



Diagnostic tools for primary care- Informative session on low cost tools

Hilkka Soininen

University of Eastern Finland

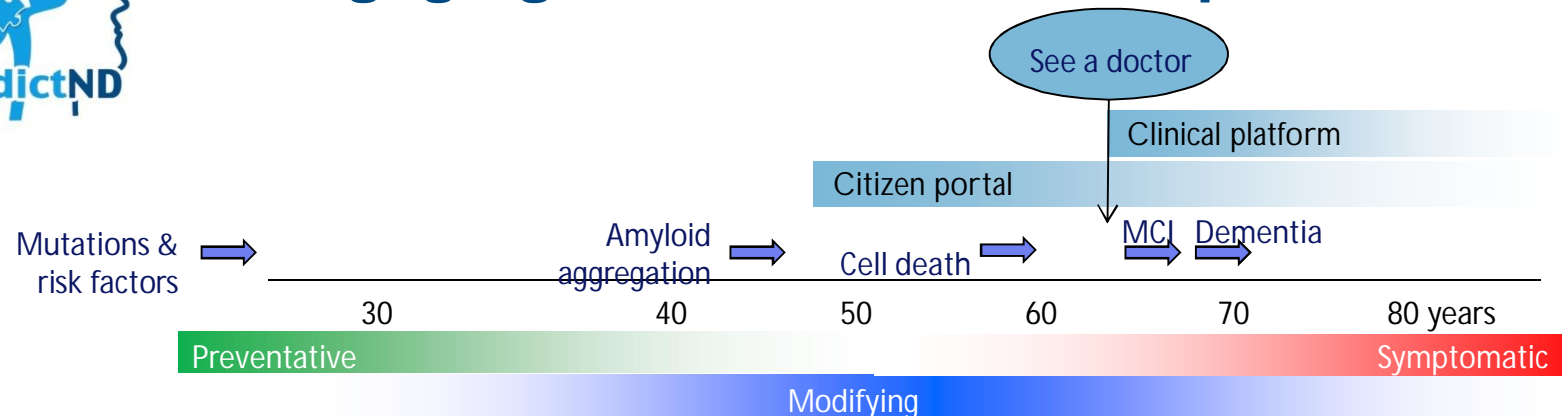


This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 611005

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Engaging citizens in dementia prediction



§ Citizen portal is a new concept to promote risk assessment and early detection of cognitive decline

§ Cognitive tests and games form one possible source of information.

§ Data can be enriched from other sources, e.g. by biomarkers from blood or gait.

§ In the future, the citizen portal could provide services also for interventions, not just for assessing the risk.



PredictND – Battery of low-cost biomarkers

PredictND aims to develop a **battery of low-cost biomarkers and a citizen portal** which could enable the detection even at the pre-symptomatic phase in the future. e.g..

- web-based cognitive test (Muistikko) and games.
- gait analysis. and
- blood-based biomarkers.

PredictND runs a **prospective study** with 334 subjects.



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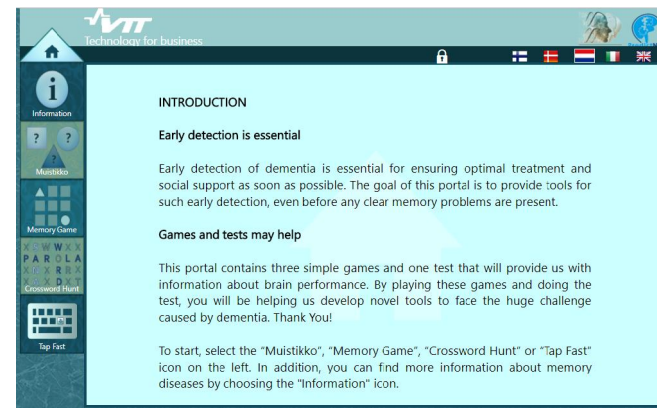




