

Helping you to assess cognition

A practical toolkit for clinicians

This toolkit was created by the following authors with contributions from an expert writing group (see page 38 for a full list of members). The toolkit is supported by Alzheimer's Society and Department of Health.



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Why we developed this toolkit

Measuring someone's cognitive function is one of the most important assessments clinicians make, particularly those in old age psychiatry and geriatric medicine. It is key to detecting dementia and delirium.

Cognitive assessments cover a very broad range of activities. They can take place:

- in a number of settings – primary care, specialist memory clinics, acute care and care homes
- for a variety of purposes – screening, diagnosing, staging and measuring change
- over a number of cognitive domains – memory, language, executive function, attention and perception. Some also include aspects of daily living.

So, it is not surprising that there is no single examination which covers all these situations.

A multitude of cognitive function tests have been developed. Each has its own unique selling points, advantages and detractors. The tests vary in how long they take and the amount of equipment you need to carry them out. Some are available for free, while for others you will need to gain permission and pay a fee. There have been many reviews of cognitive assessment tests over the years, some of which report detailed information about the psychometric properties of different tests and others which more simply describe their properties.

We developed this toolkit because we wanted to give clinicians guidance about what tests are available and how they may be used in clinical practice. This is particularly timely as the commonly used Mini Mental State Examination (MMSE), which is copyrighted, now incurs a cost for each use, so there is a need to identify alternatives.

Please note

- **We have assumed that clinicians using this toolkit have clinical knowledge about the measurement of cognitive function**
- **These tests are not diagnostic of any specific disorder and should be interpreted in the context of an individual's previous cognitive function.**
- **Appropriate training and supervision is needed to correctly interpret the results.**
- **As there is no single test which covers every eventuality, we recommend clinicians become familiar with one test and use it regularly.**
- **This toolkit is not intended for use as a care pathway or for screening purposes. The intention is to provide a list of recommended tools for assessing impaired cognition of all causes. It is not intended to be prescriptive.**
- **This toolkit focuses on assessment tools which are, to the best of our knowledge, freely available for use, although they may be subject to permissions**

About this toolkit

This toolkit offers practical advice for clinicians about a choice of cognitive tests which can be used to assess cognition in clinical settings. All of the suggested tests are available to clinicians free of charge. You can find copies of each test in this toolkit, along with links to their source.

The toolkit was developed by a multidisciplinary advisory group informed by clinical experience and reference to relevant literature. The views expressed in the toolkit are those of the authors and the advisory group.

When using the toolkit, please note:

- The suggestions are based on clinical experience and information. They are based on, but not exclusively driven by, empirical research evidence and systematic reviews.
- It is not meant to be used as a dementia screening or diagnostic tool. It should only be used to assess cognition where there is clinical suspicion that a patient has a cognitive impairment, regardless of its cause (in particular dementia and delirium).
- The toolkit focuses on cognition including perception and executive function and not the other key aspects of dementia, such as behavioural and psychological symptoms.
- The suggested tools are intended for use alongside the detailed form of neuropsychological testing carried out in memory clinics.
- It does not include assessment relating to mild cognitive impairment (MCI) (where there is cognitive impairment not amounting to dementia). Assessment of MCI is generally a task for specialists. You can find more information about MCI in the 'Information for specialists' section on page 15.
- Special consideration needs to be made where a person has a learning disability or a neurological condition such as Parkinson's disease.
- When assessing cognition, clinicians need to be sensitive to the cultural and educational background of the individual.
- This toolkit is a guideline rather than definitive clinical advice. There isn't a test which is always more appropriate than another and it is usually best for a clinician to choose one test for their setting and get familiar with using it. In this toolkit we have shown the test we believe is most appropriate for each setting.
- The tools included in this toolkit can be administered by any trained health professional without the need for a specialist, although specialist input may be required for interpretation of outcomes.

The guidance provided in this toolkit aligns with the Royal College of Psychiatrists Occasional Paper OP86 on outcomes. This is not a systematic review and the authors believe the evidence base would greatly benefit from such a review.

How to use this toolkit

This toolkit is divided into four stepped guidelines, giving advice for each clinical setting:

- 1 Cognitive assessment in primary care
- 2 Cognitive assessment in memory clinics
- 3 Cognitive assessment in acute care settings
- 4 Cognitive assessment in care homes

A number of assessment tools are recommended for each setting, based on expert panel advice and considerations of feasibility for each setting. These are not intended to be prescriptive, and the selection of the most appropriate tool should be driven by individual patient and the choice of the health professional. We hope that the suggestions in these four main settings can be adapted for every situation where a cognitive assessment is needed, for example intermediate care and outpatients.

Guidance for each setting includes suggestions for an initial assessment, further assessment and follow-up or monitoring. The type of follow-up and monitoring will depend on how severe the cognitive impairment is. Each guideline (with the exception of that for care home settings) uses the traffic light system opposite.

The distinction of mild, moderate and severe should be made on clinical grounds, according to the specific history and profile of the patient, based on the individual guidance supplied with each assessment test. You can find links to this guidance in the 'Assessment tools' section of the toolkit, alongside each scale. In cases of severe impairment tests will require tailoring according to the patient's abilities based on clinical judgement.

We hope you find this toolkit helpful and easy to use.



Guidances for cognitive assessment

The following four guidances are for use in clinical settings. They are intended to guide clinicians in selecting the most appropriate cognitive assessment tool for the setting. The range of recommended tools is listed in the introductory text. The tool marked with* in the guidance diagram is the one most recommended for the specific setting, although this is not intended to be prescriptive.

1 Cognitive assessment in primary care

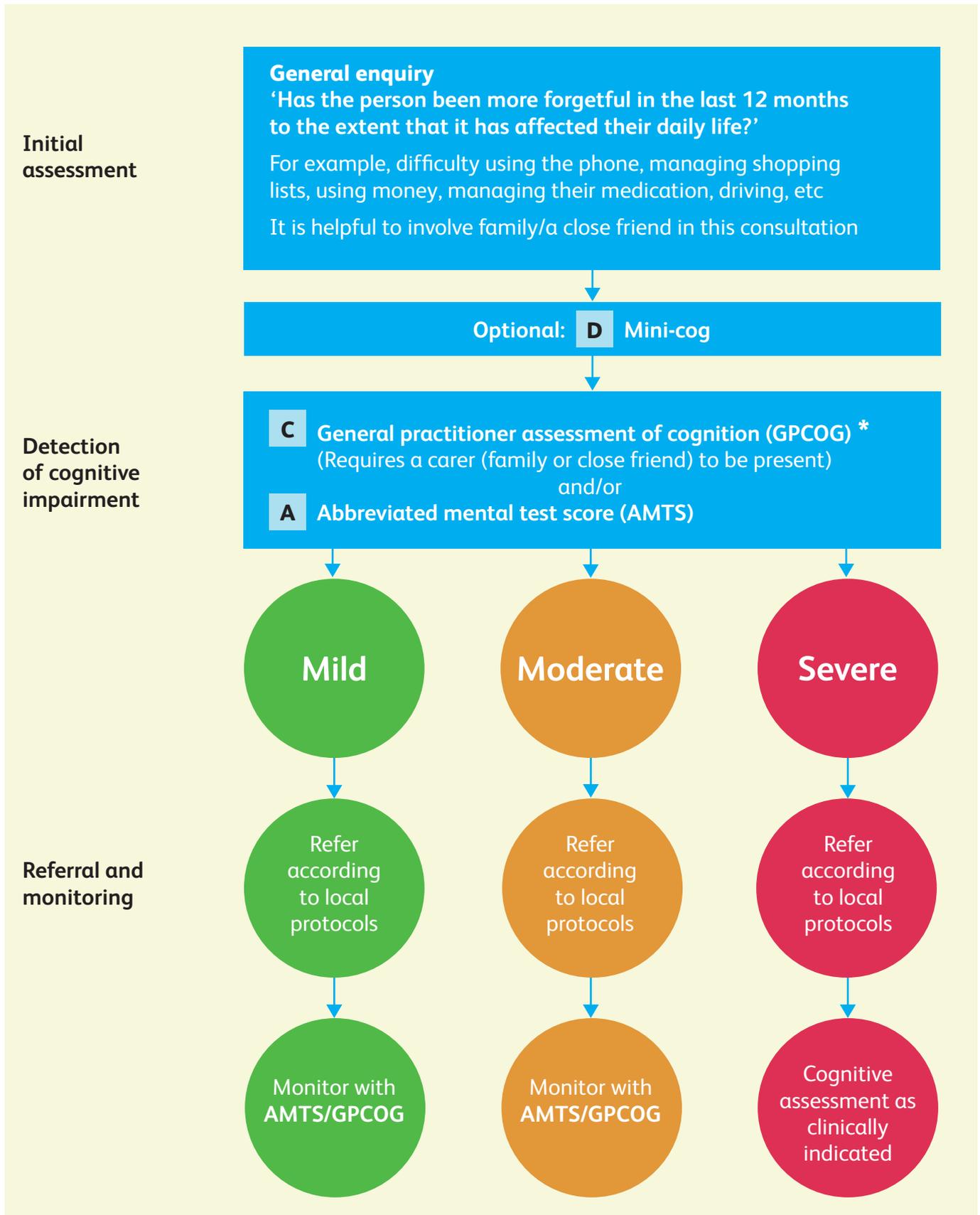
Use this guidance for guidance in primary care settings where cognitive impairment is suspected. It suggests the most relevant assessment tools you could use. The history of the nature and progression of memory difficulties is an important part of the diagnostic process and essential if you are to correctly interpret the results of the cognitive tests. If someone needs further assessment of their cognition, you should refer them to a memory clinic.

