

The Chinese University of Hong Kong The Nethersole School of Nursing CADENZA Training Programme

CTP 004

Evidence based practice in dementia care

Web-based Course for Professional Social and Health Care Workers

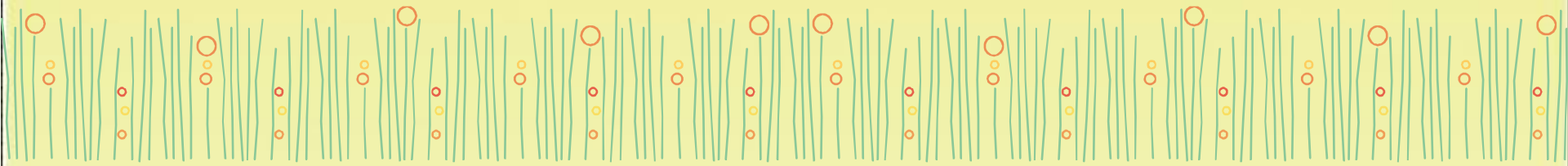
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Chapter 1

Cognitive Assessment for Older People with Dementia





Chapter Outline



1. The overview of cognitive assessment
2. Points to consider in performing cognitive assessment
3. Common domains of cognitive function in dementia assessment
4. Descriptions of commonly used cognitive assessments

THE OVERVIEW OF COGNITIVE ASSESSMENT



Cognitive assessment

What important questions you might consider before any cognitive assessment?

- What is this person's general level of intellectual functioning?
- What was the probable level of premorbid functioning?
- Does this person have an organic memory deficit?
- Is there a difference in ability between recognition and recall tasks?
- Is there a difference between verbal and visual memory ability?
- To what extent are the memory problems due to language, perceptual or attention deficits?
- How do these scores compare with people of the same age in the general population?

(Baddeley, et.al, 2004)

Clinical assessment on cognitive function in dementia

- Clinical assessment on cognition should include standardized tests as well as behavioral/ functional approach
- However, both methodologies are not in opposition to each other. They are in fact complementary
- Standardized test results help build up a cognitive map of strengths and weaknesses while behavioral assessments help clarify everyday problems, set goals for and evaluate treatment

Standardized assessment scales

- There is trend towards increased demand for cognitive assessments as part of a patient's functional evaluation in order to ensure efficient and effective discharge planning (Groves, et al., 2010)
- The core of all assessment in dementia care is [careful enquiry](#) and [attentive listening](#), and there is no substitute for a [clinical interview](#) by a trained professionals
- However, there is a special and important role for the use of [formal scales](#) in dementia assessment (Lovestone, 2001)

Standardized assessment scales



Do you think that assessment scales are used frequently in all medical conditions in research but rarely used in ordinary clinical practice? If yes, can you think of the reasons behind?

- The patients themselves are less able to describe the symptoms, partly because the symptoms are context-sensitive or subjective.
- Some types of symptoms better to formal assessment using scales than others. Such as cognitive symptoms rather than quality of life scales

Advantages of standardized assessment scales



- Reliability between assessors and over the course of time
- Reductionism: the provision of a number allows measurement of change and ready comparison of the patient to others and to population norms
- Act as a prompt to full clinical assessment
 - The incorporation of a set of assessment scales into clinical practice can encourage, for example, full and pro-active assessment of behavior rather than relying on a reactive assessment following carer complaint
 - Build up a picture of an individual's cognitive profile

Drawbacks of standardized assessment scales

- Less effective in telling us how memory deficits identified on tests affect everyday life (The manifestations of cognitive difficulties in real life)
- Do not take into account other factors such as premorbid lifestyle, personality, motivation, family support and so forth

Standardized assessment scales

ATTENTION!

Balance **practicality** with **scientific rigour**
(Lovestone, 2001)

Behavioral/ Functional assessment approach

- Involves an analysis of the relationship between a person's behavior antecedents and its consequences
- This can be carried out by direct observations, self-report measures and interview

Standardized tests **XU** Functional or behavioral assessments

Main differences

(Baddeley et al, 2004)

