Feasibility Study MEDIS EnCare

1. Foreword

This study was produced as part of a unique development project "MEDIS EnCare" in cooperation with MEDIS Management GmbH Elsterwerda, Adler Management Berlin and other partners involved.

The "Social Innovation" funding guideline is also unique in the state of Brandenburg, which makes such project implementation possible in the first place. Small project teams can receive relatively uncomplicated support in developing innovative approaches within the framework of this guideline. Thanks are therefore due to the State of Brandenburg, in particular the Ministry of Economic Affairs, Labour and Energy of the State of Brandenburg (MWAE), the European Union as a co-sponsoring institution and the technical assistance provided by Wirtschaftsförderung Land Brandenburg GmbH (WFBB) and Investitions- und Landesbank des Landes Brandenburg (ILB).

A number of participants took part in this study: MEDIS Elsterwerda staff, doctors from the MEDIS doctors' network, staff from Adler Management, Klinikum Niederlausitz and subordinate institutions.

The authors were:

Berg, Prof. Dr. Frank (survey of participants, contribution to chapter 4)

Bünger, Marco (overall editing, chapter 2, contribution to chapters 3, 4, 5 and 6)

Jäger, Dr. Carsten (Contribution to Chapters 5 and 6)

Winkelmann, Tino (Contribution to Chapter 3)

The entire project was optimally supported and technically accompanied by the developers of the EAAT test, the Czech company DAP Services a.s., despite the Corona pandemic and the lack of possibilities for presence.

The "MEDIS EnCare" project focused on the question of the extent to which a technical innovation, the digital medical product "EnCare Alzheimer's Association Test (EAAT)", can become a driver of social innovations in the Brandenburg health care system, with a particular focus on the distribution of work and the relief of skilled workers in the prevention and (early) detection of dementia. It is likely to remain unique that a medical product is first examined with regard to its social effects or its innovation potential, even before it is medically validated and brought onto the market by "big" players with the corresponding financial resources.

2. Initial situation - dementia and rural areas in Brandenburg

The rural area in Brandenburg is characterised by an increasingly ageing population, accompanied by an increase in the number of dementia patients and a simultaneous shortage of skilled workers in the entire health care system, but especially in inpatient and outpatient care. In the decade 2020-2030 alone, the country will have a shortage of about 13,000 health professionals, while at the same time the number of dementia patients will increase by more than 50% to over 90,000 by 2030. In addition, there will be a high number of retirements in the medical sector, which will lead to a further worsening of the supply situation in the country. The peripheral/remote regions of the country are particularly affected by this.

Social innovations are therefore urgently needed, especially in rural areas, in addition to the recruitment and retention of skilled workers, among other things through "a reduction in care prevalence, for example through (...) care structures (...) that take effect at an early stage locally" in order to "(...) reduce the emerging need for services and thus alleviate the foreseeable shortage of skilled workers"[1].

In the field of dementia, the situation is specifically characterised by the following serious problem complexes:

- The diagnosis of dementia, especially the differential diagnosis from the "normal" age-related loss of cognitive abilities, is time-consuming and requires early recognition by (caring) relatives.
- As differential diagnosis is often carried out too late, the number of unreported cases in this area is quite high and dementia is often diagnosed late.
- This results in various problems in the organisation of adapted care, but also in dealing with relatives (powers of attorney, etc.).

For these reasons, early detection of risks or an early phase of dementia is an essential, if not the only, approach to planning the necessary care and support in the long term, to at least slow down the course of the disease with therapeutic offers and to enable the family environment to deal with the disease at an early stage.

This functionality is brought by the EnCare EAAT test, which was developed in the Czech Republic from 2016-18 by a team from DAP Services a.s. and the Czech Alzheimer's Association.

[1] SÖSTRA & IMU Institute: Facility Survey in Selected Health Professions 2014, p. 119

3. EnCare EAAT - Innovation in dementia (early) detection?

The CA method - scientific basis of the EAAT test

Cognition and behaviour are highly interwoven in humans, but are nevertheless subject to a strong degree of involuntary physiologically determined mechanisms. The CA method is able to take and evaluate measurements of the cognitive and physiological constitution of a test person precisely at this interface. In addition, statements can be made about the behavioural repertoire currently available to the test person.

On the basis of the three closely linked dimensions of cognition, physiology and behaviour, it is possible to make diagnostic statements about the individual risk of a possible later dementia disease as well as a reliable early detection of the first cognitive changes in test persons with still very slight symptoms.

Today, there are various applications of the CA method in the fields of human resources, sports, market research, education and healthcare. To date, approximately 650,000 tests have been conducted worldwide, and scientific studies have proven the reliability and precision of the method (more information at www.camethod.com).

Neuro-physiological and sensory-physiological classification of the CA method

Humans can psychophysically distinguish about 200 colour tones through the interaction of retina and cortex. The system provides an additional differentiation in over 500 brightness levels, which can be perceived independently of the hue. Multiplicative use of the qualities hue, brightness and saturation thus results in several million differentiation possibilities that our current visual system can calculate. These strong differentiation possibilities require a highly efficient central nervous system.

Random genetic mutations, which were, however, quite advantageous for the survival and reproduction of cells, led to the development of light-sensitive cells in organisms of the primordial ocean. On this basis, evolutionary processes brought forth the eye as probably the most important sensory organ at the end of a long developmental chain. The eye is the most complex interface between the environment and our self. Today, as trichromats[2], we have about 250 million sensory cells in our visual system alone. That is more sensory cells than for all other human senses combined.

According to this, colours and colour perception played and still play a major, possibly even decisive role in the development of the human central nervous system and significantly determine our behaviour today, but also our general cognitive performance.

[2] Trichromats: Creatures that have 3 types of cones (colour receptors) in the retina.

Physiological effects of colour perception

The detection of colour stimuli by the photoreceptors of the eye, the preprocessing of these stimuli in the retinal neurons[3], their encoding and transmission via the optic nerve and visual pathway as well as their processing in the visual cortex of[4] the brain are complex psychophysical processes, at the end of which stands colour perception.

In the further neuronal processing of colour sensations, colour perception is always very closely linked to the observation and environmental conditions and the brain areas responsible for them. Colour perceptions are able to trigger emotions and further sensations and ultimately even influence differentiated feelings.

When the human eye perceives colours, ancient "programme disks" and a quasi-evolutionary programme are automatically activated on the basis of a genetic coding (script). This script runs unconsciously. It is not possible to influence it deliberately. Human behaviour is subject to a control influenced by colour perception, which we cannot escape.

Colours trigger reflexes and reactions in the brain stem. These have behavioural control functions that are important for survival and mainly affect unconscious but also conscious processes. These neuronal mechanisms of the brain stem are mainly located in its transition to the spinal cord. This transition (medulla oblongata) is a reflex centre that registers incoming sensor signals within a very short time - bypassing consciousness and voluntary control.

The incoming sensor signals are not first processed by corresponding higher brain regions and summarised for an adequate assessment in order to initiate a voluntary reaction, but are converted into direct action potential without detours. Within milliseconds, the colours adjust our brain to their meaning and trigger physiological and psychological effects that activate us and equip us with a "preset", so to speak, for the subsequent required behaviour. Colour stimuli thus reach the brain stem very quickly on direct projection pathways and influence our basic moods and sensations.

