterian, New York, NY, USA*
[g]*Compass Health Systems, Miami, FL, USA*

Abstract

Introduction: The NIH Toolbox Cognition Battery (NIHTB-CB) is a computer-based protocol not yet validated for clinical assessment.
Methods: We administered the NIHTB-CB and traditional neuropsychological tests to 247 Memory Disorders and Alzheimer's Prevention Clinic patients with subjective cognitive decline, mild cognitive impairment, mild dementia due to Alzheimer's disease, and normal cognition. Principal component analysis, partial correlations, and univariate general linear model tests were performed to assess construct validity. Discriminant function analyses compared classification accuracy.
Results: Principal component analysis identified three conceptually coherent factors: memory (MEM_{NIH}), executive function (EF_{NIH}), and crystallized intelligence (CI_{NIH}). These factors were strongly associated with corresponding traditional tests and differed across diagnostic groups as expected. Both NIHTB and traditional batteries yielded strong overall discriminative ability (>80%).
Discussion: The NIHTB-CB is a valid method to assess neurocognitive domains pertinent to aging and dementia and has utility for applications in a memory clinic setting.

Table 1
Neuropsychological measures

Cognitive domain	NIHTB-CB tests	Traditional tests
Learning/Memory	RAVLT 1, 2, 3*	MMSE-DR*
	RAVLT-DR*	Logical Memory immediate recall*
		Logical Memory delayed recall*
		FNAME*
Executive function/Attention/Processing speed	DCCS†	FAS*
	Flanker†	ANT*
	Pattern Comparison*	MMSE-attention*
	ODS*	Trail-Making Test Part B*
Crystallized intelligence	Picture Vocabulary†	
	Oral Reading Recognition†	

Abbreviations: NIHTB-CB, NIH Toolbox Cognition Battery; RAVLT 1, 2, 3, Rey Auditory Verbal Learning Task immediate recall trials 1–3; RAVLT-DR, Rey Auditory Verbal Learning Task delayed recall; DCCS, Dimensional Change Card Sort; Flanker, Flanker Inhibitory Control/Attention; Pattern Comparison, Pattern Comparison Processing Speed; ODS, Oral Digit Symbol; MMSE-DR, Mini–Mental State Examination delayed recall subscore; FNAME, Face Name Associative Memory-cued first letter; FAS, verbal fluency under phonemic constraint to letters F-A-S; ANT, verbal fluency under categorical constraint (animals); MMSE-attention, Mini–Mental State Examination attention subscore.

NOTE. Trail-Making Test Part B score represents time to completion (seconds).

NOTE. Raw and computed scores are unadjusted for demographics.

*Raw score.

†Computed score (provided by the NIH toolbox, used for computer adaptive tests and tests whose score requires combination of accuracy and reaction time vectors).

2018
La principal component analysis identifica 3 fattori (memoria, f. esecutive ed intelligenza corrispondenti ai test tradizionali

Campione totale soggetti sani (N = 177 sui 200 previsti)

Centro/fascia d'età	40-49	50-59	60-69	70-79	80-89	Totale per centro
IRCCS Fondazione Mondino, Pavia	7	5	6	4	4	26
Fondazione Card. G. Panico, Tricase, Bari	4	5	5	5	1	20
Università degli Studi della Campania Luigi Vanvitelli, Caserta	1	2	6	1	1	11
CeRiN, Università di Trento, Rovereto	4	10	4	3	1	22
IRCCS Istituto delle Scienze Neurologiche di Bologna	4	4	5	4	3	20
IRCCS Istituto delle Scienze Neurologiche, Azienda USL di Bologna	3	6	5	3	3	20
Centro Disturbi Cognitivi e Demenze, AUSL di Bologna	1	2	2	0	1	6
Università degli Studi di Palermo	4	4	1	2	1	12
ASST Spedali Civili di Brescia	5	5	3	4	3	20
Auxologico, Milano	3	7	4	3	3	20
Totale per età	36	50	41	29	21	177

Campione totale soggetti patologici (N = 48 sui 50 previsti)

Centro/fascia d'età	40-49	50-59	60-69	70-79	80-89	Totale per centro
IRCCS Fondazione Mondino, Pavia	0	1	2	2	0	5
Fondazione Card. G. Panico, Tricase, Bari	0	0	2	3	0	5
Università degli Studi della Campania Luigi Vanvitelli, Caserta	0	1	1	2	1	5
CeRiN, Università di Trento, Rovereto	0	0	1	4	0	5
IRCCS Istituto delle Scienze Neurologiche di Bologna	1	1	1	1	1	5
IRCCS Istituto delle Scienze Neurologiche, Azienda USL di Bologna	0	0	0	3	2	5
Centro Disturbi Cognitivi e Demenze, AUSL di Bologna	0	0	2	1	2	5
Università degli Studi di Palermo	0	0	3	2	0	5
ASST Spedali Civili di Brescia	0	1	1	2	1	5
Auxologico, Milano	0	0	0	3	0	3
Totale per età	1	4	13	23	7	48

Review Article

Telemedicine in Alzheimer's disease and other dementias: Where we are?