Standardized test	Functional/ behavioral assessments
<ul style="list-style-type: none">• Tend to tell what a person has	<ul style="list-style-type: none">• Tend to tell what a person does
<ul style="list-style-type: none">• Behaviors observed are typically signs of a disorder	<ul style="list-style-type: none">• Behaviors observed are seen as samples of performance
<ul style="list-style-type: none">• Usually carried out in one situation	<ul style="list-style-type: none">• Usually carried out in a number of situations
<ul style="list-style-type: none">• As part of a diagnosis	<ul style="list-style-type: none">• Help select or plan treatment
<ul style="list-style-type: none">• Have an indirect relationship to treatment	<ul style="list-style-type: none">• Have a direct relationship to treatment
<ul style="list-style-type: none">• Typically carried out prior to treatment (or perhaps post-treatment) but they are not part of the treatment process itself	<ul style="list-style-type: none">• May be carried out during treatment and are part of the treatment process

Three levels of assessment

- Three levels of assessment with respect to cognition. (Lovestone, 2001)

1. Comprehensive measures of cognitive ability

- Ø Using scales all the way through to detailed neuropsychometric testing taking many hours

Any example?

ADAS-cog

2. Assessment or screening in secondary care

- Ø Takes short period to time to perform with only a minimal amount of training necessary

Any example?

MMSE

3. Screening in primary care

- Ø For opportunistic and routine screening which only few minutes required to complete the test

Any example?

AMT/Clock drawing test

Points to consider in performing cognitive assessment



Points to consider

- There is **no single screening test** for dementia (Lui, 2008)
- The **history** is the cornerstone of any assessment (Lui, 2008)
 - Some patients may not have awareness of cognitive deficits or the high quality of information is limited by the cognitive impairment. The history should be **verified** by a reliable informant and supplementary information from other sources.
- A score **alone doesn't mean anything**. We must consider things such as age, education and cultural bias.

Plan for assessment

- **Goals**

- **To ensure that the patient is assessed in a timely and appropriate manner based on the information required by the team**

- **Considerations**

- What instrument(s) are available at the facility I'm working in ?
- What standardized vs. non-standardized instruments are available?
- What information am I needing (i.e., functional status vs. cognitive skills?)
- What are the patient's current levels (e.g. sitting tolerance, attention, written .verbal language, and fine motor control)?
- What assessment is appropriate given the time frame available?

(Groves, et al., 2010)

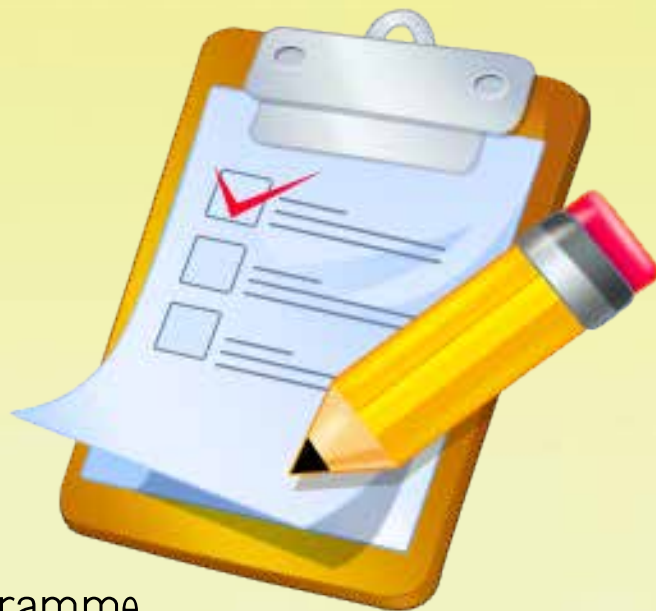
Interpret assessment results

- Goals: To interpret the assessment findings in an objective and accurate manner, and to document the findings in an understandable format for all stakeholders

(Groves, et al., 2010)

- Considerations:
 - What do the assessment findings indicate regarding the patients' cognitive capacity at this point in time?
 - Do the assessment findings correspond to the functional observations and behaviors of the patients while on the unit, or prior to admission?
 - What are the patient's strengths and limitations observed throughout the assessment process?
 - Does the patient have insight into their condition?
 - If a standardized test was used, was it administered in a standardized fashion / protocol?
 - What other factors could have influenced the assessment findings?
 - Mood (anxiety, depression)
 - Language barrier
 - Vision or hearing impairment
 - Motivation
 - Fatigue
 - Other medical conditions
 - Psychiatric history
 - Environmental distractions
 - Are the cognitive deficits permanent or temporary?
 - Is further testing required due to uncertainties in the information obtained from the assessment processes?