Through its ascending reticular activation system, the brainstem initiates higher process processing. The brainstem activates the cerebrum in such a way that consciousness and attention arise.

After colour stimuli have triggered potentials in the brainstem, the information is transmitted, among other things, via one of the most important and largest projection pathways, the formatio reticularis, ascending from the brainstem to the limbic system (mesolimbic pathway), including the hippocampi and fornix[5]. The formatio reticularis with its fibre bundles even [6]reaches the medial forebrain bundle and the

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[3] Retinal neurons: all nerve cells in the retina (cones, rods, also ganglion cells and amacrine cells).

[4] Visual cortex, entire visual cortex of the brain, seat is the occipital lobe

[5] Hippocampus: - Hippocampus (limbic system), memory consolidation, knowledge storage, memorisation processes (Alzheimer's disease almost always begins here), fornix: (limbic system), transfer of short-term memory content into long-term memory, learning processes.

[6] Formatio reticularis: wake-up system, projection pathway, activation (ARAS), start of emotion processing

diencephalon and thus finds participation in homeostasis[7] , but also voluntary behavioural control for processing pleasure, lust and reward impulses. The limbic system is a brain region that forms a ring around the upper brainstem. This is where all incoming sensory signals are coordinated and emotionally evaluated. The limbic system is responsible for services such as learning, motivation, emotions, memory and many vegetative functions. For some years now, the limbic system has also been attributed more and more intellectual performance.

Via regulatory mechanisms with the strong involvement of the amygdala, our fear and anxiety conditioning centre, effects from colour stimuli are also processed further, along with many other excitations. If, for example, a signal based on the colour red arrives at the amygdala, our organism is already preset to it, as briefly explained above. Now this signal is transmitted upwards to a higher brain region, the visual cortex. The visual cortex occupies the largest part of the occipital lobe[8]. This part of our brain, which is rather young in developmental history, is where our image of the world is formed. This is where sensory impressions are received and processed, information is stored and interpreted, actions are stimulated and feelings are triggered. The cerebral cortex is the seat of human consciousness and makes the human being what he or she is, a reflected cognitive being.

Object processing thus takes place in the occipital lobe as the first step of higher process processing. Space, time and situation are evaluated and fed back to the amygdala. If, for example, blood, lava or fire are fed back to the perception of red, the amygdala immediately activates the hypothalamus (in the diencephalon) which immediately sets our vegetative nervous system and all vegetative functions to "survival".

Continuing upwards into the frontal brain, the information now reaches the youngest and most human part of our brain, the frontal lobe. Here, in the frontal association areas, incoming emotions are processed into feelings based on experience and knowledge. The frontal lobe is also home to the executive frontal functions (EF) that generate, trigger and control our complex human behaviour (the seat of soft skills). If healthy processing can take place, it will also be possible for the individual to generate adequate, favourable behaviour that is beneficial to the self.

It becomes clear that feelings need cognition. From the coarse behaviour-controlling primal mechanisms of emotions, which vary depending on the situation, the human mind, if it is functioning, models finely graded feelings. The force of the emotions is toned down. The primal emotions such as fear, anger, anxiety, pleasure, disgust, sadness, joy and surprise become finely graded emotions such as jealousy, insecurity, melancholy, pride, enthusiasm, bewilderment, glee, boredom, mortification, thoughtfulness, gratitude, guilt and despair. This is made possible by a complex mental processing of the purely physical perception of the environment in a healthy functioning brain.

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[7] Homeostasis: Regulatory mechanism, serves to maintain all life processes in the human organism in the necessary dynamic equilibrium.

[8] Occipital lobe: Occipital lobe of the cerebrum, part of the visual system, visual centre of the brain, tasks are colour perception, interpretation of visual stimuli, space, time,

Forms of dementia

A dementia syndrome can produce many symptoms. Although similar symptoms develop during the course of the disease, it is important to first distinguish the cause when making a diagnosis. There are primary and secondary forms of dementia. In the primary forms (frequent forms), the causes lie in a multi-layered cortical neurodegeneration. The secondary forms (rather rare forms) are not cortical neurodegenerative in nature. The cause is a long-lasting, moderate to severe depression. However, both forms of dementia always lead equally to a reduction in cognitive performance and, in the further course, also to unfavourably influenced social behaviour, changes in emotional control and motivational difficulties.

In primary forms of dementia such as Alzheimer's disease, frontotemporal dementia, vascular dementia or Lewy body dementia, the causes of the disease are neurodegenerative. In very simplified terms, this means that mainly neurons, neurites and dendrites die off[9].

The number of neurons decreases, connections between the nerve cells are lost, communication between the cells is disturbed. Thus, projection pathways and projection areas are also gradually lost. Depending on which area of the brain is affected first, the functions performed by this region are also affected first. **Alzheimer's disease** (AD) almost always begins in the hippocampi, a large region of the limbic system. This brain region is the switch point between short- and long-term memory and is significantly involved in memory consolidation. Another important function of the hippocampus is the control of basic emotions such as anger, fear, sadness, disgust and joy. In connection with the amygdala, the hippocampus is able to emotionally evaluate and control signals (stimuli) from the environment. With the onset of Alzheimer's disease, disturbances in memory, thinking and orientation can develop quite quickly. In the course of the disease, there are increasing problems with arithmetic, learning ability and general comprehension. Eventually, speech and language comprehension, impulse control and judgement are also affected.

In contrast, in the less common **frontotemporal dementia** (FTD / Pick's disease), the disease begins in the areas of the frontal lobe, the brain region that generates our social behaviour and where our other executive functions are located. FTD is also a neurodegenerative form of dementia. In contrast to Alzheimer's, the social behaviour of the sufferer is impaired first. Impulses become increasingly difficult to regulate and can no longer be adequately compensated. Compassion, sympathy and empathy disappear. It is difficult to feel differentiated feelings such as joy or gratitude. Aggression can occur.

Circulatory disorders in the brain can trigger **vascular dementia** (MID, SAE) when blood vessels supplying the brain are narrowed or even blocked. The nerve cells are then no longer supplied with sufficient blood and die.

Lewy body dementia (LBD) is very similar to Alzheimer's disease. It is often difficult to distinguish between the two. It is currently assumed that mixed forms can occur. Symptoms of this dementia include severe fluctuations in cognitive performance and general alertness. Some patients suffer from visual

[9] Neuron: nerve cell, neurite: efferent (leading out) cell process of a neuron, dendrite: cell processes of nerve cells responsible for stimulus reception.

hallucinations, which can often be very detailed. In addition, mild Parkinson's-like symptoms such as stiff movements and trembling of the hands can be classified under this disease.

Those who suffer from dementia lose their mental and intellectual abilities step by step. Memory, thinking, language and practical skills deteriorate continuously. Emotionality and the experience of feelings weaken. The person finds it increasingly difficult to relate to himself and his environment.

Unfortunately, an early diagnosis of dementia or a reliable risk assessment is still difficult today. Especially when the patient still shows almost no symptoms. In early diagnosis, methods such as questionnaires, also in the form of psychometric tests, the diagnostic interview and cognitive performance tests are mainly used. Well-known and established test methods are the MMST, the clock test and the DemTect test. However, valid early detection is not possible with these methods.