Citizen portal

The citizen portal contains currently the following modules:

- Information package for users
- Web-based cognitive test (Muistikko)
- 3 simple games
- Visualisation module





Muistikko

A web-based cognitive test with 10 subtasks was designed by neuropsychologists from UEF and implemented by VTT:

- verbal memory with visual cues (recall words/pictures)
- Corsi block tapping test
- reaction time and processing speed test
- executive function and flexibility
- delayed recall and recognition

Muistikko has been/is used in the following studies:

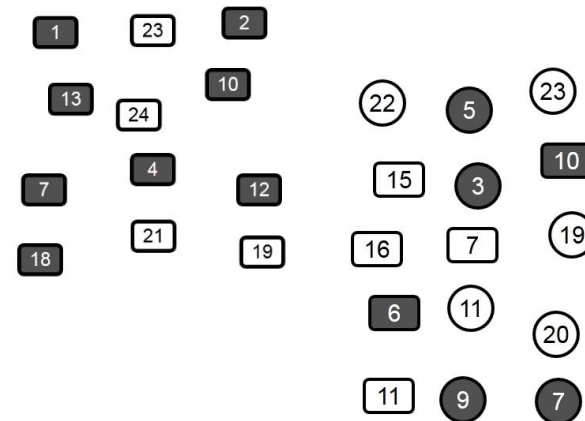
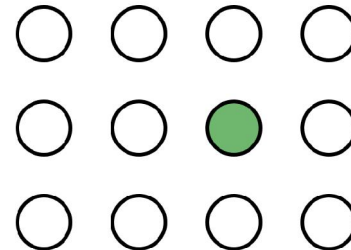
- FINGER (N=131) – baseline & follow-up – very early symptomatic cases.
- VPH-DARE (N=83) – baseline – healthy & MCI & AD/FTD.
- PredictND (N=337) – baseline & FU6. FU12. FU18 – MC patients with MMSE \geq 25.
- TTL (N=3000) – baseline & FU - employees

10/26/2017



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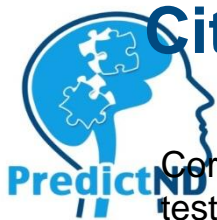


Global cognitive score



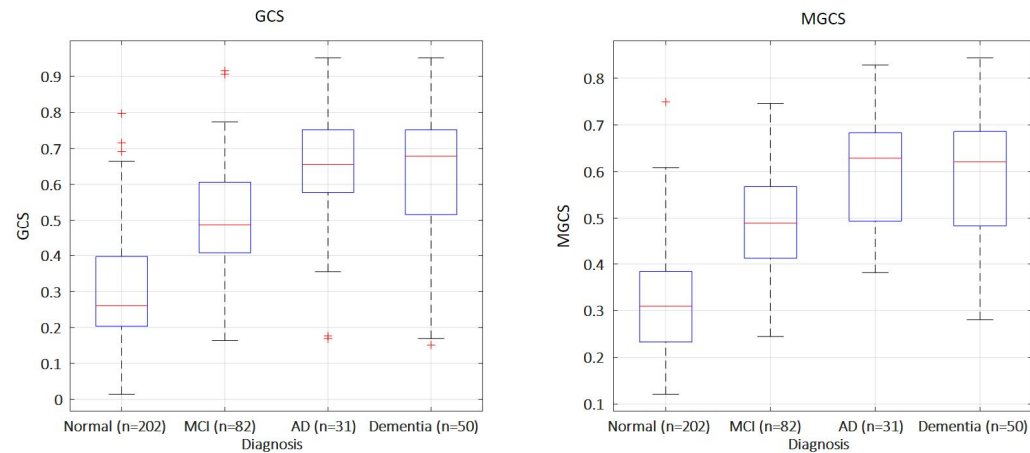
- 1) Define global cognitive score (GCS) from VUMC data (CN vs. AD) using DSI:
 - Age
 - Sex
 - Mini-Mental State Examination (MMSE)
 - Digit Span: Forward and Backward
 - Rey Auditory Verbal Learning Test: Total Score and Delayed Recall (or CERAD Total Learning and Recall)
 - Trail Making Test A and B (TMT-A. TMT-B)
 - Animal Fluency
- 2) Compute GCS for PredictND, VPH-DARE and FINGER.
- 3) Estimate GCS (dependent variable) using linear regression from Muistikko parameters (independent variable).