Journal of Alzheimer's Disease
2025, Vol. 103(1) 3–18

DOI: 10.1177/13872877241298295
journals.sagepub.com/home/alz

Efthalia Angelopoulou[1] **and Sokratis G Papageorgiou**[1]

Technological issues (hardware and software)	The camera of the patient should be placed close to his/her face and ideally repositioned during the neurological assessment for viewing the body parts of interest Ideally, the camera and video should be of high-quality, with zoom function and adjustments of the camera angle can be made The camera of the remote clinician should be at eye level Use a user-friendly platform, with minimal preparatory steps for the patient, ideally universally compatible across devices (smartphones, tablets, computers) Ensure adequate internet connectivity and bandwidth possibly via an internet speed test (for instance 384 Kbps for uplink and downlink directions) Have a back-up plan if connection is lost, such as continuing via telephone For data security, encrypted, password-protected software ideally meeting HIPAA requirements

Neuropsychological-cognitive assessment	Use the camera or "screen sharing" for demonstrating pictorial test elements, ask the patient to show drawing or writing samples in front of their camera Screening tests: MMSE (or MoCA with oral trails) Digit Span Forwards, Digit Span Backwards and Digit Span Total Oral Trails A and B Phonemic and semantic fluency Hopkins Verbal Learning Test – Revised Clock Drawing Test Assess for apraxia as in-person
Neuropsychiatric assessment	In general: as in-person Suggested scales: NPI-Q, GDS-15 (or PHQ-9 for younger individuals)
Functional assessment	In general: as in-person Suggested scales: FAQ, IADL or IQCODE

Memory Med: il Test sui disturbi di memoria, linguaggio e attenzione con refertazione specialistica in 48 ore.

Da eseguire direttamente in Farmacia

Cosa significa Valutazione Neuropsicologica in Telemedicina?

Vuol dire che i risultati del Test Memory Med vengono valutati da **Neuropsicologi,** entro 48 ore si riceve il Referto (Valutazione Neuropsicologica) con i consigli e la firma dello Specialista che lo ha valutato.

Remote clinical assessment

General neurological examination:

- Disease-relevant digital exam “modules” are tailored to the specific examination features of a disease. For ischemic stroke, these include blood pressure, heart rhythm, language, speech, motor, and gait assessments. For Parkinson disease, they include cognitive, behavioral, speech, motor, and gait assessments.

- Location-specific digital exam “modules” are also tailored to the needs and location of the patient and provider. [1]

(1) Cohen AB, Nahed BV. The Digital Neurologic Examination. Digit Biomark. 2021 Apr 26;5(1):114-126.

Remote clinical assessment

General neurological examination:

- Difficulties in comprehensive examination of eyes (i.e. fundoscopy), neuromuscular components (i.e. reflexes) and vestibular system.
- The evaluation of other neurological systems depends on the teleneurology setup (i.e. sufficient space for gait examination), and the availability of a caregiver to help (like in case of sensory examinations).
- Availability of technology to deliver good quality teleconsultations (e.g. webcam quality, high-speed internet connection).
- Patients or caregivers with cognitive impairment, limited education or low economic resources may not be able to easily access the technology necessary to benefit from teleconsultations. (1)

(1) Galán-Mercant A, Cuesta-Vargas AI. Mobile Romberg test assessment (mRomberg). BMC Res Notes. 2014 Sep 12;7:640. doi: 10.1186/1756-0500-7-640. PMID: 25217250; PMCID: PMC4167282.

Telemedicine

- **Synchronous** telemedicine is defined as interactive video connections that transmit information in both directions at the same time. (1)
- **Asynchronous** telemedicine is a term describing store-and-forward transmission of medical images and/or data because the data transfer takes place over a period of time, and typically in separate time frames. In asynchronous telemedicine, the transmission typically does not take place simultaneously. (1)

Srinivasan R, Ben-Pazi H, Dekker M, Cubo E, Bloem B, Moukheiber E, Gonzalez-Santos J, Guttman M. Telemedicine for Hyperkinetic Movement Disorders. Tremor Other Hyperkinet Mov (N Y). 2020 Feb 17;10. .

Teleneuropsicologia: le condizioni devono essere simili alla valutazione in presenza.

Table 1. A brief guide for the assessment of patients with cognitive impairment via telemedicine: essential elements-required in all cases.