Predicting the risk of a later Alzheimer's-type dementia as early as possible, even before the first symptoms appear, is an important and meaningful goal for many people. Several Alzheimer's blood tests and genetic tests currently seem suitable for this purpose.

The EAAT's online sensor as an interface between psychophysics and cognition

A new possibility for this is offered by the EAAT based on the CA method. The CA method measures and evaluates **authentic, uncensored associations** - and in the case of the EAAT can diagnose changes in the interaction between the subconscious (intuition) and conscious (thinking). Neuronal connections are stimulated in milliseconds by the association of colour and word. In addition to rational aspects, the method also takes into account emotional, social and physiological aspects that cannot be captured by simple questionnaires or psychometric tests.

This is made possible by combining two psychological-diagnostic assessment methods. The test design of the CA method works simultaneously with the principles of psychometric tests and the principles of projective procedures. In the process, the scale often used for psychometric tests is replaced by the graduated intuitive colour selection in the evaluation of the words. At the same time, the described colour effects on our central nervous system stimulate a social and emotional classification of the term in the colour wheel. This succeeds differently depending on the mental state.

In the CA method, therefore, an evaluation algorithm assesses and objectifies the physiological, emotional and social decisions of the subjects evoked by the colours and words.

Psychometric tests to diagnose dementia do not provide robust data in the early stages. The scales used for measurement simply cannot be fine-tuned. In simpler qualitative interviews, for example in the course of a family history or self-assessment, no measurement data are provided in the strict sense, but at best a highly subjective self-assessment is made.

The EAAT could be a good additional diagnostic aid here. It measures precisely at the sensory interface between the human mind and the environment. It includes a whole range of cognitive functions such as (colour) perception, learning, reading, recognition, judgement, memory, thinking, orientation and behaviour in the measurement.

Description of the EnCare Alzheimer's Association Test (EAAT)

The EAAT test was developed by the Czech Alzheimer's Association in cooperation with DAP services s.r.o. in 2016-18. It is currently offered in a number of pharmacies in the Czech Republic in cooperation with the Czech Alzheimer's Association. The test can be carried out anywhere and at any time, only an internet connection is required. It can be carried out on computers, tablets or smartphones, and a virtual reality application is currently being developed.

It has been proven in the first application studies[10] that especially older test persons with a large tablet or a touch screen computer can perform this test best. If there are already noticeable cognitive or motor impairments, a caregiver can be present.

The test procedure is as follows:

- The test persons identify themselves in the test by their first and last name as well as their age and gender. It is possible to remain anonymous, for example by reducing one's own name to initials or choosing a pseudonym, as no plausibility check is carried out by the system.
- Then the 3 parts of the test are briefly explained. After the explanation, the test starts:
- The test person first clicks on all 8 specified colours one after the other, starting with the most likeable and ending with the least likeable.
- Approximately 110 terms are displayed, to which the respondent assigns/associates 3 of the 8 colours to the respective term relatively quickly (2-5 sec.) and thus intuitively by clicking on them.
- At the end, the respondent sorts all 8 colours again according to liking (this is not a memory test, colour preferences may shift during the test).

Figure: Login screen and screenshots of the test

After completion of the test, the supervisor can access the results on a secure internet portal and receives them as a PDF file.

The time required for the test is approx. 15-30 min after instruction by a supervisor, the result is immediately available and can therefore also be evaluated directly afterwards.

[10] cf. https://digital-library.theiet.org/content/journals/10.1049/htl.2016.0102

Diagnostic result of the EAAT

The test result shows cognitive impairment in 3 areas on a scale from 0 to 10:

A. Reaction time
coordinative abilities in relation to the temporal and spatial reaction pattern as well as the rhythm when clicking on the colours during the test show the speed of the person's temporal reaction to impulses and events in their environment; in the development of the EAAT, significant differences were discovered here when clicking on the 2nd and 3rd colour between healthy and ill subjects.
Increased values show that rational thinking is less or no longer involved in the reaction to external stimuli. The person has less or no time to become aware of the consequences of their own actions.

B. Social distance
Social behaviour, feelings, relationship with self and others, attitudes towards people.
Elevated scores indicate the person's reluctance to establish relationships with other people or participate in group activities. A high score indicates extensive social isolation

C. Isolated associations
Difficulties in recognition and spatio-temporal experience; disturbed or damaged frames of reference, categories and associations.

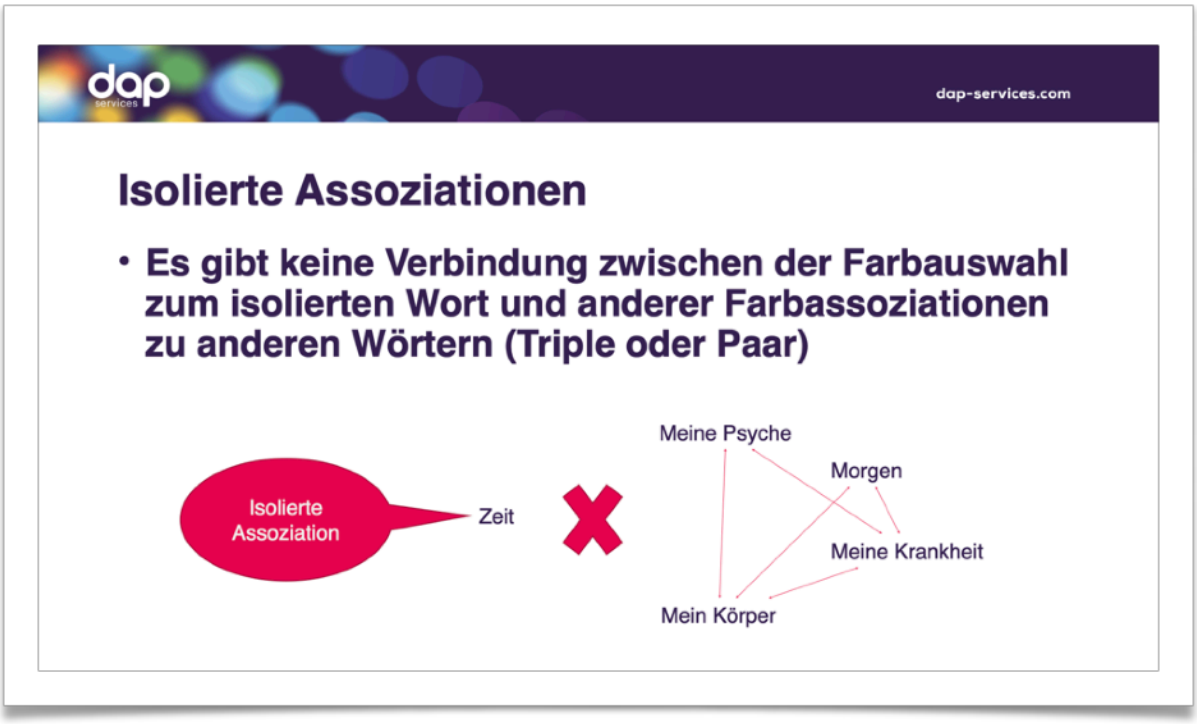

Figure: The principle of isolated association [11]

[11] Source: Lecture by Jiri Simonek (DAP) on 5.8. at the kick-off workshop of the project "MEDIS EnCare".