Recommended tests for this assessment are:

- A** Abbreviated mental test score (AMTS)
- C** General practitioner assessment of cognition (GPCOG)
- D** Mini-cog

1

Cognitive assessment in primary care settings



2 Cognitive assessment in memory clinics

Use this guidance for guidance in a memory clinic. It suggests the most relevant assessment tools you could use. When a person is referred to a clinic, a cognitive impairment will have already been identified and an initial inquiry or test carried out. Detailed neuropsychological tests may also be indicated. You can find more information in the 'Information for specialists' section on page 15.

Recommended tests for this assessment are:

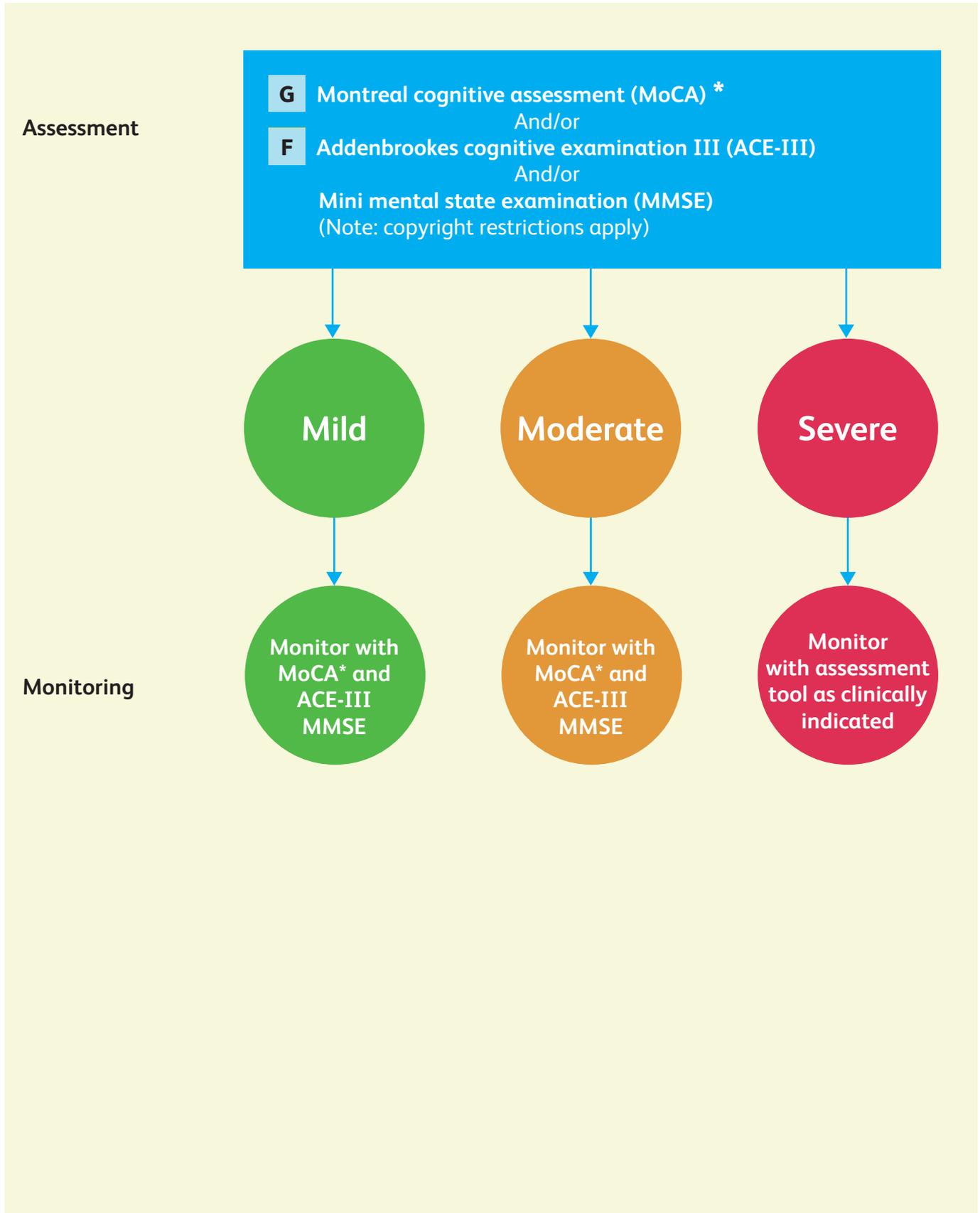
F Addenbrookes cognitive examination-III (ACE-III)

G Montreal cognitive assessment (MoCA)

Mini mental state examination (MMSE)
(Copyright restrictions apply)

2

Cognitive assessment in memory clinics and for outpatient specialist assessment



3 Cognitive assessment in acute care settings

Use this guidance in acute care settings where cognitive impairment is suspected. It suggests relevant assessment tools you can use to help with the detection of cognitive impairment. The tools should be supplemented by diagnostic instruments such as the Confusion Assessment Method (CAM) for delirium and implementing the NICE Delirium guideline.