Guide for assessment of patients with cognitive disorders via telemedicine: Essential elements	
Initial "words"	Introduce yourself to the patient with first and last name, specialty and healthcare facility Use two-factor verification of the identity of the patient, such as name and date of birth Orient the patient to the virtual visit, inform about the context and limitations of the remote assessment Obtain at least verbal and ideally written consent for the telemedicine session Ask about patient's address for safety reasons, and telephone number in case connection is lost
Clinician-patient communication	Cultivate empathy by maintaining eye contact by looking straight at the camera, conducting gestures such as head nods, keeping an open body language and demonstrating attentiveness Speak clearly and loudly Inform the patient while looking away from the camera for viewing or taking medical notes, since they might suppose you ignore him/her Wait a few seconds before beginning to talk after the patient stops talking, due to a possible audio lag
Technological issues (hardware and software)	The camera of the patient should be placed close to his/her face and ideally repositioned during the neurological assessment for viewing the body parts of interest Ideally, the camera and video should be of high-quality, with zoom function and adjustments of the camera angle can be made The camera of the remote clinician should be at eye level Use a user-friendly platform, with minimal preparatory steps for the patient, ideally universally compatible across devices (smartphones, tablets, computers) Ensure adequate internet connectivity and bandwidth possibly via an internet speed test (for instance 384 Kbps for uplink and downlink directions) Have a back-up plan if connection is lost, such as continuing via telephone For data security, encrypted, password-protected software ideally meeting HIPAA requirements A second screen available at the remote clinician's office might facilitate looking at the patient while simultaneously documenting or reviewing the medical record
Requirements in space, lighting, materials	The room should be private and quiet, with adequate lighting (avoid backlighting – without windows behind the patient), ideally large enough for gait assessment (at least 5 steps), with no obstacles between the camera and the patient, and close to the internet router A plain background behind the remote clinician is recommended to limit visual distraction Ask the patient to have an available white sheet of paper, pen or pencil, eraser -if available-, and any other printed material sent beforehand to the patient Ensure access to glasses, hearing aids and assistant walking devices (if used) Ensure absence of calendars or newspapers (for orientation cues)

Medical History	In general: as in-person; obtain a medical history additionally from an informant after patient's ensuring consent
Neuropsychological-cognitive assessment	Use the camera or "screen sharing" for demonstrating pictorial test elements, ask the patient to show drawing or writing samples in front of their camera Screening tests: MMSE (or MoCA with oral trails) Digit Span Forwards, Digit Span Backwards and Digit Span Total Oral Trails A and B Phonemic and semantic fluency Hopkins Verbal Learning Test – Revised Clock Drawing Test Assess for apraxia as in-person
Neuropsychiatric assessment	In general: as in-person Suggested scales: NPI-Q, GDS-15 (or PHQ-9 for younger individuals)
Functional assessment	In general: as in-person Suggested scales: FAQ, IADL or IQCODE Assessing dementia staging with CDR as in-person
Neurological examination	Cranial nerves examination For smooth pursuit: ask the patient to follow your finger on the screen (if the screen is large enough), while encouraging to open their eyes widely, or either the patient or a third party holds the upper eyelids during downward movement in front of the camera; for saccades: ask the patient to look at the camera, keep their head still, and look in cardinal directions

Table 1. Continued.

Guide for assessment of patients with cognitive disorders via telemedicine: Essential elements	
	Motor examination: Ask the patient to extend their hands in outstretched position to evaluate postural tremor and pronator drift For assessing resting tremor ask the patient rest their hands on lap, close their eyes, and start abstracting backwards from 100. For assessing bradykinesia demonstrate physically and ask the patient to perform finger tapping, fist opening and closing, and pronation and supination, as well as foot and heel tapping on the floor (ensure camera captures the lower half of the body). Muscle tone cannot be reliably assessed unless a healthcare professional is present Coordination: In general: as in-person; ask the patient to touch his/her nose, and bring his/her hand to an outstretched position, while assessing for intention tremor or dysmetria. Assess for dysdiadochokinesia with rapid alternating movements as in-person Stance and Gait: Ensure capturing full body with the camera. If an assistant device is used, ask the patient to use it for gait assessment. Ask for a family member/caregiver to stay close to the patient for safety reasons during gait assessment, and especially tandem walking if unsteadiness is suspected. Observe for signs of parkinsonian gait (camptocormia, narrow-based, reduced arm swing, festination, and turning en-bloc), ataxic gait (wide-based), diplegic or steppage gait. Romberg and pull-test are not recommended if a healthcare professional is absent for safety reasons
Diagnostic approach & disclosure of diagnosis	Send a written medical report to the patient and referral physician Provide online educational material and resources in the community for support
Instructions for follow-up & treatment	In general: as in-person. Inform the patient about available options such as genetic testing, lumbar puncture for biomarkers' measurement, participating in ongoing clinical trials (in selected cases). Highlight the importance of non-pharmacological interventions (physical exercise etc.). Written instructions via e-mail are recommended for prescription changes
Interconnection with other services	In general: as in-person. The remote clinician should be aware of the local community resources, social services, caregivers' support groups, and psychoeducation services. Interconnection with online services offering non-pharmacological treatments (for instance tele-exercise, cognitive tele-rehabilitation programs, tele-psychoeducation services)

CDR: Clinical Dementia Rating; FAQ: Functional Activities Questionnaire; GDS-15: Geriatric Depression Scale; IADL: Instrumental Activities of Daily Living Scale; IQCODE: Informant Questionnaire on Cognitive Decline in the Elderly; MMSE, Mini-Mental State Examination; MoCA, Montreal Cognitive Assessment; NPI-Q: Neuropsychiatric Inventory Questionnaire; PHQ-9: Patient Health Questionnaire-9.