Increased values show the occurrence of phases with isolated associations. The system also shows which phrases are (particularly) isolated. These can be temporal or spatial references (day, in front, behind,...) or direct references to problems (remembering, household).

The overall assessment of a person's cognitive state is represented by the average of the three parameters. For the evaluating person, there is a uniform scale for all three indicators:

- **Low values** in an indicator between 0 and 4 are considered completely unproblematic (or sum of the values of all three indicators below 12)
- **Increased values** between 4 and 7 are considered minor deviations; in this case, further medical examination is recommended in case of genetic predisposition or suspicion (or sum of the values between 12 and 21).
- **High values** between 7 and 10 indicate an already existing dementia, further clinical examinations are recommended (or sum of the values above 21).

Besides this average, the test shows risks in individual indicators:

- Elevated values or high values in a range should indicate a (low) risk.
- If the values are increased in two areas, this can already be considered as a higher risk ("gateway") (the busy and socially isolated manager, for example).
- In healthy people, the occurrence of isolated associations is actually not detectable. In case of doubt, a second test should be carried out in case of rashes.

4. Pilot tests within the framework of the feasibility study

Study design

The pilot tests in our study were conducted with volunteers aged 30 years and older. A total of 33 people took the test, 21 of them women and 12 men. The average age of the test persons was 53.8 years.

These were subjected to the test in various environments:

- Tests in the dementia shared flats of MEDIS Elsterwerda and in the accompanying residential facilities
- Tests in GP practices in the Elsterwerda region
- Tests in a "private" environment with volunteers
- Tests without personal accompaniment for volunteers

It was also planned to use the EAAT in the geriatric department of the Niederlausitz Clinic and to use it in parallel to conventional tests during anamnesis. This plan could [12]*not be implemented due to the Corona pandemic and the associated early isolation of the department.*

20 participants took part in a written survey, in which above all the acceptance of the procedure was tested.

Evaluation of the results of the pilot tests

Almost half of the test results (16/33) indicated neither a disease nor a risk, in 14 subjects a medium risk was selected (here, testing for a genetic predisposition and, if necessary, consultation with a doctor is recommended), in 2 cases a dementia-related disease (these were actually residents of the shared flat suffering from dementia) and once a - previously unknown - high risk of such a disease (here, further medical examinations are recommended). In the small group of test persons, no trends were recognisable that correlated with the age of the test persons. Only in the area of social distance was there a recognisable trend towards a higher social distance in old age.

These results are not representative and cannot be generalised. Moreover, they must first be validated by a corresponding clinical comparative study with regard to their medical significance. However, the project team was able to draw some conclusions and gain experience in the course of the pilot tests:

I. Dementia can be very clearly ruled out with the test. This is shown by the marked test results of three test persons in the 70+ age group visible in the diagram.

II. Early risks for later dementia are also clearly visible and interpretable (visible in the middle segment of the diagram).

[12] A corresponding further training of the staff in the department on the use of the EAAT was planned for 11.11.2020. An earlier date was not feasible due to the heavy workload of those involved. Already at the end of October, the Niederlausitz Clinic decreed for safety reasons that no more events with external persons could take place for employees of the Lauchhammer geriatric department.

III. The scope for interpretation increases for test results with high values; more precise clinical comparative studies are necessary here to reduce this and to make the significance of tests with high results more precise.

IV. There were also cases where a high value arose in isolated associations due to "conscious" colour associations, although these associations had or appeared to have no dementia background. This occurred in 3 conversations with correspondingly affected test persons. In one case, the repetition of the test with better clarification in advance led to a changed result for the indicator "isolated associations". However, the high validity of the method was shown as the other two indicator values were identical to the first test. In another case, the values between the first and second test were completely identical.

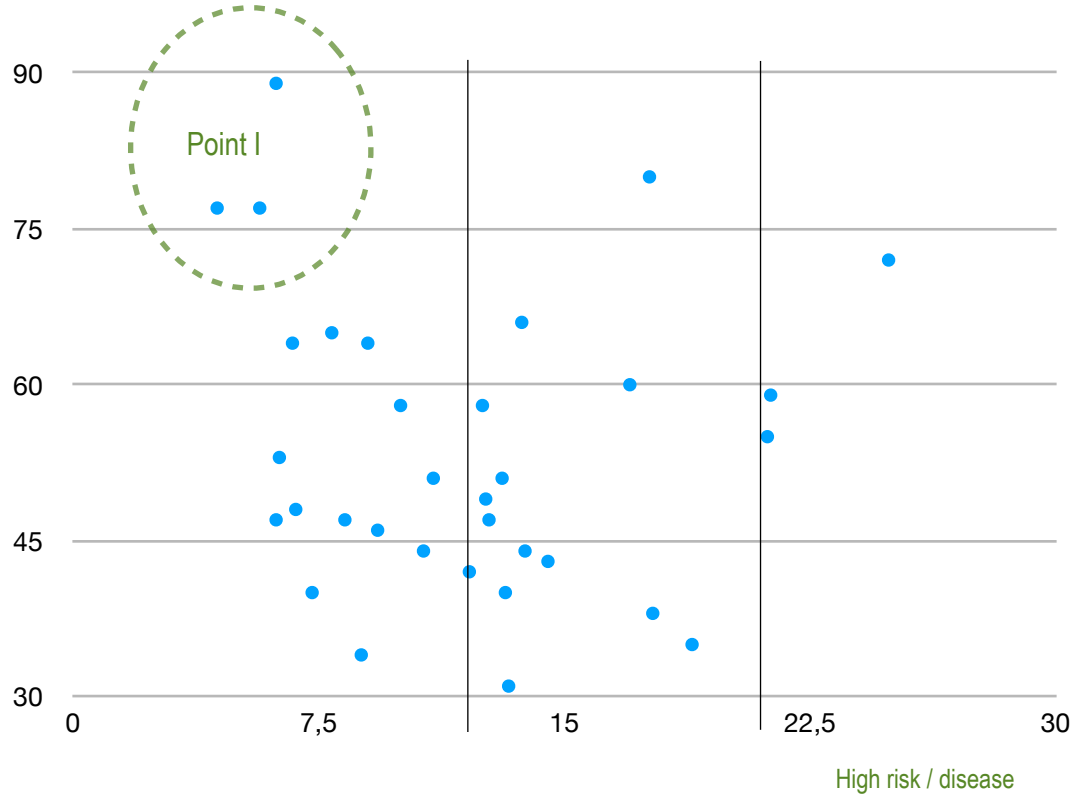

Figure: Distribution of test results by age and total indicator score

Reflections of the participants

In the evaluation of the pilot tests, 20 people were asked about their experiences with and opinions about this test. Only those people who were able to complete the test from start to finish due to their general state of health were interviewed. From this, insights can be gained into how the results of the test are to be evaluated and where the test procedure should be further developed, if necessary.

QUESTIONNAIRE

The survey was based on a questionnaire (see appendix) that was to be completed either by the respondents alone or with the help of an accompanying person (usually the person who had already ac-

companied the test). The purpose of the questionnaire was to provide a uniform grid for the survey. The questionnaire was not about percentage frequencies or further statistical calculations. The number of respondents would be too small for that. Rather, some qualitative assessments were to be derived from the results, which were then fed back and compared with the experiences of the "interviewees". The results of the survey were entered into a grid. This was the basis for the evaluation.