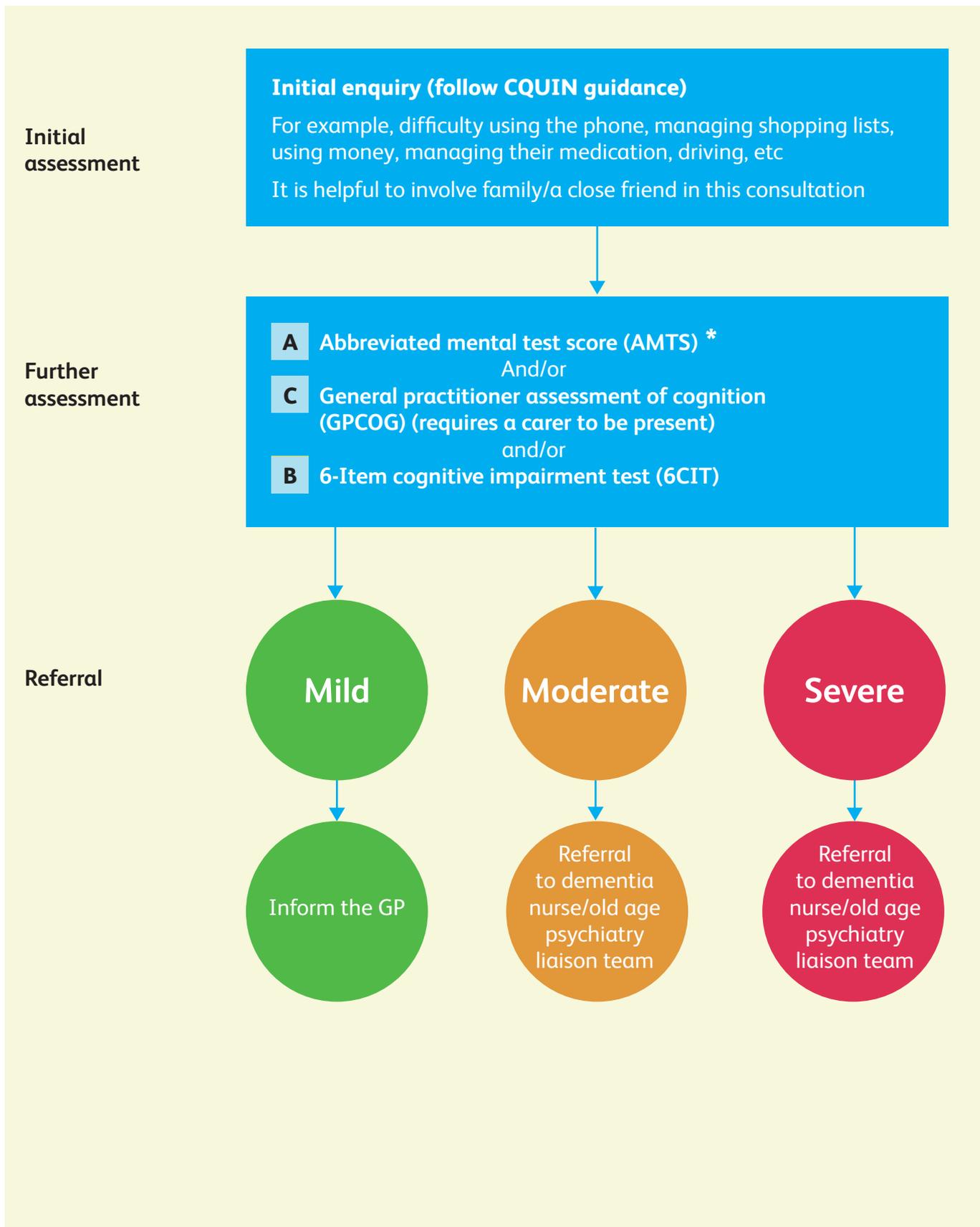
It is important to note that in patients in acute care settings, delirium and dementia frequently occur together. Once any underlying conditions have been treated, it is essential to re-evaluate cognition. This is so you can exclude confounding factors causing delirium. To do this, follow with CQUIN guidelines as the guidance indicates. As delirium is very common in post-operative patients, you should be cautious about interpreting cognitive performance at this stage.

Recommended tests for this assessment are:

- A** Abbreviated mental test score (AMTS)
- B** 6-Item cognitive impairment test (6CIT)
- C** General practitioner assessment of cognition (GPCOG)

3

Cognitive assessment in acute care settings



4 Cognitive assessment in care homes

Use this guidance for guidance in care home settings where cognitive impairment is suspected. It suggests the most relevant assessment tools you could use. A person admitted to a care home may have a pre-existing diagnosis of dementia or it may be suspected and so further diagnosis of cognitive impairment is needed. We recommend that a cognitive assessment is carried out routinely for everyone admitted to a care home.

Recommended tests for this assesement are:

- A** Abbreviated mental test score (AMTS)
- B** 6-Item cognitive impairment test (6CIT)
- C** General practitioner assessment of cognition (GPCOG)
- G** Montreal cognitive assessment (MoCA)

4

Cognitive assessment in care homes

Where no diagnosis of cognitive impairment or dementia has previously been made

‘Is there any suspicion from the history or current situation that the person has dementia?’

eg History of forgetfulness affecting the person’s ability to manage prior to admission or current disorientation/ loss of independence not related to physical illness.

It is helpful to involve family/a carer in this consultation.

C General practitioner assessment of cognition (GPCOG) *

And / or

A Abbreviated mental test score (AMTS)

And / or

B 6-Item cognitive impairment test (6CIT)

Where a diagnosis of cognitive impairment or dementia has been previously made

G Montreal cognitive assessment scale (MoCA) *

And / or

A Abbreviated mental test score (AMTS)

Where cognition is significantly impaired

A Abbreviated mental test score (AMTS)

Information for specialists

This section is for professionals working in specialist settings. It provides guidance and supporting information for more specific cases where assessment is not straightforward and specialist referral may be needed.

Mild cognitive impairment (MCI)

People with mild cognitive impairment (MCI) convert to dementia at a rate of approximately 10 per cent a year. MCI represents a clinical challenge due to the variety and often dynamic nature of symptoms.

Please note that this toolkit does not specifically cover the assessment of mild cognitive impairment due to these complications and the current lack of validated tools. Careful enquiry is needed to confirm that there is objective (as opposed to subjective only) cognitive impairment but no functional change. The subtlety of change means it is crucial to assess pre-morbid intellectual achievement.

As a result MCI is frequently not identified in primary care. This lack of clarity for patients can lead to anxiety and distress over symptoms which have not been properly diagnosed. Furthermore, the lack of identification of MCI can delay diagnosis with dementia at a later date.

While we have not specifically included MCI in this toolkit, we highly recommend that specialists consider MCI when assessing patients for cognition.

We also recommend continued monitoring in cases where appropriate. This is an important factor in ensuring a prompt detection of dementia in people who convert from MCI. The scales included in this toolkit may help with identifying MCI, at the discretion of the specialist and in consultation with the patient and an informant (a family member, close friend or caregiver).

Cases requiring specialist referral

There may be cases where the assessment shows that there is a more complex need, in which case the person should be referred to a specialist. We recommend using the table below to support this decision. New early Alzheimer's disease diagnostic approaches based on deficit biomarkers are now available (Dubois et al Lancet Neurol. 2007; 6(8):734-46) and may support this process.

Cognitive deficit found on screening (eg MoCA and ACE-III)	Functional impairment found from clinical history	Cognitive screening scores and clinical history consistent with each other	Presentation fits a recognised profile	Action
✓	✓	✓	✓	Specialist to make diagnosis of dementia
✗	✗	✓	✓	
✓	✓	✓	✗	Consider further neuropsychological assessment before making a diagnosis of cognitive impairment or dementia
✓	✗	✗		
✗	✓	✗		

Note: The above table focuses on the criteria for considering specialist neuropsychological testing. Other diagnostic tests (eg neuroimaging) may be required to make a diagnosis of cognitive impairment or dementia.

Summary of the assessment tools available

The table below outlines the assessment tools that are currently available. It also details how they are used and current validity evidence that supports them. Please note that while the table provides the evidence base, this toolkit is also based on recommendations from experts in the advisory group and known practicalities and feasibilities of use of the tools in clinical settings.