Table 2. A brief guide for the assessment of patients with cognitive impairment via telemedicine: optional depending on each case.

Guide for assessment of patients with cognitive disorders via telemedicine: Optional depending on each case	
Vital signs	Ask the caregiver to check heart rate via an automated blood pressure machine or radial pulse for 15 sec (especially if a cholinesterase inhibitor is going to be prescribed or increase the dosage) Assessment of orthostatic hypotension might be feasible with instructions in selected cases if safety measures are taken
Neuropsychiatric Assessment	HAM-A (in suspected anxiety) MBI-C (in suspected MBI)
Neurological examination	Cranial nerves examination: A Snellen chart can be used ensuring the right size and distance, but an ophthalmologic examination should be performed if visual deficits are suspected. For visual neglect ask the patient to conduct the line bisection test. For testing VOR, ask the patient to fixate on the camera and perform head movements vertically and horizontally. Facial nerve examination as in-person. For assessing dysphagia, ask the patient to drink a small sip of water and/or cough loudly. Dysarthria assessment as in-person Motor examination: A writing sample and Archimedes spiral can be performed and demonstrated at the camera for micrographia and tremor assessment. For a rough assessment of power of muscle groups, perform functional strength maneuvers, such as rising from a chair, raising arms, finger tapping, pronator drift, lifting objects Sensory examination: A family member/caregiver -if present- can be instructed to identify differences in sensation between right and left body parts (if sensory deficits are suspected), as well as cortical sensory deficits (stereognosis, graphesthesia, and position sense discrimination, particularly if CBS is suspected) Reflexes: Superficial and deep tendon reflexes cannot be reliably performed remotely, unless a trained healthcare professional is close to the patient. Frontal release signs might be possible to assess if a helpful third party is present Coordination: Similarly, instruct for heel-to-shin if coordination deficit is suspected, by asking the patient to place legs on a stool Stance and Gait: Ask the patient to stand up from sitting position while arms crossed on the chest

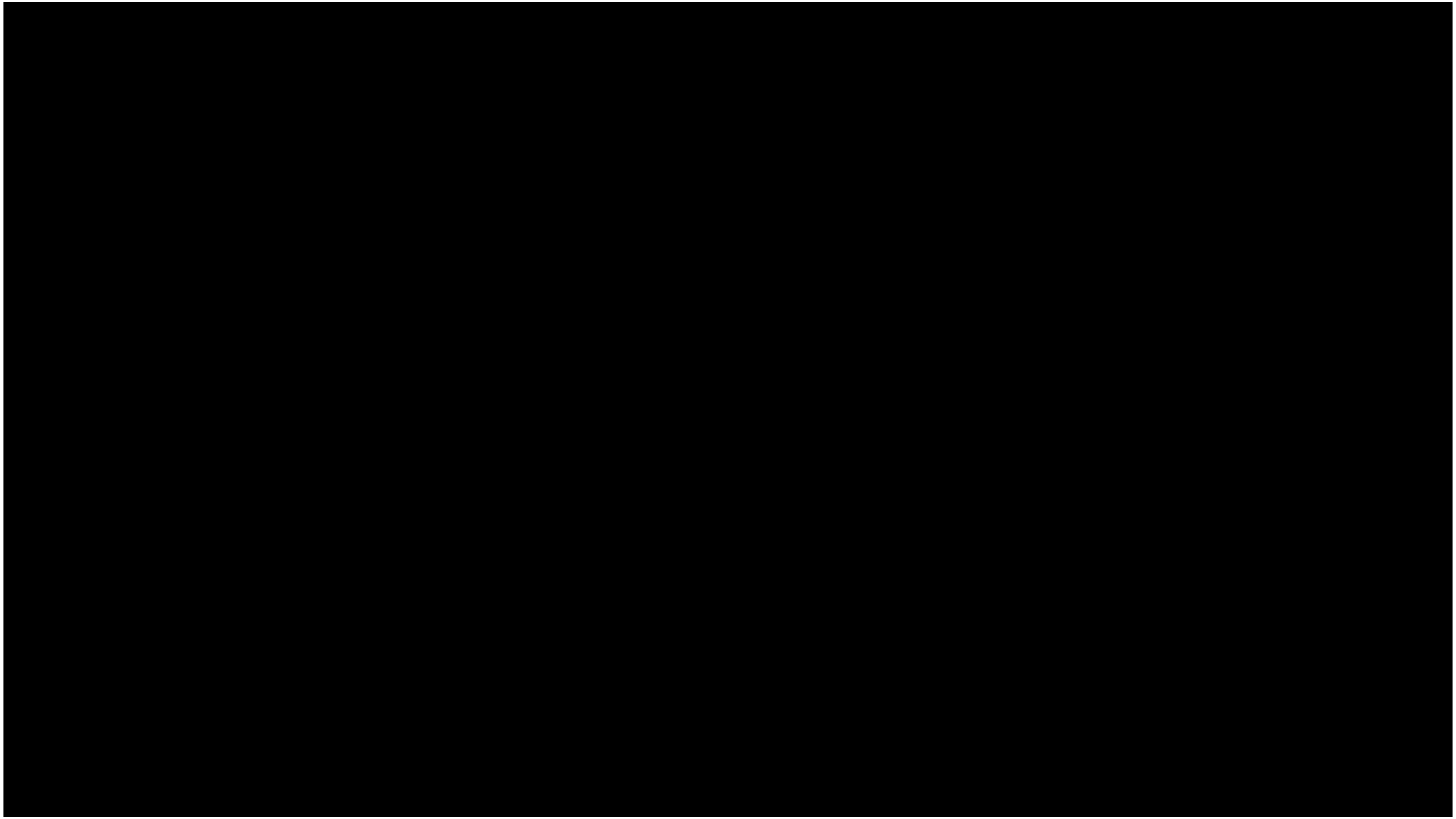
CBS: corticobasal syndrome; HAM-A: Hamilton Anxiety Rating Scale; MBI-C: Mild Behavioral Impairment Checklist; VOR: vestibulo-ocular reflex.