Common domains of cognitive function in dementia assessment



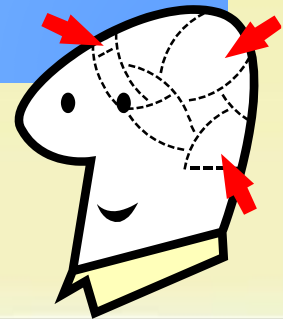


Dementia



- Dementia is a diagnosis of impaired mental function
- It is defined as a reduction or impairment of multiple cognitive abilities, including memory, sufficient to interfere with self-maintenance, work or social relationships
- Dementia cannot be diagnosed on the basis of radiological, biochemical, genetic, or psychological tests alone. Such tests serve to confirm the presence of altered brain function and to help determine the cause of the dementia syndrome

(Weiner & Lipton, 2003)



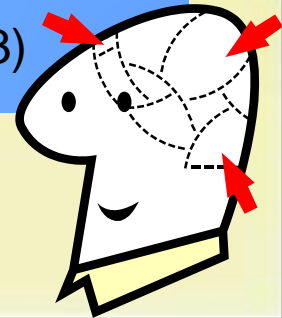


Dementia



- The intellectual impairment occurs without clouding of consciousness and may or may not be permanent
- The diagnosis is based on the history (usually supplied by informants other than the patient) and clinical examination
- The diagnosis of dementia is complicated by the enormous variation between individuals. The clinician must compare a person's present abilities with his or her own past abilities
- Individual family members' biases are minimized through the use of multiple informants

(Weiner & Lipton, 2003)



General diagnostic criteria for dementia based on DSM-IV-TR criteria

A. The development of multiple cognitive deficits manifested by both (1) and (2): (Weiner & Lipton, 2003)

(1) **Memory impairment** (*impaired ability to learn new information and to recall previously learned information*)

a) Short term memory

Primary memory - assessed by digit span forward and in reverse. Discrepancy of three digits or more suggests impairment.

Secondary memory – three different methods to assess. 1st: ask to recall three words presented by the examiner after an interval of 5 minutes. 2nd : present three objects without naming them, then cover them up, and ask the examinee to recall the objects 5 minutes later. 3rd : read a short paragraph aloud to the examinee and then ask the examinee to tell what he or she remembers.

b) Long-term or tertiary memory

Question about personal information that can be validated by the accompanying person (date of birth, graduation from high school, marriage, etc.) and by asking facts of common knowledge compatible with the examinee's education and cultural background, including questions such as the name of the Chief Executive of HK, or the main city of HK e.g. MongKok, Shatin

General diagnostic criteria for dementia based on DSM-IV-TR criteria (cont'd)

(2) **One (or more) of the following cognitive disturbances:**

- a) Aphasia* (language disturbance) including, in addition to the classic aphasias, difficulty with word finding and confrontational naming. In advanced dementia, word finding difficulty including empty speech devoid of nouns and verbs with relative preservation of socially overlearned speech, such as “How are you?” Earlier, it can be demonstrated by asking the patient to name as many animals as possible in 1 minute. Dementia patients will not be capable of naming 10 animals in 1 minute and will frequently name the same animal again. They will find difficulty naming the parts of a watch (watchband, stem, back, crystal) , making paraphasic errors (such as strap for band or lens for crystal), or describing functions (e.g., “It’s how you set it” for watch stem) instead.
- b) Apraxia* (inability to carry out motor activities despite intact motor function; e.g., strength and coordination), i.e., to draw the face of a clock and set the hands at 10 minutes after 11. (Sunderland et al. 1989)

General diagnostic criteria for dementia based on DSM-IV-TR criteria (cont'd)

- (c) *Agnosia* (failure to recognize or identify objects despite intact sensory function)
- (d) *Disturbance in executive functioning*
(i.e., planning, organizing, sequencing, abstracting)
 - i) Impaired planning, organizing, and sequencing are indicated by an inability to deal with interpersonal, family, and employment-related issues and to describe logically how they might be dealt with. Changes in long-standing habits and personal hygiene may reflect executive dysfunction. The best source of information about executive functioning is history taking, but it may also be assessed by whether individuals have problems in handling daily life issues, such as an overdrawn bank account or a medical emergency. Executive functioning can be additionally assessed by asking examinees to perform serial tasks, such as going through the steps of mailing a letter (i.e., folding the paper, inserting it into an envelope, addressing the envelope, placing a stamp on it, and sealing it).
 - ii) Impaired abstracting ability is evidenced by inability to abstractly categorise the similarity between objects such as a chair and a table, or a knife and a fork, or for highly educated persons, between a poem and a statue or praise and punishment. Impaired abstracting ability is also evidenced by inability to interpret abstractly common proverbs such as “Don’t cry over spilled milk” or “The grass always looks greener on the other side of the street.”