	Age	Females (%)	Total	CN	MCI	Dementia
PredictND	67±13	56	334	202	82	50
VPH-DARE@IT	68±8	50	80	19	37	24
FINGER	70±5	46	93	81	8	4



Citizen portal - Muistikko

Correlation coefficients between global cognitive score (GCS) from basic neuropsychological tests and Muistikko GCS (MGCS) using the model derived from PredictND data: 0.79 for PredictND, 0.76 for VPH-DARE and 0.62 for FINGER.



	CN (N=200) - DEM (N=50)			CN (N=200) - MCI (N=81)		
	MMSE	GCS	MGCS	MMSE	GCS	MGCS
AUC	85.5	89.0	93.1	77.4	83.4	86.7
Accuracy	83.4	85.6	88.7	78.3	76.3	81.2
Sensitivity	74.1	78.7	81.4	57.6	76.1	79.0
Specificity	85.8	87.4	90.7	86.5	76.3	82.1



S4. Validation of Low cost methods in differentiation against traditional methods



MAHDIANI S, PAAJANEN T, BRUUN M, BARONI M, RHODIUS-MEESTER H, LEMSTRA AW, HERUKKA SK, PIKKARAINEN M, HÄNNINEN T, NGANDU T, KIVIPELTO M, GILS M van, HASSELBALCH S, MECOCCI P, FLIER WM van der, REMES A, SOININEN H, LÖTJÖNEN J

Muistikko validated in PredictND, VPH-DARE@IT and FINGER cohorts

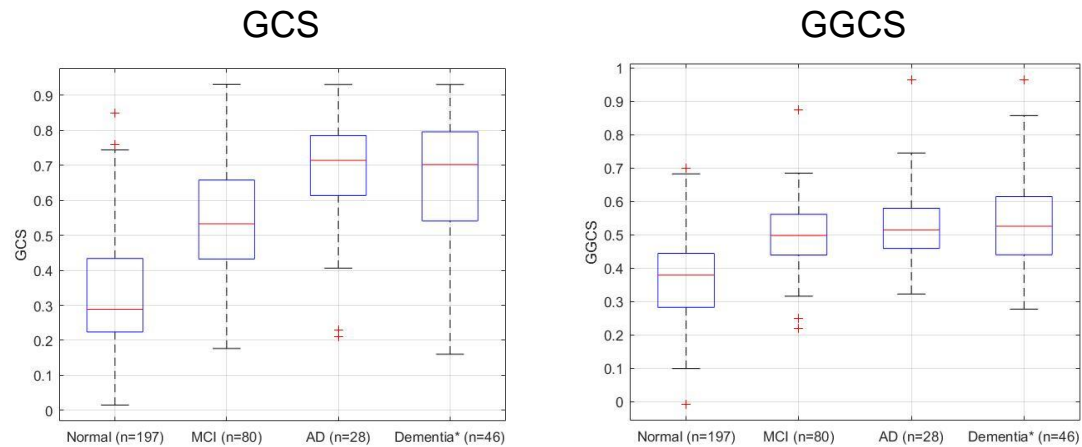
PredictND (N=334) VPHDare (N=80) FINGER (N=93)	GCS			MMSE			RAVLT-Learning			RAVLT-Recall			CSF-Ab			CSF-tau			MRI-Hippu		
	PRN	VPH	FNGR	PRN	VPH	FNGR	PRN	VPH	FNGR	PRN	VPH	FNGR	PRN	VPH	FNGR	PRN	VPH	FNGR	PRN	VPH	FNGR
VerbalImmediate [N]	-0.66	-0.63	-0.56	0.47	0.52	0.24	0.47	0.61	0.51	0.46	0.53	0.54	0.29	0.27		-0.19	-0.40		0.29	0.11	
ReactionTime II [s]	0.38	0.49	0.02	-0.25	-0.54	-0.04	-0.26	-0.35	0.00	-0.26	-0.27	-0.03	0.09	-0.03		-0.07	0.12		-0.19	0.03	
VisualShift [s]	0.57	0.59	0.47	-0.35	-0.69	-0.15	-0.27	-0.38	-0.25	-0.27	-0.35	-0.28	-0.18	-0.06		-0.05	0.14		-0.20	-0.02	
VerbalDelayedRecall [N]	-0.65	-0.55	-0.55	0.45	0.47	0.32	0.46	0.51	0.43	0.52	0.51	0.53	0.40	0.35		-0.31	-0.49		0.30	0.37	
VerbalRecognitionDuration [s]	0.52	0.39	0.21	-0.43	-0.52	0.01	-0.27	-0.38	-0.18	-0.30	-0.24	-0.17	-0.23	-0.14		0.12	0.21		-0.22	0.13	
Muistikko GCS (MGCS)	0.79	0.76	0.59	-0.53	-0.60	-0.28	-0.50	-0.60	-0.40	-0.51	-0.52	-0.48	-0.36	-0.23		0.21	0.40		-0.33	-0.17	