Yldirim
Arch Neuropsychiatry
2024

Table 1. Results from tests that are used in teleneuropsychological assessment and application recommendations

Name of the test	Results	Recommended modifications
MMSE	FF=VC (8,10,12,14)	While assessing time orientation, patients can be asked to either look away from the screen or close their eyes. This would enable the tester to prevent them from seeing the date and time information displayed on the screen. Visual stimuli might be presented via screen sharing option. For items assessing copying and writing skills, the patient can be asked to hold the paper in front of the camera, and a screenshot may be taken.
MoCA	FF=VC (12,25) VC > FF (26,38)	Same with MMSE
Digit span (forward – backward)	FF=VC (10,13,34) FF > VC (14,38,39) – for forward digit span	Trials should not be repeated, except when sequences are not heard due to technical problems.
Symbol Digit Modalities Test	FF=VC (11,24)	-
WAIS – Similarities	FF=VC (34)	-
Oral Trail Making Test	In Form A: FF > VC; in Form B: FF=VC (14)	-
Clock Drawing Test	FF=VC (10,12–14) VC > FF (9)	The patient might be asked to face the camera toward the drawing so that the clinician can observe their planning ability. A screenshot may be taken when the patient is asked to show their drawing to the camera.
WAIS – Vocabulary	FF=VC (9,11,34)	-
Boston Naming Test	FF=VC (12,13) FF > VC (14)	Visual stimuli may be shown via screen sharing option.
Semantic Fluency	FF=VC (12,14,38) FF > VC (13,39)	-
Lexical Fluency	FF=VC (9,12–14,38,39)	-
Word list learning test (Rey Auditory Verbal Learning Test, Hopkins Verbal Learning Test	Immediate memory: VC > FF (9,12), FF=VC (13,14); delayed recall: FF=VC (12–14,38)	Patient should be instructed not to write down or record the items in the list. The patient should be carefully observed to make sure they are not recording the items on the list.
WMS – Logical Memory	Immediate memory: VC > FF; delayed recall: FF=VK (11,34).	Same with word list learning tests

FF: Face-to-face; MMSE: Mini Mental Status Examination; MoCA: Montreal Cognitive Assessment; VC: Videoconference; WAIS: Wechsler Adult Intelligence Scale; WMS: Wechsler Memory Scale.



In post-stroke patients, assessment of aphasia using videoconferencing was found to have good agreement with a face-to-face assessment in a randomised double cross over design [72]. Previous pilot studies of speech therapy have indicated its feasibility of this application.

The inter-rater agreement was near-perfect to perfect (kappa statistic of 0.81–1.0) for plantar responses, facial strength, sitting balance, sensation and gait examination. It was moderate (kappa statistic of 0.61–0.80) for power and co-ordination. The areas where the agreement was only fair (kappa statistic of 0.21–0.40), included eye movements and deep tendon reflexes, for which face-to-face examination also had a similar performance. Remote examination by experienced neurologists using telemedicine, in a cohort of community-dwelling patients with Parkinson's disease, demonstrated excellent agreement in examination of postural stability, gait and arising from a chair; good agreement for examination of speech, facial expression, tremor at rest, hand and body bradykinesia; fair agreement for finger taps, hand grip and action tremor.