COMPOSITION OF THE RESPONDENTS

The respondents were not selected according to representative criteria, but in fact all persons who had previously taken the test regularly were interviewed. It was therefore not a question of representativeness. This was also not necessary in the context of the goal of the tests and the subsequent interview, because it was about exploration, the search for clues and suggestions for a further research and work process.

Of the 20 respondents, 7 were male and 13 were female. 11 people were in the age group up to 50, 5 in the age group up to 65 and 4 in the age group over 65. For future tests it would be interesting to include more of the over 65 age group.

12 of the respondents had a university degree, 4 had a skilled worker's, technical school or master's degree, 2 persons had no vocational qualification and 2 times there was no indication. Thus, mainly persons with a university degree were interviewed (and previously mainly persons with a university degree were tested), which suggests the task for further research to more strongly address subjects with an intermediate degree of education and professional qualification.

Almost all respondents (=15) did not have a care degree (only one person had a degree of 1; another 4 did not answer). This is in line with the purpose of the tests, which are supposed to indicate signs of the possible development of dementia at an early stage before the medical determination of mental or psychological impairments (and, if necessary, with pre-medical means).

GENERAL SENSITIVITIES DURING THE TEST

Most of the respondents found it easy to[13] complete the test. There was no person who found the test moderately difficult, rather difficult or difficult. This is also confirmed by the fact that 14 persons stated that they did not need any assistance with the test, 5 only needed slight assistance. 1 person needed medium assistance; this person was in the age group over 65 and did not have a vocational qualification. It should therefore be further investigated whether the test is too difficult for people over 65 and with an intermediate / lower level of education, or whether it needs to be accompanied in a suitable way.

On average, the respondents felt calm and relaxed during the test[14], a certain tension can be explained by the test situation itself and was also present in conversations with the respondents due to the topic of dementia.

[13] 11 very easy, 9 rather easy; mean =1.45 with 1= easy... 5= difficult

[14] Mean = 2.15 with 1= very relaxed ... 5=very stressed

A prerequisite for a relaxed approach to the test is that the meaning and the procedure are discussed with the respondents, which was the case for all respondents. The quality of this preparation is of great importance and should therefore be ensured as a pretest routine. Reflections in project meetings showed that small misunderstandings sometimes [15]occurred and that good preparation and training of the test facilitators is therefore necessary in order to minimise misunderstandings and misinterpretations.

PERCEPTION OF THE TEST RESULTS

It is noteworthy that 4 persons did not or did not want to state whether signs of dementia had been detected. This can be explained by the fact that the evaluation of the tests was done with great caution and restraint, since a clinical evaluation of the test is still pending and was not the goal here. It can be deduced from this that the test persons took the results with caution and questioned them.

Nevertheless: The discussed result was accepted by most of the subjects, more or less accepted by three subjects and 4 subjects did not give an answer to this question.

The question of whether the test persons consider the procedure to be useful in the early detection of dementia was answered by almost half of the test persons with "yes" or "rather yes", only 20% with "no" or "rather no". About one third could not make a statement on this, which can possibly be justified with the already mentioned, not yet available medical evaluation. Even if this question is rarely asked of a patient, it is a clear indication of the existing acceptance of a medical procedure and thus also its application in the population.

PLACE OF THE TEST PROCEDURE

An important question is where best to conduct the testing procedure. In the reality of the 20 respondents, the tests were carried out in different places, predominantly at home (via internet) or at the office workplace, also in the area of day care. When asked about their wishes for the location of the test, the majority said "at home / via the internet", also "doctor's office," sometimes also "dementia counselling centre". It can be seen from the answers that, depending on the local situation and individual wishes, a high degree of flexibility is possible in the place of questioning. In any case (also when testing at home), however, competent, personal counselling or corresponding instruction via video / explanatory text must be guaranteed before and after the test.

[15] for example, one respondent understood the terms "left" and "right" (meant locally) as political and assigned them corresponding colours (red and brown)

Use of the results of the EnCare test

The results of the EAAT test can point in three directions:

I. no abnormalities = repeat the test after a certain period of time (2-5 years)

II. individual risks = education about risk factors, testing of genetic pre-disposition, behavioural modification if necessary, repetition of the test after a certain period of time (1-3 years).

III. High risk or indication of dementia = information about risk factors, examination of genetic predisposition, if necessary further medical or clinical examinations.

For Case I, the question arises as to how long a retest should take place. In the field of HR tests, a minimum of 3 months is considered to be the minimum; in this case, a minimum interval of 1 year seems to make sense. The younger the test person is, the longer the interval between 2 tests can be.

PROPHYLAXIS

For case group II, education about risk factors may be useful first.

Risk factors for dementia		
Factor	**Age group**	**Influencing the risk of of a dementia-related disease**
Lack of education	Under 45 years	Cause for 7% of dementia cases
Hearing loss	45-65 years	Plus 100%
Depression and mental stress		Plus 100%
Social isolation	Over 65 Lifelong singles Widowed	Plus 60% Plus 40% Plus 20%
Obesity		Plus 60%
Diabetes	Over 65 years	Plus 50%
Physical inactivity		Plus 40%
Excessive alcohol consumption		Plus 20%
Smoking	Over 65 years	Biggest risk factor
Air pollution		Plus 10%, but applies to 75% of the world's population
Craniocerebral trauma		Abruptly

Table[16] : Risk factors for dementia; this information can be part of any counselling or online test or content of a health app in whatever form.

[16] Eigene Darstellung in Anlehnung an Lancet 2020; 396: 413-446: Dementia prevention, intervention, and care: 2020 report of the Lancet Commission

The EAAT test refers to the topic of social distance, a previously underestimated risk. Current meta-studies[17] now assume that the risk of dementia increases by 20% in widowed people and by as much as 40% in lifelong singles. The parameter "social distance" is therefore directly related to risk and can usually be actively influenced positively by the affected test person.

Besides social distance, hearing loss is one of the TOP 3 dementia risks.[18] Although not directly measurable with the EAAT test, appropriate education can help a lot here, especially since this fact is little known in the general public. Risk factors that can also be influenced but not directly measured with EAAT include excessive alcohol consumption, obesity, high blood pressure, depression and psychological stress as well as physical inactivity. In the age of 65 and older, smoking is added as an important risk factor.

An appropriately designed setting consisting of an EAAT test plus an educational talk about the various dementia risks and possibilities of prophylaxis can be an essential innovation in dementia prevention, since large parts of the population can be sensitised and educated much earlier and the comparatively simple test also provides a quick "tool" for measuring cognitive risk factors.

In addition to the option of a medical product (statutory health insurance, IGeL service), there is also the possibility here of making the EAAT test available as a health app for broad sections of the population at a low price.

FURTHER DIAGNOSTICS & THERAPY

Test persons in group III should first check for a genetic predisposition, depending on the test result; in any case, a medical consultation is recommended. If necessary, a more detailed clinical diagnosis can follow.

Therapeutic offers for people with dementia do not bring a cure, but have been proven to slow down the course of the disease and should be accepted accordingly. This can be training (thinking ability, reaction speed) but also social therapies (dementia community, day care, voluntary everyday support).