(Weiner & Lipton, 2003)

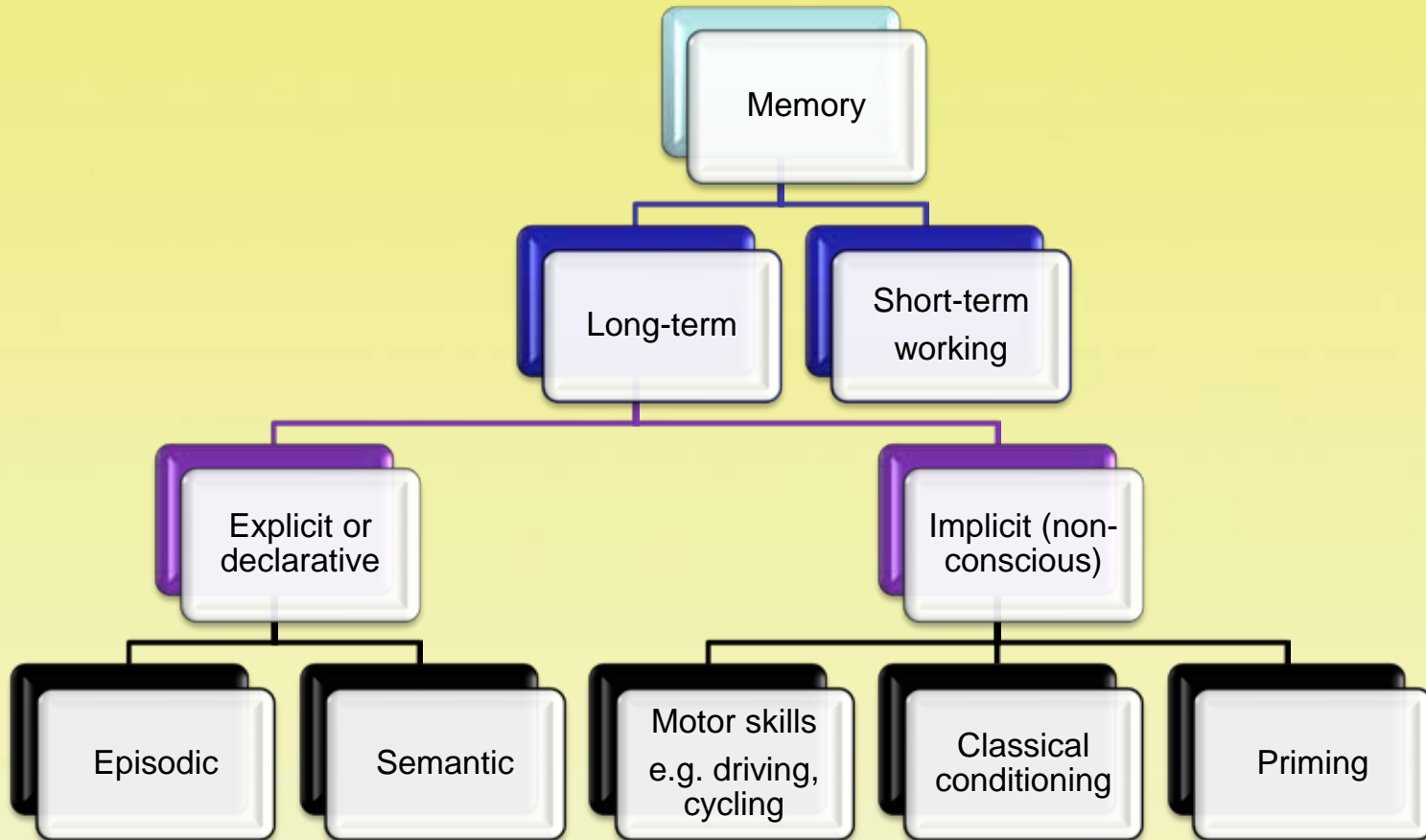
General diagnostic criteria for dementia based on DSM-IV-TR criteria (cont'd)

B. The cognitive deficits in Criteria A1 and A2 each cause significant impairment in social or occupational functioning and represent a significant decline from a previous level of functioning

C. The deficits do not occur exclusively during the course of delirium

Memory

Major subdivisions of memory



Working (Short-term) memory

- In neuropsychological terms, short-term memory is synonymous with the system of working memory responsible for the **immediate recall** of small amounts of verbal (for example, digit span) or spatial material.
- Working memory appears to function independently of, but **in parallel with**, longer-term memory.