Scale	Overview of scale	Duration of application	Cut-off point for dementia	Reference
Abbreviated mental test score (AMTS)	A 10-item scale. validated in wards but used in UK primary care.	<5 minutes	6-8/10	Hodkinson HM: Age Ageing 1972; 1:233–238 Jitapunkul S, Pillay I, Ebrahim S. Age Ageing 1991; 20: 332-36.
6-item cognitive impairment test (6CIT)	Three orientation items, count backwards from 20, months of the year in reverse, learn an address. Validated in primary care.	<5 minutes	8/24	Callahan CM, Unverzagt FW, Hui SL, Perkins AJ, Hendrie HC. Med Care 2002;40(9):771-781. Brooke P, Bullock R.. Int J Geriatr Psychiatry 1999; 14: 936-40.
Mini-cog	3-item word memory and clock drawing. Validated in primary care. Low sensitivity.	2-4 minutes	5/8	Borson S, et al. J Am Geriatr Soc 2005; 53:871–874. Buschke H, Kuslansky G, Katz M, Stewart WF, Sliwinski MJ, Eckholdt HM, et al.. Neurology 1999; 52: 231-38.
General practitioner assessment of cognition (GPCOG)	Developed for primary care and includes a carers' interview.	5 minutes		Brodsky et al. American geriatric society. 2002;50:530–4.

Scale	Overview of scale	Duration of application	Cut-off point for dementia	Reference
Montreal cognitive assessment scale (MoCA)	Tasks are executive function and attention, with some language, memory and visuospatial skills. Validated in many conditions incl MCI, Alzheimer's disease and Parkinson's disease dementia.	10 minutes	26/30	Nasreddine ZS, et al. J Am Geriatr Soc 2005;53:695–9 Smith T, Gildeh N, Holmes C. Can J Psychiatry 2007; 52: 329-32. Dalrymple-Alford JC, , et al. Neurology 2010; 75: 1717-
Addenbrookes cognitive examination-III (ACE)	Based on the ACE-R which is the well-validated version with very similar characteristics.	10-20 minutes	82-88/100	Int J Geriatr Psychiatry. 2012 Jul;27(7):659-69. doi: 10.1002/gps.2771. Epub 2011 Nov 8.
Mini mental state examination (MMSE)	This 11-item measure of cognitive functioning and its change, is extensively studied and has good validity. Less good for Lewy body dementia and fronto-temporal dementia due to its focus on memory. Cutpoint not valid in different cultures and in particularly highly or uneducated participants.	≤10 minutes	24/30	FolsteinMF, FolsteinSE, McHughPR.1975.J PsychiatrRes12 (3):189–198. Tombaugh TN, McIntyre NJ.J Am Geriatr Soc 1992; 40: 922-935. Nilsson FM. Acta Psychiat Scand 2007; 116: 156–157.

Assessment tools

The recommended cognitive assessment tools in this section are for use in clinical settings according to the suggestions in this toolkit.

A

Abbreviated mental test score (AMTS)

The AMTS was developed in 1972 for assessing cognition. The test takes around five minutes and is widely used, particularly in UK primary care. Validity has been evaluated in acute geriatric ward inpatients with normal cognition, dementia and delirium. Validation has shown good sensitivity but more limited specificity.

Guidance and further information:

[www.patient.co.uk/doctor/Abbreviated-Mental-Test-\(AMT\).htm](http://www.patient.co.uk/doctor/Abbreviated-Mental-Test-(AMT).htm)

- | | | |
|--|---|--|
| 1. Age? | <input type="checkbox"/> Incorrect – 0 points | <input type="checkbox"/> Correct – 1 point |
| 2. Time? (to nearest hour) | <input type="checkbox"/> Incorrect – 0 points | <input type="checkbox"/> Correct – 1 point |
| 3. Address for recall at end of test: '42 West Street'
(this should be repeated by the patient to ensure it has been heard correctly) | | |
| 4. Year? | <input type="checkbox"/> Incorrect – 0 points | <input type="checkbox"/> Correct – 1 point |
| 5. Name of this place? | <input type="checkbox"/> Incorrect – 0 points | <input type="checkbox"/> Correct – 1 point |
| 6. Identification of two persons (doctor, nurse etc.)? | <input type="checkbox"/> Incorrect – 0 points | <input type="checkbox"/> Correct – 1 point |
| 7. Date of birth? | <input type="checkbox"/> Incorrect – 0 points | <input type="checkbox"/> Correct – 1 point |
| 8. Last year of second world war? | <input type="checkbox"/> Incorrect – 0 points | <input type="checkbox"/> Correct – 1 point |
| 9. Name of present monarch? | <input type="checkbox"/> Incorrect – 0 points | <input type="checkbox"/> Correct – 1 point |
| 10. Count backwards 20 to 1 | <input type="checkbox"/> Incorrect – 0 points | <input type="checkbox"/> Correct – 1 point |
| Address recall correct? | <input type="checkbox"/> Incorrect – 0 points | <input type="checkbox"/> Correct – 1 point |
| Abbreviated mental test score total = <input type="text"/> /10 | <input type="text"/> | <input type="text"/> |

B

6-Item cognitive impairment test (6CIT)

The 6CIT is a brief test which takes less than five minutes. It is used in primary care. It involves three orientation items – counting backwards from 20, stating the months of the year in reverse and learning an address. This correlates highly ($r^2= 0.911$) with the MMSE. It shows good sensitivity for detecting mild dementia as well being culturally unbiased. However, validation data is limited. The 6CIT has advantages over the MMSE in hospitals settings (Tuijl et al, 2012).

Guidance and further information:

www.patient.co.uk/doctor/six-item-cognitive-impairment-test-6cit

- | | | |
|---|--|--|
| 1. What year is it? | <input type="checkbox"/> Incorrect – 4 points | <input type="checkbox"/> Correct – 0 point |
| 2. What month is it? | <input type="checkbox"/> Incorrect – 3 points | <input type="checkbox"/> Correct – 0 point |
| 3. Give the patient an address phrase to remember with 5 components, eg John, Smith, 42, High St, Bedford | | |
| 4. About what time is it (within 1 hour)? | <input type="checkbox"/> Incorrect – 3 points | <input type="checkbox"/> Correct – 0 point |
| 5. Count backwards from 20-1 | <input type="checkbox"/> 1 error – 2 points
<input type="checkbox"/> More than one error – 4 point | <input type="checkbox"/> Correct – 0 point |
| 6. Say the months of the year in reverse | <input type="checkbox"/> 1 error – 2 points
<input type="checkbox"/> More than one error – 4 point | <input type="checkbox"/> Correct – 0 point |
| 7. Repeat address phrase | <input type="checkbox"/> All wrong – 10 points
<input type="checkbox"/> 3 errors – 6 points
<input type="checkbox"/> 1 errors – 2 points | <input type="checkbox"/> 4 errors – 8 point
<input type="checkbox"/> 2 errors – 4 point
<input type="checkbox"/> Correct – 0 point |

6CIT score = /28

C

General practitioner assessment of cognition (GPCOG)

The GPCOG is a reliable, valid and efficient tool to use to screen for dementia in primary care settings for people with carers. It takes less than four minutes to carry out the patient assessment and two minutes to interview the carer. There is some evidence that interviewing both carers and patients improves accuracy. The GPCOG is not influenced by someone’s cultural and linguistic background, making it useful in multicultural patient settings. It is less sensitive and specific than the Mini-cog and takes longer.