Requirements for the users

The EAAT test does not make high demands on the users. Before using the EAAT test, they should have undergone basic training, which includes dementia-related illnesses as well as all necessary information about risks, prophylaxis and later care and therapy. The test itself only requires knowledge of how to use an internet-enabled computer or tablet.

For this reason, the group of users can be relatively open. It would be advisable to have a basic medical education, such as a vocational training in nursing, as then the above-mentioned basic training on dementia can be omitted. This applies to nurses as well as nursing staff in old people's homes, as well

[17] cf. Lancet 2020; 396: 413-446: "Dementia prevention, intervention, and care: 2020 report of the Lancet Commission

[18] cf. ibid. p. 418

as employees of care support centres in the districts or those in geriatric associations, voluntary networks, etc.!

On the other hand, newcomers, for example in the voluntary sector, should undergo the complete training.

Any testing outside of outpatient or inpatient health care facilities conserves their resources. But tests can also take place in these facilities, for example as a "gap filler" during waiting times, supervised by medical assistants (MFA). In inpatient facilities, for example in geriatrics, EnCare can be introduced parallel to conventional tests. Here, too, only training in the use of the test may be necessary.

5. Social innovation in dementia (early) detection - implications for processes and functions in health care with a special focus on rural areas

Introduction

The EAAT test can work in two ways, especially in rural areas:

A. With appropriate sensitisation of the population and various offers to carry out the test (community nurses, care support points, anterooms of doctors' practices), the "threshold for dementia testing" can be lowered and thus the number of clearings can be significantly increased. This in turn ultimately reduces the number of unreported cases of dementia. Due to the simplicity of the test and the low requirements for the qualification of the personnel carrying out the test, this effect is associated with low costs.

B. By shifting an initial clarification of possible dementia-related illnesses out of the medical service spectrum and into other areas, doctors are initially relieved, as they are only called upon if the EAAT test is positive[19].

Approximately 19,400 people aged 65-79 currently live in the Elbe-Elster district[20]. Based on the prevalence rates, approx. 800 to 1,000 people in this group can be estimated to have dementia[21]. Should this group reach the age of 80, the proportion of dementia patients would already be more than 2,500, and at the age of 85, more than 4,500 people from this group would have dementia.

Early diagnosis - for example as a voluntary, free service of the statutory health insurance (GKV) for every person from the age of 65 - would, measured against the age group-specific prevalence rate, not show any dementia in more than 90% of the persons of the target group mentioned up to the age of 80 and thus "calm" them down; on the other hand, risk groups can be specifically cared for earlier through preventive health care, social commitment and prophylactic measures with the aim of slowing down or postponing the disease. Patients who are diagnosed with dementia after a positive EAAT test and further diagnostics could be integrated into care and nursing at an early stage, while at the same time making it easier for nursing facilities and (caring) relatives to plan the processes in the long term.

Distribution of work and functions in the outpatient and inpatient health care system

Since the turn of the millennium, the demographic development of the rural region of South Brandenburg has been characterised by the migration of young people to urban centres and an accompanying

[19] in the case of an area-wide deployment of EAAT, an additional burden may also arise at the beginning of such a campaign if previously hidden cases are "discovered".

[20] Demography report LK EE; http://www.wegweiser-kommune.de; retrieved on 20.12.2020

[21] https://www.deutsche-alzheimer.de/uploads/media/infoblatt1_haeufigkeit_demenzerkrankungen_dalzg_01.pdf

decline in absolute population numbers, combined with a significant increase in the average age of the remaining population.

This increase in the average age also and especially applies to doctors and medical professionals, with the result that the gap between the need for care and the supply of care is widening.

With the help of new technical aids, innovative networks can contribute to a restructuring of the distribution of tasks in care in order to close this gap to some extent or to prevent a further drifting apart of the need for care and the supply of care.

In the MEDIS doctors' network, for example, the restructuring of care has so far been implemented mainly without technical innovations by coordinating treatment processes and relieving the burden on practices through specially qualified non-medical staff and volunteers. It has already been shown that attractive working conditions could be created in this way in order to keep doctors and medical professionals in the region and to offer young doctors incentives to settle in the region.

The focus so far has been on the care, nursing and support of already diagnosed dementia patients and their relatives, among other things within the framework of so-called delegable medical services (case management agneszwei - home visits, etc.). For the patient population addressed in this study with risks of dementia or early forms of dementia, however, a redistribution (delegation) of medical tasks to trained non-medical staff can hardly take place within the existing care framework. The reason for this lies in medical professional law, which explicitly reserves diagnosis as a non-delegable service to licensed physicians.

For a restructuring of the distribution of tasks, a (technical) tool is needed that offers the possibility to identify risks for dementia-related diseases and to identify patients with a high probability of dementia-related diseases as early as possible in order to refer them to a medical diagnosis. With a technically supported pre-selection, the doctor would thus be able to dedicate his scarce time resources to the diagnosis of patients with special risks and/or signs of an early form of dementia - exactly here the EAAT test offers the corresponding support.

The EAAT test can be used to enable non-medical staff in social and/or socio-legal care and support, such as staff of care support centres, case managers, agneszwei professionals, voluntary carers or relatives, to accompany and guide pre-diagnostic activities. In the case of routine use of the EAAT test in the sense of age-dependent screening (e.g. annually from the age of 40), completely unaccompanied test performance by the test persons is also possible - provided that they are able to understand and implement written instructions for performance and can operate a computer mouse or touchpad. The final diagnosis is still the responsibility of a licensed physician, who is, however, relieved of the extensive tasks of unspecific symptom clarification and can concentrate on the patient group with a specific risk constellation.

The situation of identifying risk factors for dementia by means of the EAAT test is comparable to the routine blood count as part of the preventive check-ups in the "CheckUp" programme of the statutory health insurance (GKV). The doctor delegates blood collection and blood analysis to practice staff and laboratory employees. Once the results are available, the practice staff interpret the laboratory parameters on the basis of clear guideline values and identify critical values outside or close to the tolerance

limits of the guideline values. Clearly inconspicuous values are filed in the patient's file without further medical consultation, while the doctor interprets conspicuous values to make a diagnosis or initiates further measures. Such a redistribution of tasks is also made possible by the EAAT tests in the field of early dementia detection.

However, this requires further clinical studies with randomised control groups that clinically prove the specificity and sensitivity of the EAAT tests and validate the procedure. However, the results of this study so far (which are not representative) have already convinced the doctors and specialists involved of the high predictive value.

Use of the EAAT in an innovative outpatient care system using the example of the MEDIS doctors' network

For many years, "doctor-relieving structures" (e.g. case managers and community nurses) have been used under the sponsorship of MEDIS Management GmbH and relieve the respective family doctor of non-medical tasks on his or her instructions without burdening him or her with bureaucratic tasks of employment or billing.

Volunteer dementia caregivers relieve patients, caring relatives, doctors and case managers by providing low-threshold care in the respective home. Day care places are available especially for dementia patients in order to maintain the home care situation as long as possible. Alternative forms of housing, in particular residential communities for people with dementia, are offered at a total of 3 locations in the service area as new buildings or as conversions. The network's own outpatient care service looks after, supplies and cares for both the residents of the alternative forms of housing and patients in their previous homes.