(Hodges, 2007)

Long-term memory

- Explicit or declarative memory—memory available to conscious access and reflection.

- Episodic memory—personally experienced episodes and events; time-and context-specific

- Ø anterograde (the ability to learn new information)

- Ø retrograde (the recall of old information)

- Semantic memory—our permanent store of representational knowledge of facts and concepts, objects and people, as well as words and their meaning (general store of world knowledge).

- Implicit memory—those types of learned responses which are not available for conscious reflection.

Orientation



- The ability to **relate** to the current environment in an appropriate fashion, to understand current time (e.g. time of day, date, etc.), persons (who they are, who the examiner is), place (awareness of present physical location and location of their home), and the situation (what is going on and why).
- The ability to **update** oneself with respect to his **basic information** likely involves a number of fundamental cognitive capacities (e.g., memory, attention)
- Orientation can remain stable when attentional resources are fairly intact and so an absence of impairment in orientation does not imply normal cognitive function or absence of brain disease

Attention

- Commonly used to refer to selectivity of processing
- Subdivided into four domains:
 1. *Arousal* (describes the general state of responsiveness and wakefulness)
 2. *Selective attention* (The capacity to highlight, or focus upon, one stimulus while suppressing awareness of competing stimuli)
 3. *Divided attention* (Involves the ability to respond to more than one task at once)
 4. *Vigilance or sustained attention* (the ability to focus attention over an extended period of time)
- In patients with diminished awareness, further testing of cognition is clearly pointless

(Hodges, 2007)

Can you think of any test question on attention?

Language

- Aphasia is defined as a loss or impairment of language function caused by brain damage
- Language is the complex symbolic signal system used by individuals to communicate with others
- The **left hemisphere** is strongly dominant for language functions in most human
- Four aspects of language should be considered for the purpose of gross clinical diagnosis (Hodges, 2007)
 - *Fluency*
 - *Repetition*
 - *Comprehension*
 - *naming*

Can you think of any examples of testing questions on these areas?



Apraxia

- Apraxia is the inability to carry out complex motor acts despite intact motor and sensory systems and coordination, good comprehension, and full cooperation

(Hodges, 2007)

Can you think of any test on apraxia?

Agnosia

- The term can be roughly translated as 'non-recognition'
- Within a particular modality, agnosia can occur of different classes of stimuli such as colors, objects or faces
- Agnosias may be **visual, tactile, or auditory**
- **Visual object** and **face agnosia** are most common (Hodges, 2007)



Visuoconstructive ability

- Deficits in constructional abilities including drawing are often early signs of degenerative dementia and mostly pronounced in Lewy-Body-Dementia (Stoppe, 2008)
- Visuoperception, spatial analysis, and constructional ability are a group of related functions that permit the individual to apprehend, process, and interact with the environment around them. (Morris, 2006)

Can you think of any test examples on constructional abilities?

Components of an assessment battery

- A good neuropsychological assessment battery aimed at **distinguishing between normal ageing, depression and dementia** and **between different types of dementia**.
- *Linda Clare* suggested the following components: (Baddeley, et al, 2004)
 - *delayed recall*
 - *paired associate learning*
 - *recognition memory*
 - *semantic memory*
 - *naming*
 - *constructional praxis*
 - *anomalous sentence repetition*
 - *verbal letter fluency and category fluency*
 - *executive function (abstraction, planning/organising, set shifting, problem-solving)*
 - *attention (sustained, selective, divided)*

Descriptions of commonly used cognitive assessments in Hong Kong

1. *Cantonese version of Mini-Mental State Examination (CMMSE)* 簡短智能測驗
2. *Chinese Version of Mattis Dementia Rating Scale (CDRS)*
老人癡呆症評估表

Cantonese version of Mini-Mental State Examination (CMMSE)

簡短智能測驗



MMSE

- MMSE was first developed by [Folsten et al.](#) in 1975. They originally devised it to differentiate patients with organic and functional psychiatric illness
- Widely used as intake and screening assessment for cognitive functions
- It is used on every continent, with all cultures and is translated in over 50 languages
- **30-point** screening tool and quick to administer – **about 5-10 minutes**
- The score should be the raw number of correct answers (out of a total of 30 points)
- The MMSE was NOT meant to be used for establishing a diagnosis of dementia. i.e. MMSE is **screening** tool – NOT **diagnostic** tool
- (Remark: [MMSE 2nd edition](#) has been just released)