Guidance and further information: www.gpcog.com.au/info.php#3

Patient name:

Date:

Step 1: Patient examination

Unless specified, each question should only be asked once

Name and address for subsequent recall test

1. ‘I am going to give you a name and address. After I have said it, I want you to repeat it. Remember this name and address because I am going to ask you to tell it to me again in a few minutes: John Brown, 42 West Street, Kensington.’ (Allow a maximum of 4 attempts)

Time orientation

2. What is the date? (exact only)

Incorrect Correct

Clock drawing – use blank page

3. Please mark in all the numbers to indicate the hours of a clock (correct spacing required)
4. Please mark in hands to show 10 minutes past 11 o’clock (11.10)

Information

5. Can you tell me something that happened in the news recently? (Recently = in the last week. If a general answer is given, eg ‘war’, ‘lot of rain’, ask for details. Only specific answer scores).

Recall

6. What was the name and address I asked you to remember
 John
 Brown
 42
 West (St)
 Kensington

Total correct (score out of 9) (To get a total score, add the number of items answered correctly)

/9

If patient scores 9, no significant cognitive impairment and further testing not necessary.
 If patient scores 5-8, more information required. Proceed with Step 2, informant section, on the next page.

If patient scores 0-4, cognitive impairment is indicated. Conduct standard investigations.

C

General practitioner assessment of cognition (GPCOG) (Continued)

Informant's name:

Date:

Informant's relationship to patient, ie informant is the patient's:

Step 2: Informant interview

These six questions ask how the patient is compared to when s/he was well, say 5–10 years ago

Compared to a few years ago:

	Yes	No	Don't know	N/A
1. Does the patient have more trouble remembering things that have happened recently than s/he used to?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Does he or she have more trouble recalling conversations a few days later?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. When speaking, does the patient have more difficulty in finding the right word or tend to use the wrong words more often?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Is the patient less able to manage money and financial affairs (eg paying bills, budgeting)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Is the patient less able to manage his or her medication independently?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Does the patient need more assistance with transport (either private or public)? (If the patient has difficulties due only to physical problems, eg bad leg, tick 'no')	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Total score (score out of 6)

(To get a total score, add the number of items answered 'no', 'don't know' or 'N/A')

/6

If patient scores 0–3, cognitive impairment is indicated. Conduct standard investigations.

D

Mini-cog

Mini-cog combines three-item word memory and clock drawing. It was developed in a community sample that over-represented people with dementia, low education, non-white ethnicity and non-English speakers. In a population-based retrospective study, its effectiveness was compared with MMSE and a standardised neuropsychological battery. It has similar sensitivity than the MMSE at a cut-off point of 25 (76 per cent vs 79 per cent) and similar specificity (89 per cent vs. 88 per cent) for dementia and therefore had little advantage except speed.

Guidance and further information:

<http://geriatrics.uthscsa.edu/tools/MINICog.pdf>

Administration

The test is administered as follows:

1. Instruct the patient to listen carefully to and remember 3 unrelated words and then repeat the words.
2. Instruct the patient to draw the face of a clock, either on a blank sheet of paper or on a sheet with the clock circle already drawn on the page. After the patient puts the numbers on the clock face, ask him or her to draw the hands of the clock to read a specific time.
3. Ask the patient to repeat the 3 previously stated words

Scoring

Give 1 point for each recalled word after the CDT distractor.

Patients recalling none of the three words are classified as demented (Score = 0)

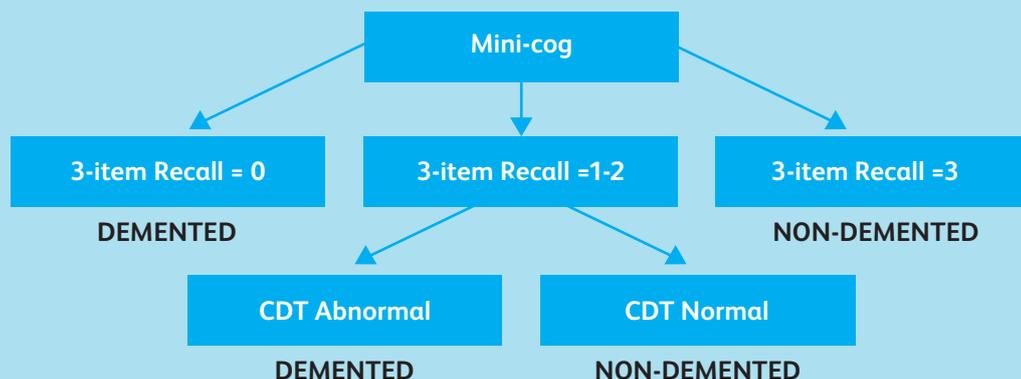
Patients recalling all three words are classified as non-demented (Score = 3)

Patients with intermediate word recall of 1-2 words are classified based on the CDT

(Abnormal = demented; Normal = non-demented)

Note: The CDT is considered normal if all numbers are present in the correct sequence and position, and hands readably display the requested time.

Mini-cog scoring algorithm (Borson, et al, p 1024).



From Boston, S., Scanlan, J., Brush, M., Vitallano, P., & Dokmak, A. (2000). The Mini-Cog: A cognitive 'vital signs' measure for dementia screening in multi-lingual elderly. *International Journal of Geriatric Psychiatry*, 15(11), 1021-1027. Copyright John Wiley & Sons Limited. Reproduced with permission.

E

Dementia commissioning for quality and innovation (CQUIN)

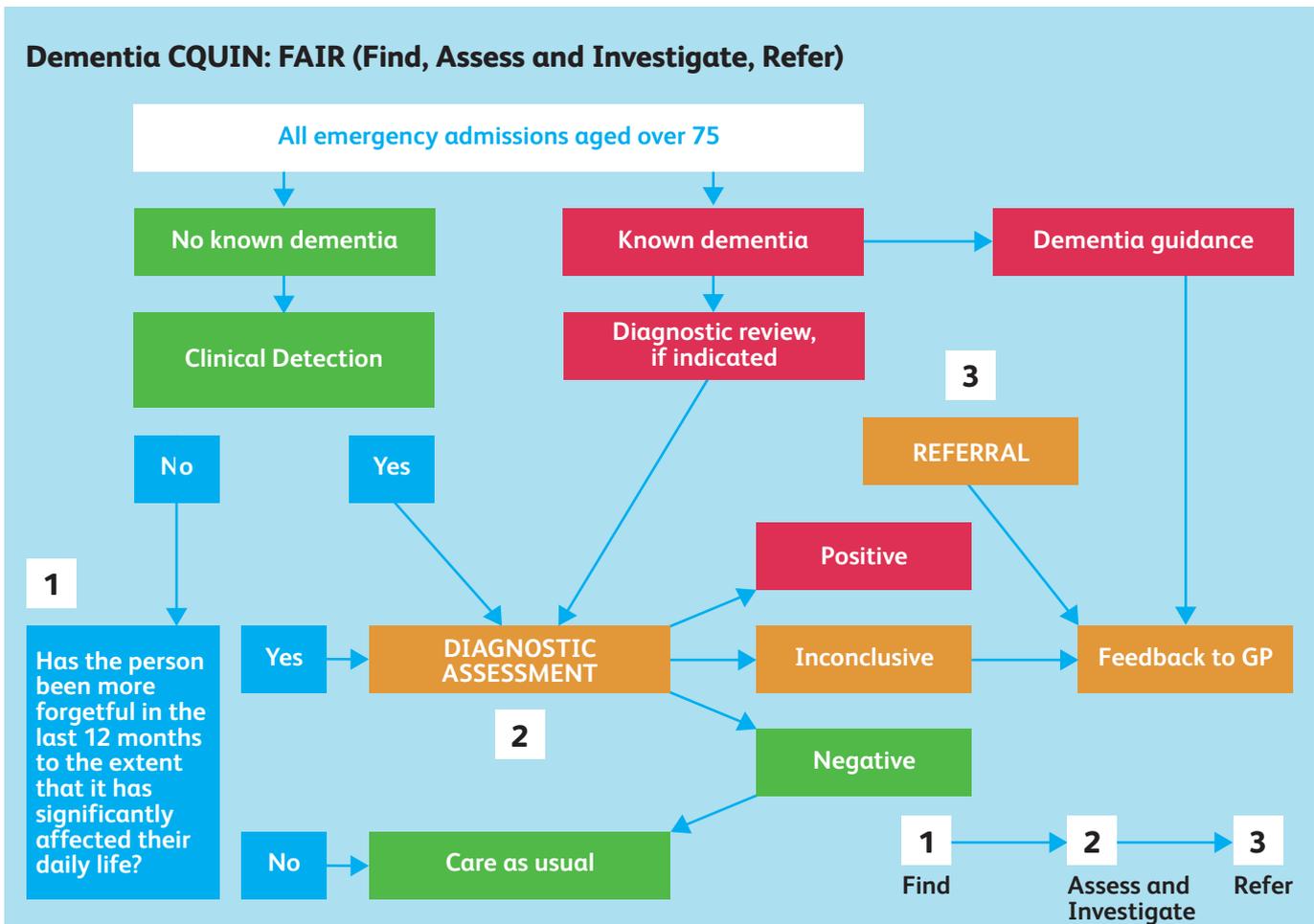
The dementia CQUIN aims to develop the system within acute trusts which incentivises clinicians/trusts by linking a proportion of their income to the achievement of targets to identify patients with dementia and other causes of impaired cognition alongside their other medical conditions. It also encourages them to refer appropriately and follow up after they leave hospital.