Citizen portal - Games



Very tentative results from the games in the citizen portal show that they also provide potentially relevant information for screening purposes.



PredictND	CN (N=194) - DEM (N=42)						CN (N=194) - MCI (N=77)					
	GCS	GGCS	MemC	CW-W	CW-I	Tap	GCS	GGCS	MemC	CW-W	CW-I	Tap
Games												
AUC	87.7	83.8	84.2	78.1	77.9	52.6	83.5	77.7	72.6	74.2	73.8	62.3
Accuracy	84.8	77.1	82.6	63.4	69.1	56.4	75.3	72.7	70.9	62.4	67.8	61.0
Sensitivity	82.7	70.1	51.7	75.5	75.4	38.6	74.1	76.0	45.5	75.5	68.8	52.8
Specificity	85.3	78.6	89.2	60.8	67.8	60.3	75.7	71.3	81.0	57.2	67.4	64.3

GGCS=Game Global Cognitive Score=Memory Card + Crossword + Tapping. MemC = Memory Card. CW-W = CrossWord with Words. CW-I = CrossWord with Images.

S. Mahdiani – AAIC 2017



Gait as predictor of dementia risk P3.4

PÄRKKÄ J, MAHDIANI S, BRUUN M, BARONI M, RHODIUS-MEESTER Herukka SK,
GILS M van, HASSELBALCH S, MECOCCI P, FLIER W van der, REMES, A,
SOININEN H, LÖTJÖNEN J

- The WALK test: standing up from a chair, walking 20 m with 3 turns, and finally sitting down on a chair.
- The DUAL test: walking as above with simultaneously counting aloud backwards, starting from 100.
- Movements were measured with Actigraph GT3X-BT accelerometers.
- MMSE correlated with **walking irregularity during the DUAL task but not with walking speed**. Collecting 12-month follow-up data and further analyses are ongoing.



Conclusions

- § The validation of the platform showed promising results. The portal has great potential in providing tools for the early detection of memory disorders.
- § The platform could be a cost-efficient tool for
 - § initial assessment of the patient in the primary care
 - § used independently by citizens at home for assessing their brain health
 - § in clinical trials for enriching populations for patient selection.
- § Several hospitals have indicated their interest to use especially the web-based cognitive test Muistikko both in research and clinical practice.