PHYSICIAN RELIEF AND PERSONNEL RESOURCES

The development of outpatient specialist care has been particularly problematic in recent years. Resources became scarcer, while at the same time their utilisation increased steadily due to the morbidity development associated with the demographic development in the region.

In the past years, treatment pathways have been developed in working groups under the leadership of the respective specialists and with the participation of GPs in private practice and integrated into the software. GPs are provided with IT-supported information and decision-making bases, for example, in order to carry out differential diagnostic examinations in a targeted manner.

Such a working group could, in cooperation with external actors (care support centres, MDK), define a process scheme for the implementation of the EAAT in the prophylaxis and treatment pathways.

The results, including the relevant preliminary findings, laboratory data and anamnestic data, are directly transmitted electronically to the specialist. Undifferentiated referrals could thus be successively reduced. This procedure led to specialist capacities being freed up for outpatient treatment. However, it also led to an increased workload in the GP practices, which were also heavily utilised. Here, various relief

and support instruments were implemented, which now give the GPs in private practice the opportunity to delegate non-medical services to network staff - including agneszwei specialists, case managers and palliative care coordinators - and to volunteer caregivers.

"The use of the network's own case managers and community nurses was characterised by high initial scepticism followed by extreme virulence in GP practices" [22].

Due to the many years of positive experience of MEDIS doctors with staff who relieve doctors, such reservations no longer have to be overcome in South Brandenburg today - the use of case managers and community nurses is not only tolerated but actively demanded.

Based on the good experiences of the actors involved, a corresponding test system can be established using the EAAT under the responsibility of case managers, Agnes Two nurses, care support points and, if necessary, other actors.

Decisive for the acceptance of the case managers and community nurses are their communicative and professional skills. Both the senior case manager and the Agnes Two specialists at MEDIS have years of professional experience and have helped to introduce and shape these job profiles in the state of Brandenburg.

In particular, the view for caring relatives, who often become a care case themselves under the burden of care, is part of the self-image of these professionals. "Days off" for family caregivers are extremely important for stabilising the home care situation and are created by organising additional care such as volunteer dementia helpers or day care. In addition to the non-medical activities, case managers and community nurses also provide valuable information for the doctor's therapy decisions - especially on the topic of adherence and compliance. Trust, competence and above all communication are the keys to success here - for patients and relatives as well as for doctors!

It is also conceivable that (caring) relatives - after prior instruction by a specialist - carry out the EAAT with the person concerned in the event of a suspicion of dementia or a corresponding risk and have the result assessed by the specialist. In this way, possible resistance on the part of the person affected can be minimised and the threshold for diagnosis/recognition lowered.

JOY OF LIFE - COMPREHENSIVE CARE FOR DEMENTIA

Due to the ageing of the population in the network region described at the beginning, diagnosis-related statistical evaluations, which are collected anonymously annually in all network practices within the framework of a so-called "network monitor", show a continuous increase in patients suffering from de-

[22] This quote comes from one of the most committed MEDIS doctors and describes the situation very accurately. Through the discussions in nationwide committees and interest groups, buzzwords such as "substitution of the medical profession", "loss of competence of the doctor", "loss of turnover for practices" and the like are fuelling uncertainty (="initial scepticism"), which is completely unfounded for grassroots practitioners, at least in rural or structurally weak regions.

mentia. Neither society nor the health care system seem to be adequately prepared at present for the care of an increasing number of dementia patients - care and support structures beyond home and family care are lacking, especially in rural regions.

MEDIS began to develop the concept of joie de vivre eight years ago as an answer to these structural deficits. Today, the concept comprises a total of six building blocks, which are (have to be) permanently expanded in scope and supplemented by further modules as needed.

- Stage 1: Doctors of the medical network diagnose dementia and initiate care within the framework of the project in addition to medical therapy. MFAs of the network who have been trained as dementia specialists (DeFa) support the practices in this process.

In future, the MFAs could take over the testing and, in the case of abnormal values, arrange for further medical diagnosis and subsequent therapy.

- Stage 2: Case managers and agneszwei specialists from the doctors' network visit patients in their homes, talk to relatives, provide information, coordinate appointments and the provision of aids and offer the possibility of care within the framework of the project Lebensfreude.

It would be conceivable to do this already in the case of suspicion and to arrange for an appropriate test in the home environment, then continue as in stage 1.

- Level 3: A total of more than 100 volunteers (volunteer circle) can be deployed by the MEDIS case managers and community nurses for dementia care. The care is always provided "1 to 1" and in addition to the nursing care. Depending on the patient's inclination and biography, it includes services such as going for a walk, reading aloud, shopping together, fishing, playing skat, etc. In organisational terms, MEDIS Management GmbH has founded a non-profit subsidiary, MEDIS Lebensfreude gGmbH, for this purpose. The initial training of the caregivers is provided by the Alzheimer's Association, the permanent further training and professional guidance is provided by the network's leading case manager.

With the appropriate personal suitability, volunteers in the village environment could also use the EAAT (assuming appropriate communication of the offer).

- Level 4: The relatives have the additional option of having the sick patients looked after by a care group for dementia patients (also 1 to 1) by the hour, in order to have the freedom to run their own errands. Specially rented rooms are available for this purpose.

- Stage 5: The MEDIS doctors' network runs its own day care for dementia patients for a total of 12 guests. This structural development under its own auspices was necessary because there were no other day care facilities in the network region.
- Level 6: A new building complex with three graded alternative forms of living, including a dementia living community with eight rooms was built with the help of an investor in 2014. All living conditions are designed to maintain abilities for as long as possible and to offer help when it is needed. The MEDIS doctors' network is the user and operator of this property and coordinates all support services.

Summary

The use of the EAAT can make dementia (early) detection much more efficient and low-threshold and is particularly suitable in regions with appropriately developed and networked structures, for example in the districts of Elbe-Elster and Oberspreewald-Lausitz (MEDIS in cooperation with the care support centres) and in another form in the Uckermark. The existence of grown constellations of actors familiar with such processes is the prerequisite for a fast and area-wide effective change in dementia (early) detection. For this reason, an area trial in the sense of a model project in the above-mentioned districts of South Brandenburg is recommended, possibly in cooperation with the Uckermark.

In regions where active, networked structures in this form do not yet exist, it is initially recommended to establish a service with the support of the care support points as well as under the responsibility of Agnes Two nurses, possibly also the MDK.

For the MDK, the EAAT can be a very quickly usable, objective way of assessing the cognitive performance of patients, the use of which could objectify and "revolutionise" the process of assessing the need for care.

EAAT Application - Who and how?	
User	**Comment**
Care support points	Possible throughout the state of Brandenburg
MDK	Possible throughout the state of Brandenburg
Medical practices, here: Medical assistants	Primarily in the MEDIS doctors' network
Agnes Two Sisters	In districts with corresponding supply structures
Volunteer dementia carers	In districts with corresponding supply structures

The application of the EAAT in inpatient settings was not the focus of the study. Nevertheless, if the test is medically validated, it can also [23]bring about a significant (cost) reduction in inpatient areas. On the

[23] Expected cost of an EAAT test > €100, a fraction of the cost of a biopsy or CT. CT and biopsy would only be used in case of a positive indication.

one hand, in geriatrics during anamnesis, but also - as is currently being pursued in the [24]IdA project - in the dementia-sensitive acute care of patients.