Currently around 40 per cent of patients over 75 admitted to general hospitals have dementia with only half having prior detection of cognitive diagnosis. There's an opportunity while people are in hospital to make sure that a proper diagnostic assessment takes place. This will also mean that while they are in hospital and on discharge, reasonable adjustments can be made in their care to take into account their dementia.

The more systematic identification of patients with cognitive impairment is also likely to improve the detection of delirium, depression etc and give opportunities to manage them better. The guidance is summarised below and has three parts: **Find, Assess and Investigate, Refer (FAIR)**

Guidance and further information:

www.gov.uk/government/uploads/system/uploads/attachment_data/file/215049/dh_133859.pdf



F

Addenbrookes cognitive examination-III (ACE-III)

The ACE-III replaced the previous ACE and ACE-R versions in November 2012. The scale includes five subdomains, which provide a cognitive score out of a maximum of 100.

Guidance, scoring guide and further information:

www.neura.edu.au/frontier/research/test-downloads

For training in the ACE III go to: www.fom.gla.ac.uk/aceiiitrainer/ (registration/login needed)

Name:	Date of testing:
Date of birth:	Tester's name:
Hospital no. or address:	Age at leaving full-time education:
	Occupation:
	Handedness:

Attention

Ask: What is the Day Date Month Year Season Attention (Score 0-5)

Ask: Which No./Floor Street/Hospital Suburb State Country Attention (Score 0-5)

Attention

Tell: 'I'm going to give you three words and I'd like you to repeat them after me: lemon, key and ball.' After subject repeats, say 'Try to remember them because I'm going to ask you later'.

Score *only* the first trial (repeat 3 times if necessary).

Register number of trials:

Attention

Ask the subject: 'Could you take 7 away from 100? I'd like you to keep taking 7 away from each new number until I tell you to stop.'

If subject makes a mistake, do not stop them. Let the subject carry on and check subsequent answers (eg, 93, 84, 77, 70, 63 – score 4).

Stop after five subtractions (93, 86, 79, 72, 65):

Memory

Ask: 'Which 3 words did I ask you to repeat and remember?' Memory (Score 0-3)

F

Addenbrookes cognitive examination-III (ACE-III) (Continued)

Fluency

Letters

Say: 'I'm going to give you a letter of the alphabet and I'd like you to generate as many words as you can beginning with that letter, but not names of people or places. For example, if I give you the letter 'C', you could give me words like 'cat, cry, clock' and so on. But, you can't give me words like Catherine or Canada. Do you understand? Are you ready? You have one minute. The letter I want you to use is the letter 'P'.

Fluency
(Score 0-7)

≥ 18	7
14-17	6
11-13	5
8-10	4
6-7	3
4-5	2
2-3	1
0-1	0
total	correct

Animals

Say: 'Now can you name as many animals as possible. It can begin with any letter.'

Fluency
(Score 0-7)

≥ 22	7
17-21	6
14-16	5
11-13	4
9-10	3
7-8	2
5-6	1
<5	0
total	correct

F

Addenbrookes cognitive examination-III (ACE-III) (Continued)

Memory

Tell: 'I'm going to give you a name and address and I'd like you to repeat the name and address after me. So you have a chance to learn, we'll be doing that 3 times. I'll ask you the name and address later.'

Memory
(Score 0-7)

Score *only* the third trial.

	1st Trial	2nd Trial	3rd Trial
Harry Barnes 73 Orchard Close Kingsbridge Devon			

Memory

Name of the current Prime Minister

Memory
(Score 0-4)

Name of the woman who was Prime Minister

Name of the USA president

Name of the USA president who was assassinated in the 1960s

Language

Place a pencil and a piece of paper in front of the subject. As a practice trial, ask the subject to '**Pick up the pencil and then the paper.**' If incorrect, score 0 and do not continue further.

Language
(Score 0-3)

If the subject is correct on the practice trial, continue with the following three commands below.

- Ask the subject to '**Place the paper on top of the pencil**'
- Ask the subject to '**Pick up the pencil but not the paper**'
- Ask the subject to '**Pass me the pencil after touching the paper**'

F

Addenbrookes cognitive examination-III (ACE-III) (Continued)

Language

Ask the subject to write two (or more) complete sentences about his/her last holiday/weekend/Christmas. Write in complete sentences and do not use abbreviations. Give 1 point if there are two (or more) complete sentences about the one topic and give another 1 point if grammar and spelling are correct.

Language

(Score 0-2)

Language

Ask the subject to repeat: **'caterpillar'; 'eccentricity'; 'unintelligible'; 'statistician'**
Score 2 if all are correct; score 1 if 3 are correct; and score 0 if 2 or less are correct.

Language

(Score 0-2)

Language

Ask the subject to repeat: **'All that glitters is not gold'**

Language

(Score 0-1)

Language

Ask the subject to repeat: **'A stitch in time saves nine'**

Language

(Score 0-1)

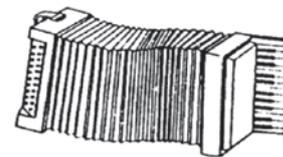
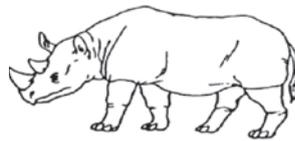
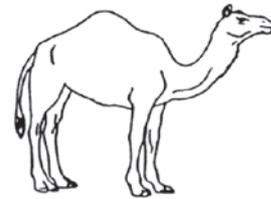
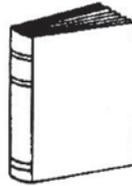
F

Addenbrookes cognitive examination-III (ACE-III) (Continued)

Language

Ask the subject to name the following pictures:

Language
(Score 0-12)



Language

Using the pictures above, ask the subject to:

- Point to the one which is associated with the monarchy
- Point to the one which is a marsupial
- Point to the one which is found in the Antarctic
- Point to the one which has a nautical connection

Language
(Score 0-4)

F

Addenbrookes cognitive examination-III (ACE-III) (Continued)

Language

Ask the subject to read the following words: (Score 1 only if all correct)

sew
pint
soot
dough
height

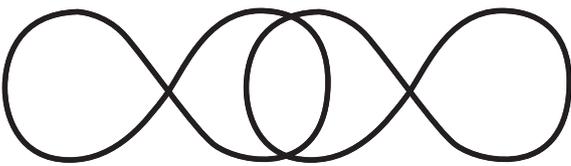
Language

(Score 0-1)



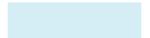
Visuospatial abilities

Infinity Diagram: Ask the subject to copy this diagram:

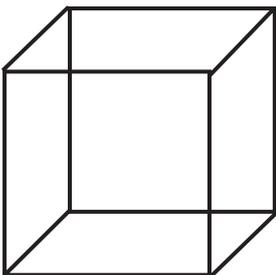


Visuospatial

(Score 0-1)



Wire cube: Ask the subject to copy this diagram:



Visuospatial

(Score 0-2)



Clock: Ask the subject to draw a clock face with numbers and the hands at ten past five.
(For scoring see instruction guide: circle = 1, numbers = 2, hands = 2 if all correct).