VIEWS & REVIEWS

Telemedicine in neurology

Telemedicine Work Group of the American Academy of Neurology update

Jaime M. Hatcher-Martin, MD, PhD, Jamie Lynn Adams, MD, Eric R. Anderson, MD, PhD, Riley Bove, MD, Tamika M. Burrus, MD, FAAN, Mahan Chehrenama, DO, Mary Dolan O'Brien, MLIS, Dawn S. Eliashiv, MD, FAAN, Deniz Erten-Lyons, MD, FAAN, Barbara S. Giesser, MD, FAAN, Lauren R. Moo, MD, Pushpa Narayanaswami, MBBS, MD, FAAN, Marvin A. Rossi, MD, PhD, Madhu Soni, MD, FAAN, Nauman Tariq, MD, Jack W. Tsao, MD, DPhil, FAAN, Bert B. Vargas, MD, FAAN, Scott A. Vota, DO, FAAN, Scott R. Wessels, MPS, ELS, Hannah Planalp, and Raghav Govindarajan, MD, FAAN

Correspondence
American Academy of Neurology
practice@aan.com

Neurology® 2020;94:30-38. doi:10.1212/WNL.0000000000008708

accepted Oct, 6, 2019
Evidenced-based on teleneurology

Table 2 Summary of search results by subspecialty

	Total identified by search terms, n	Additional abstracts identified outside of search terms, n	Included: clinical effectiveness or review of literature, n
Concussion/ traumatic brain injury	74	8	12
Dementia	233	6	20
Epilepsy/status epilepticus	101	2	7
Headache	33	2	10
Inpatient	17	2	1
Movement	177	2	31
Multiple sclerosis	73	7	16
Neuromuscular	45	3	4

Diagnostic accuracy and Reliability Screening test 76-100%

The Clinical Neuropsychologist

ISSN: 1385-4046 (Print) 1744-4144 (Online) Journal homepage: https://www.tandfonline.com/loi/ntcn20

Validity of teleneuropsychology for older adults in response to COVID-19: A systematic and critical review

David E. Marra, Kristin M. Hamlet, Russell M. Bauer & Dawn Bowers

2020

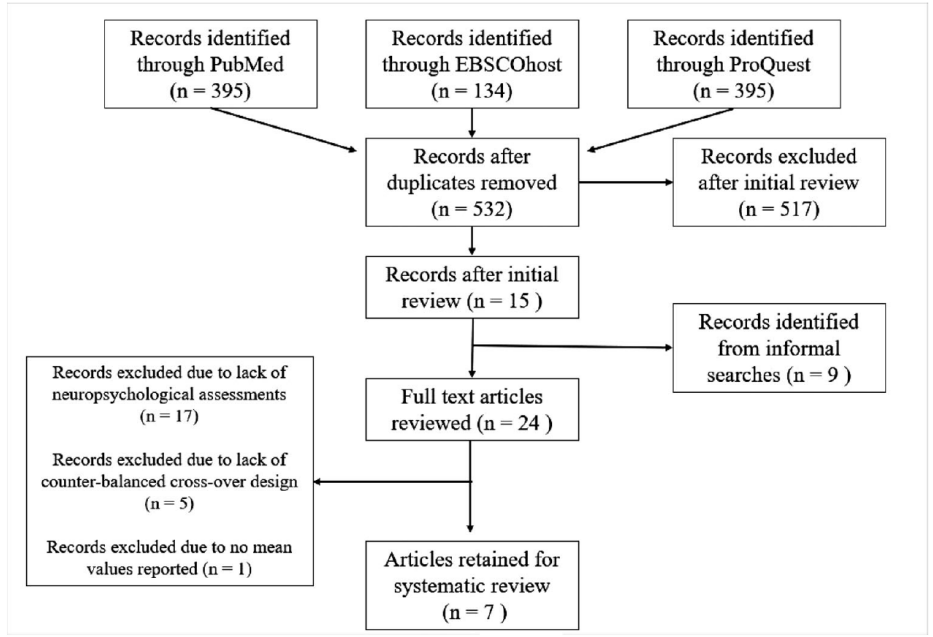


Figure 1. Flowchart of study selection. *Note*: Search was limited from 1/1/2016 to 3/22/2020 with the modifier of "older adult." Three of the articles excluded based on exclusion criteria were deemed important by the authors and retained for systematic review.