Consequences for securing skilled workers in the participating institutions

The use of the EAAT can have various consequences for the tense situation of professionals in Brandenburg's health care system. The aim should be to relieve doctors and nursing staff and to shift the work with the test to lower qualified professional groups, which has already been described and is possible.

A. The greatest possible effect of using the EAAT is to be expected when it is used within the framework of a health app financed by SHI. Here, no additional personnel expenditure would be necessary and the test person would visit his or her family doctor for further consultations/examinations if a corresponding risk disposition was issued by the app. However, the low affinity of older sections of the population for digital solutions and the lack of Internet-capable PCs/tablets in private households are probably still the main obstacles to the widespread use of a health app. However, this situation will change in the coming years with the ageing of the "digital natives"; today's 50-60 year olds already have different experiences and possibilities of use.

B. The use of the EAAT in the outpatient system (e.g. Agnes nurses), in care support centres, in geriatric alliances and networks of care for the elderly or voluntary dementia support groups, on the other hand, could be expanded. Particularly in the peripheral areas, the shortage of doctors/medical capacities is significantly greater than that in the area of nursing and auxiliary staff[25], so that these can be put in a position to use the EAAT test across the board and especially with older, digitally non-affine clients by means of the competence development described. This form of use could (still) become the predominant one in the coming years.

C. It would be supplemented by testing in the area of medical practices without the involvement of a doctor (during the test) for particularly conservative patients. This option offers the advantage that an evaluation or further steps in case of a positive indication can be discussed directly and without diversions or loss of time at the doctor's office.

If the results of the EAAT are medically validated, it can replace conventional, significantly more time-consuming procedures under medical supervision and thus make a significant contribution to relieving the workload of doctors, especially in the outpatient care system of rural areas in the state of Brandenburg.

If the theoretically necessary number of tests, estimated at approx. 3,000 per year in the district of Elbe-Elster, were to be carried out in the above-mentioned organisational forms in one third each, this would

[24] Interdisciplinary dementia-sensitive acute care: The aim here is to include a dementia diagnosis in the general anamnesis of patients over a certain age (e.g. in the case of a bone fracture or similar) in order to determine the cause of the acute event on the one hand, but also to plan appropriate dementia-tolerant treatments (e.g. operations with local anaesthesia only) on the other.

[25] Source: own surveys within the framework of the projects "The Intercultural Hospital" and "National Matching Brandenburg

result in a time requirement of 0 supervision hours for group A, an estimated 2,000 hours[26] for group B and approx. 1,000 hours[27] for group C. In purely mathematical terms, one full-time staff member would be needed for group B, or rather 2 full-time staff members with preparation and follow-up, supplemented by the additional working hours of the physician assistants in group C. Conventional dementia tests for all three groups would take up the annual working time of 3-4 doctors, based on the above figures.

For the state of Brandenburg, this effect can be extrapolated by a factor of about 20. This means that EAAT would lead to about 40 specialists (e.g. Agnes nurses) carrying out the tests nationwide; in addition, about 10-12 full-time positions would be necessary for the assistants in the doctors' practices. This, in turn, would mean a nationwide release of capacities among medical staff in the order of 60-80 full-time positions.

[26] Assumption: 2 hours per person, of which 30 min arrival and departure, 20 min introductory talk, 20 min test and 20 min evaluation.

[27] Assumption as above, only without travel times

Requirements for competence development

In order to be trained in the use and handling of the EAAT test, every user should have undergone appropriate further training. This training covers three main topics - these reflect the experiences of our project team from the pilot tests, the introduction to the tests and their evaluation:

A. Basic knowledge about dementia

B. How the EAAT test works

C. Evaluation of the results

Successful completion of this training can be confirmed with a certificate, which is a prerequisite for access to the EAAT test.

At the same time, every user should also have the possibility of supervision in order to quickly answer recurring questions and clarify ambiguities. Experience in the application of the CA method in HR shows that the need for supervision is still present at the beginning, but then decreases rapidly[28].

The training can be integrated as a module in the initial vocational training in care, as well as being offered as a module for care assistants. It can also be part of the basic training of voluntary dementia helpers.

EAAT Competence Development - Further training to become a certified user of the EnCare test			
Module no	**Topic**	**Content**	**Scope in hours**
1	***Basics to Dementia***	Introduction	2,5-3
2		Forms of dementia	
3		Risk factors for dementia	
4		Possibilities of prophylaxis / therapy	
4	***The EAAT Test***	Introduction to the CA Method	3,5-4
5		Psychological foundations of the CA method	
6		How the EAAT test works	
7		Description of indicators & results	
8	***Testing & further action***	Preparation of the patients	1,0
9		Carrying out the test	
10		Discussion & interpretation of the results	
11		Derivation of the further procedure	

[28] Prognosis: 2-3 supervisions / first 10 tests; 1-2 supervisions / tests 11-50; thereafter 1 supervision / 100 tests.

6. Closing words

In this study, the focus was not on medical innovation, but on its possible effects on the organisation of outpatient and inpatient care and subsequently care for people suffering from dementia in the state of Brandenburg.

This feasibility study concludes that:

- the EAAT test, subject to its medical validation, is a suitable diagnostic tool to reposition both the prophylaxis and the (early) detection of dementia.
- No negative associations were aroused in the test subjects of the pilot test, on the contrary: the test can be carried out quickly and with a "neutral" emotional effect, depending on digital affinity from the doctor's anteroom to accompanied testing (for example by Agnes nurses) to independent implementation "at the dining table".
- Its use in rural areas enables a shift in function, relieves the burden on doctors and makes the threshold for patients to be tested lower and easier.

In the area of prophylaxis, an early sensitisation of broad sections of the population can be achieved, which can have an indirect effect on the probability of a later dementia illness through a possible early change in the behaviour of those tested - at best lowering it, but at least through an early attitude and improved planning in dealing with the illness. This in turn indirectly relieves the burden on the caring structures and relatives.

In the field of dementia detection, this innovation has multiple effects: The test itself can be organised very flexibly, a medical consultation is only necessary in case of an indication, but then in a targeted and precise way. It was shown that a considerable relief of the outpatient doctors can be achieved if, for example, Agnes nurses or participants in geriatric associations / dementia networks or the employees of the care support points of the state of Brandenburg, after appropriate training, become those who carry out the test. In the medium term, it is quite conceivable that the digital solution can be used by patients completely on their own and with appropriate guidance.

The necessary measures for the competence development of the actors involved have been worked out, can be carried out quickly and are reducible with appropriate previous training. The effort required here is kept within manageable time and financial limits at 1-2 days.

In summary, the authors conclude that EAAT will become an innovation in the social sector with a particular impact on work organisation and skilled labour relief in rural areas, and - subject to medical validation - equally an innovative medical device with a wide range of possible applications.

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Contact for enquiries

On the project, on dementia care in rural areas:

Dr Carsten Jäger, MEDIS, c.jaeger@medis-netz.de

On the project and the context of the CA method:

Marco Bünger, Adler Management, marco.buenger@web.de