Visuospatial

(Score 0-5)



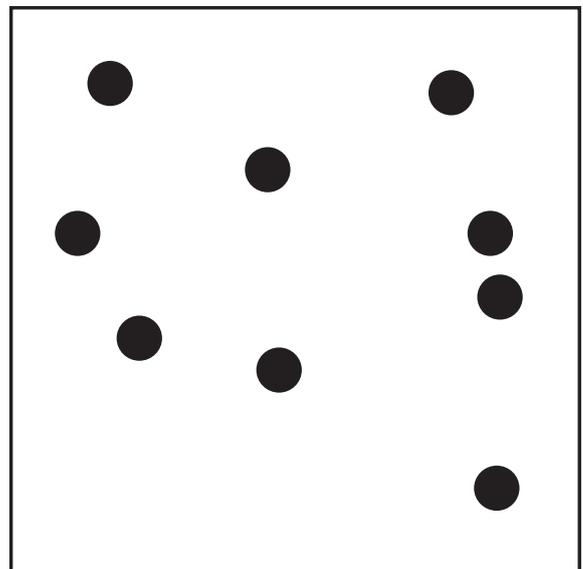
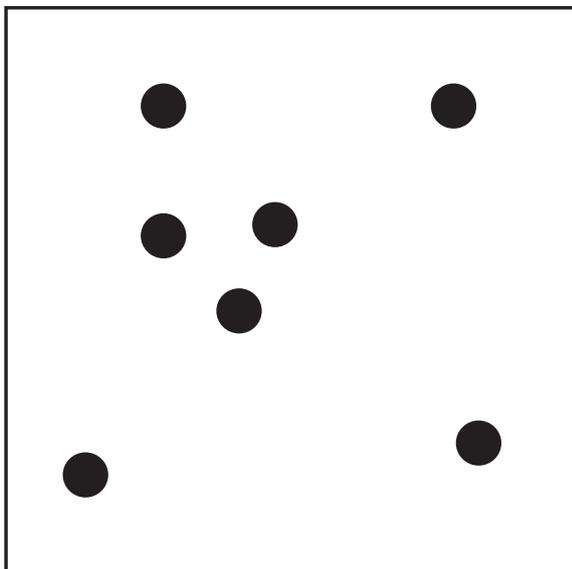
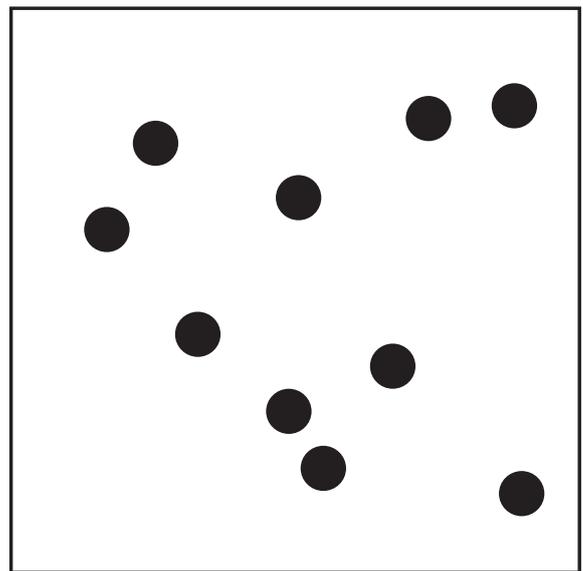
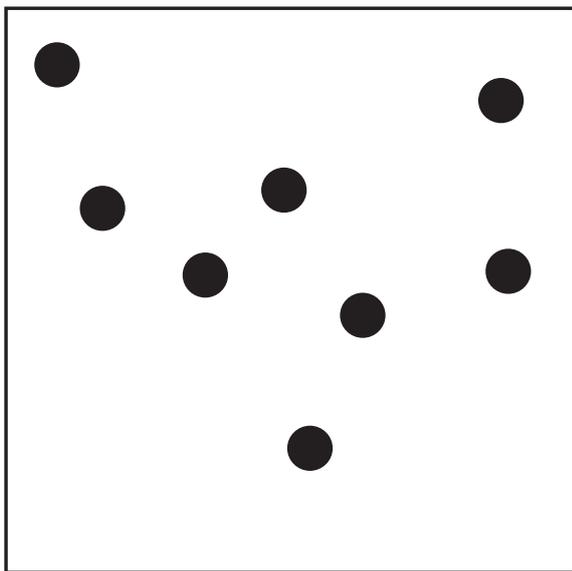
F

Addenbrookes cognitive examination-III (ACE-III) (Continued)

Visuospatial abilities

Ask the subject to count the dots without pointing to them

Visuospatial
(Score 0-4)



F

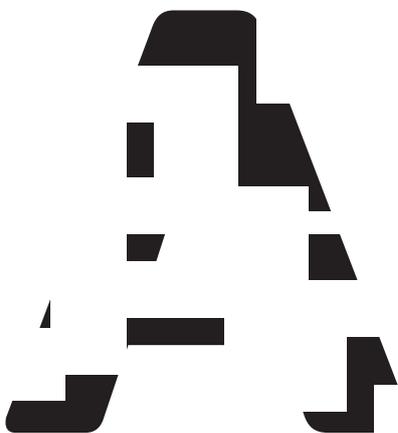
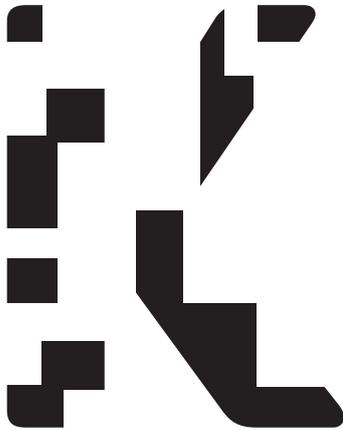
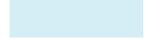
Addenbrookes cognitive examination-III (ACE-III) (Continued)

Visuospatial abilities

Ask the subject to identify the letters

Visuospatial

(Score 0-4)



F

Addenbrookes cognitive examination-III (ACE-III) (Continued)

Memory

Ask 'Now tell me what you remember about that name and address we were repeating at the beginning'

Memory
(Score 0-7)

Harry Barnes

73 Orchard Close

Kingsbridge

Devon

Memory

This test should be done if the subject failed to recall one or more items above. If all items were recalled, skip the test and score 5. If only part was recalled start by ticking items recalled in the shadowed column on the right hand side; and then test not recalled items by telling the subject 'OK, I'll give you some hints: was the name X, Y or Z?' and so on. Each recognised item scores one point, which is added to the point gained by recalling

Memory
(Score 0-5)

Jerry Barnes	Harry Barnes	Harry Bradford	recalled	
37	73	76	recalled	
Orchard Place	Oak Close	Orchard Close	recalled	
Oakhampton	Kingsbridge	Dartington	recalled	
Devon	Dorset	Somerset	recalled	

Scores

TOTAL ACE-III SCORE	/100
Attention	/18
Memory	/26
Fluency	/14
Language	/26
Visuospatial	/16

G

Montreal cognitive assessment (MoCA) Version 7.1 original version

The MoCA is a 10-minute; 30-point cognitive test with executive functioning and attention tasks, as well as language, memory and visuo-spatial skills designed for those scoring 24-30 on MMSE. The suggested cut-off for dementia is 26. It was prospectively validated in a UK memory clinic setting to determine its usefulness as a predictive tool for the development of dementia. At six-month follow up MoCA detected mild dementia in people with MCI (MMSE score above 25 points) with 94 per cent sensitivity and 50 per cent specificity. MoCA is also accurate in Parkinson's disease, with cut-offs of 21/30 for Parkinson's disease dementia (sensitivity 81 per cent; specificity 95 per cent). A separate scoring sheet is need to administer the category-cued and multiple choice recall items.