Test attendibili in TNP

MMSE

MoCA

Boston Naming Test

Fluenza verbale fonologica

Digit span

Test di memoria HVLT-R (Hopkins Verbal-Revised)

Received: 21 August 2020 | Accepted: 26 August 2020 | Published online: 22 September 2020

DOI: 10.1002/dad2.12111

Alzheimer's & Dementia
Diagnosis, Assessment & Disease Monitoring

REVIEW ARTICLE

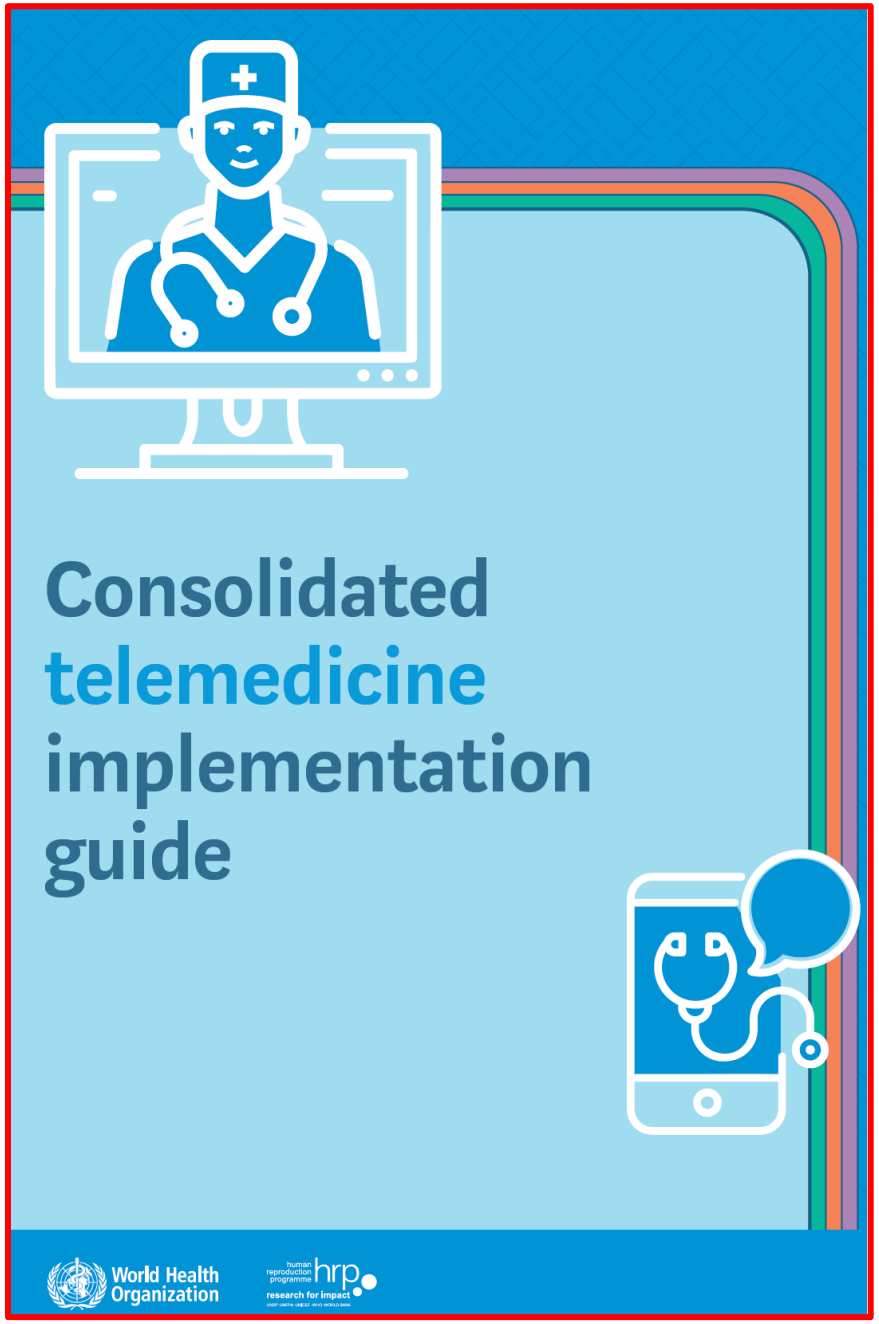
Remote cognitive and behavioral assessment: Report of the Alzheimer Society of Canada Task Force on dementia care best practices for COVID-19

Maiya R. Geddes[1,2,3] | Megan E. O'Connell[4,5] | John D. Fisk[6,7,8] | Serge Gauthier[2] | Richard Camicioli[9] | Zahinoor Ismail[10,11] | for the Alzheimer Society of Canada Task Force on Dementia Care Best Practices for COVID-19