Guidance and further information: www.mocatest.org

Name:

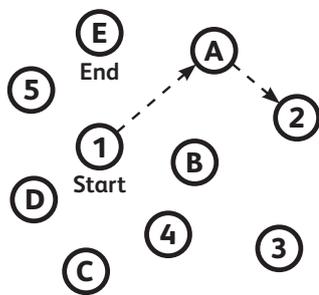
Date of Birth:

Education:

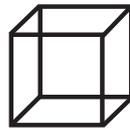
Sex:

Date:

Visuospatial/Executive



Copy cube



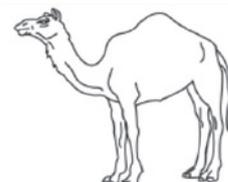
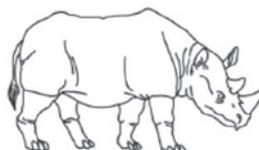
Draw CLOCK (Ten past eleven)
(3 points)

Contour Numbers Hands

Points

/5

Naming



/3

Memory

Read list of word, subject must repeat them.
Do 2 trials, even if 1st trial is successful.
Do a recall after 5 minutes.

	Face	Velvet	Church	Daisy	Red
1st trial	<input type="checkbox"/>				
2nd trial	<input type="checkbox"/>				

No points

G

Montreal cognitive assessment (MoCA) Version 7.1 original version (continued)

Attention

Read list of digits (1 digit/sec)

Subject has to repeat them in the forward order 2 1 8 5 4

Subject has to repeat them in the backward order 7 4 2

/2

Read list of letters. The subject must tap with his hand at each letter A. No points if > 2 errors

F B A C M N A A J K L B A F A K D E A A A J A M O F A A B

/1

Serial 7 subtraction starting at 100

93 86 79 72 65

4 or 5 correct subtractions: **3pts** 2 or 3 correct: **2pts** 1 correct: **1pt** 0 correct: **0pt**

/3

Language

Repeat: I only know that John is the one to help today.

The cat always hid under the couch when the dogs were in the room.

/2

Fluency/Name maximum number of words in one minute that begin with the letter F

(N > 11 words)

/1

Abstraction

Similarity between eg banana – orange = fruit

train – bicycle

watch – ruler

/2

Delayed recall

Has to recall words WITH NO CUE Face Velvet Church Daisy Red Points for UNCUED recall only

/5

Optional

Category cue

Multiple choice cue

Orientation

Date Month Year Day Place City /6

Administered by:

Normal > 26/30 **TOTAL** /30

Add 1 point if < 12 yr edu

H

Other tests

We have not included copies of the following tests in this toolkit, but there is evidence to support using them.

Severe impairment battery (SiB7)

The SiB7 takes 10 to 15 minutes to complete. It was derived from analysing the data from people who had completed the full SIB whose MMSE scores ranged from 5-7. It avoids the floor effect of the MMSE and so is useful for assessment where cognition is severely impaired.

Guidance, information and access:

www.pearsonassessments.com/HAIWEB/Cultures/en-us/Productdetail.htm?Pid=015-8054-431&Mode=summary

Hopkins verbal learning test (HVLT)

HVLT assesses verbal recall and recognition with three learning/free-recall trials, followed by a recognition trial. It has six equivalent forms, for reliable re-testing even at short intervals and takes under 10 minutes. It does not have ceiling effects and is not sensitive to educational levels.

In a district geriatric psychiatry service, HVLT had better sensitivity (96 per cent) when compared to MMSE in detecting dementia with a cut-off of 18/19. In a community dwelling population, when tested between people with dementia and non-demented controls (including MCIs), at a cut-off of <16 the sensitivity was 80 per cent and specificity 84 per cent. The sensitivity increased to 90 per cent at <18 with lower specificity 68 per cent. Results were similar for both Alzheimer's disease and vascular dementia. The cut-off score of 14.5 of the HVLT 'total recall' score showed a good discrimination between cases and controls (sensitivity 87 per cent and specificity 98 per cent). If the sensitivity needs to be higher ie for research, then a higher cut-off for the 'total recall' of 19.5 or 'memory' score with a cut-off point of 24.5 is suggested (NB the revised version of the HVLT is under copyright).

Guidance and further information:

www4.parinc.com/Products/Product.aspx?ProductID=HVLT-R

Test for the early detection of dementia

(TE4D-Cog)

Initially developed in Germany (known as TFDD), TE4D-Cog was modified for use in an English-speaking population. This eight-item test takes about 10 minutes. It is scored out of 45 on immediate recall, semantic memory, clock drawing test, category fluency, orientation to time and ideomotor praxis. A cut-off of 35 gives sensitivity of 100 per cent and specificity of 84 per cent, in differentiating early dementia from non-dementia. The TE4D-Cog is age, gender and education independent in people with mild dementia. It still needs further evaluation in memory clinics and non-English-speaking populations.

Information and access:

www.ncbi.nlm.nih.gov/pubmed/16315149

Test your memory test (TYM)

TYM is a 10-item test, self-administered under medical supervision, scoring from 0-50. It was specific and sensitive for the diagnosis of Alzheimer's disease and to detect more cases than MMSE in memory clinic patient with a higher level of education, including those with sensory impairments and in situations where clinician time is limited. It still needs further validation in diverse education, cultural and care setting.

Guidance and further information:

www.cambridgebrainsciences.co.uk

H

Other tests

CANTABMobile

A series of tests delivered electronically, including the Paired Associate Learning test, structured functional assessments and assessment of depression.

Information and access:

www.cantabmobile.com/

The 5-word test

A brief two-minute memory test in French consisting of a five word recall developed by Dubois et al 2002 and validated in 86 people with Alzheimer's disease and 126 people with memory disorder.

Guidance and further information:

www.esculape.com/geriatrie/alzheimer_5mots.html

The commercial organisation CANTAB raised comments on the content of this toolkit which could not be included due to the clear conflict of commercial interest. It is suggested that interested parties contact CANTAB directly.

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Alzheimer's Society is the UK's leading support and research charity for people with dementia, their families and carers. We provide information and support to people with any form of dementia and their carers through our publications, National Dementia Helpline, website, and more than 2,000 local services. We campaign for better quality of life for people with dementia and greater understanding of dementia. We also fund an innovative programme of medical and social research into the cause, cure and prevention of dementia and the care people receive.

Alzheimer's Society

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DAA Dementia
Action Alliance

**RC
GP** Royal College of
General Practitioners


Department
of Health

C · M · H · P
College of Mental Health Pharmacy

**RC
PSYCH**
ROYAL COLLEGE OF
PSYCHIATRISTS

NHS
England