TABLE 1 Domain-specific cognitive measures for telemedicine use

Test name	Administration time, min	Public domain	Telephone administration possible	AAN Behavioral Neurology Workgroup[21] recommended	Use in telemedicine (references)
Attention					
Oral Trail Making Test, Part A[37]	5	✓	✓		✓[41]
Digit Span Forward[21]	3-5	✓	✓	✓	✓[42,41,43–46]
Digit Span Backward[21]	3-5	✓	✓	✓	✓[41,43–44]
Sequential Operations Series (eg, Months-of-the-Year-Backward)[21]	2	✓	✓	✓	✓[47]
					[49]
Executive Function					
Oral Trail Making Test, Part B[37]	3	✓	✓		✓[41]
Frontal Assessment Battery[21]	10	✓		✓	✓[50]
Similarities subtest (WAIS-IV)[21]	3-5		✓	✓	✓[51]
Language					
Boston Naming Test-15-Item Short Form[21]	3-5			✓	✓[42,41,43,44]
Cookie Theft Picture[52,53]	3-5	✓			✓[54]
Controlled Oral Word Association[21]	5		✓	✓	✓[14,42,41,43,54,55]
Semantic Category Fluency[21]	5	✓	✓	✓	✓[42,41,43–45]
Auditory naming test[39]	3-5		✓		✓[38]
Memory					
Rey Auditory Verbal Learning Test[21]	15	✓	✓	✓	✓[56,57]
Hopkins Verbal Learning Test[21]	5-10	✓	✓	✓	✓[42,41,43–45]
Rey Visual Design Learning Test[58]	5-10	✓			✓[89]
Spatial cognition					
Cube Copying Test[21]	3	✓		✓	✓[14]
Short-forms JLO[21]	10	✓		✓	✓[59]
Social cognition					
Ekman 60 Faces Test[60]	10				

AAN, American Academy of Neurology; ANT, Auditory Naming Test; BNT-15, Boston Naming Test-15 Item Short Form; COWAT, Controlled Oral Word Association; HVLT, Phonemic/Letter Fluency; Hopkins Verbal Learning Test; JLO, Judgment of Line Orientation; MBT, Months of the Year Backward Test; RAVLT, Rey Auditory Verbal Learning Test; RBANS, Repeatable Battery for the Assessment of Neuropsychological Status; RVDLT, Rey Visual Design Learning Test; TMT-A, Trail Making Test Part A; TMT-B, Trail Making Test Part B; WAIS-IV, Wechsler Adult Intelligence Scale, Fourth Edition.



World Health Organization
European Region

Regional Committee for Europe
72nd session

Tel Aviv, Israel, 12–14 September 2022

EUR/RC72/5 | 1 August 2022 | 220529 | ORIGINAL: ENGLISH
Provisional agenda item 3

Regional digital health action plan for the WHO European Region 2023–2030

This draft regional digital health action plan for the WHO European Region 2023–2030 intends to support countries in leveraging and scaling up digital transformation for better health and in aligning digital technology investment decisions with their health system needs, while fully respecting the values of equity, solidarity and human rights.

The regional digital health action plan aims to contribute to (i) the achievement of the health-related Sustainable Development Goals, the WHO European Programme of Work, 2020–2025, and the WHO Thirteenth General Programme of Work, 2019–2025; and (ii) the operationalization of the WHO Global strategy on digital health 2020–2025.

The regional digital health action plan identifies four strategic priorities for the achievement of this vision: (i) setting norms and developing technical guidance; (ii) enhancing country capacities to better govern digital transformation in the health sector and advance digital health literacy; (iii) building networks and promoting dialogue and knowledge exchange; and (iv) conducting horizon-scanning and landscape analysis for patient-centred solutions that can be scaled up.

The draft regional action plan is submitted to the 72nd session of the WHO Regional Committee for Europe together with a draft resolution in September 2022.

Domain / Factor	Face-to-Face Testing	Distance (Remote) Testing	Performance Impact
Test Accuracy (Overall)	Very high; gold standard; optimal control of environment.	Generally high if using validated remote protocols; slightly more variability.	Usually minimal differences.
Memory (verbal tasks)	Reliable and consistent.	Reliable if audio quality is clear.	Little to no difference.
Language Tasks	Clear communication and cueing.	Works well; minor issues if audio/video distort speech.	Minimal difference.
Attention (basic)	Stable measurement; controlled environment.	Similar accuracy unless interruptions occur.	Minimal difference.
Processing Speed	Accurate timing using physical materials.	Can be affected by lag or slower response via computer.	Slightly lower scores possible.
Executive Function	Optimal observation of strategy and behavior.	Largely comparable; may miss subtle behavioral cues.	Small potential differences.

Visuospatial Tasks (e.g., drawing)	High fidelity—they can see your work and posture clearly.	Harder to evaluate due to camera angle and resolution.	Moderate differences; in-person preferred.
Motor Tasks (fine or timed movements)	Accurate observation of motor speed, tremor, etc.	Limited by video quality; subtle movements may be missed.	Often less accurate remotely.
Timed Tests	Exact timing with physical measures.	Affected by latency or delayed instructions.	Slight performance drop.
Behavioral Observation	Examiner can observe fine details (fatigue, frustration).	Some subtle cues missed due to camera limitations.	Lower observational precision.
Rapport & Engagement	Stronger rapport; fewer distractions.	Some participants feel less engaged or more self-conscious.	Mild effect on performance.
Technical Factors	No technology barriers.	Internet issues can disrupt cognitive load.	Potential small negative impact.
Accessibility & Convenience	Requires travel; may increase fatigue.	Easier access; reduces anxiety for some individuals.	Sometimes improves participation.