MMSE

- According to MMSE clinical guide (Folstein, 2001), the most widely accepted and frequently used cut off score is **23**, with scores of 23 or lower indicating the presence of cognitive impairment.
- For classification purposes, suggested cut-off level:
 - *Normal cognitive function = 27-30*
 - *Mild cognitive function = 21-26*
 - *Moderate cognitive impairment = 11-20*
 - *Severe cognitive impairment = 0-10*

MMSE

- It consists of 11 items covering a multitude of relevant domains including:
 - Orientation to time and place
 - Registration
 - Attention and calculation
 - Recall
 - Language
 - Visual construction





CMMSE簡短智能測驗

- The Cantonese version of Mini-Mental State Examination (MMSE) was translated from the original version MMSE and adapted by [Chiu et al 1994](#)
- CMMSE has been validated on the local population of elderly with satisfactory reliability and validity in detecting cognitive impairment (Chiu et al, 1994)

[Chiu, H.F., Lee. HC., Chung W.S., Kwong, P.K. reliability and validity of the Cantonese version of mini-mental state examination –a preliminary study. *Journal of Hong Kong College of Psychiatrists* 1994;4\(Suppl 2\): 25S-28S](#)

CMMSE簡短智能測驗

- Several items of the original MMSE were modified for use in locality by CMMSE (Chiu et al, 1994)

Original MMSE		CMMSE	Reasons
1) Write a sentence		Say a sentence	Avoid failure on this item as a result of lack of education
2) Spelling "WORLD" backwards.(For the alternative test equivalent for the test of serial sevens)		Reverse five digits (42731)	No Cantonese equivalent in this test (But the serial sevens test was retained)
3) Read and obey The phrase "Please close your eyes"		Read and obey the phrase "Clap your hands 顛瀾"	The original phrase may sometimes be interpreted to be related to death in the Chinese culture
4) Repeat the phrase "No If's, ands or buts"		Repeat the phrase "Uncle buys fish intestine 姨丈買魚腸"	An alliteration in Cantonese

CMMSE簡短智能測驗

- The cut-off score was adjusted according to the level of **educational attainment** of Hong Kong elderly people (Chiu et al, 1998).
- The cut-off score is categorised as follows:

Educational level	Suggested cut-off score
More than 2 years schooling	22 or below
Elementary schooling (1-2 years)	20 or below
No schooling/ illiterate	18 or below

CMMSE簡短智能測驗

Categories represent different cognitive domains or functions: (marks—maximum 30 marks)

- Orientation (10) (Time:5, Place:5)
- Immediate registration (3)
- Attention and calculation (5)
- Delay recall (3)
- Language (8)
 - ρ Naming (2)
 - ρ Repetition (1)
 - ρ Comprehension (3)
 - ρ Reading (1)
 - ρ Initiate speech (1)
- Visual construction (1)

CMMSE

Advantages	Limitations
Quick	False negatives secondary to low education, inattention, physical problem and visual impairment. (Groves et al, 2010)
Easy scoring	It has both a 'ceiling' or 'floor' effect: a score of 30 does not always mean normal cognitive function, and a score of zero does not mean an absolute absence of cognition. (Woodford & George, 2007)
Familiar to other healthcare colleagues	Insensitive to screen early dementia/mild cognitive impairment (Nasreddine et al, 2005; Woodford & George, 2007, Chiu et al, 1994) and the very severely demented patients who generally suffer from the floor effects. (Chan et al, 2003)
Various translations including Chinese and Cantonese versions	It does not contain much capacity to test frontal/executive or visuospatial (typically right parietal) functions. As a result it may have a limited ability to detect non-Alzheimer's dementias, such as post-stroke cognitive impairment, frontotemporal or subcortical dementias in their early phases. (Groves et al, 2010; Woodford & George, 2007)

Chinese Version of Mattis Dementia Rating Scale (CDRS) 老人癡呆症評估表

Mattis Dementia Rating Scale (DRS)

- First developed by Steven Mattis in 1973 and revised in 1988 (DRS2).
- One of the standardised mental status examinations that is widely used in the US for detecting and staging dementia.
- It consists of a professional manual, 1 stimuli booklet and 30 scoring forms.
- Consists of 36 items in five subscales:
 - Attention (A)
 - Initiation/Perseveration (IP)
 - Construction (C)
 - Conceptualisation (P)
 - Memory (M)

The first four sections are graded in difficulty, and contain screening tests at the beginning. If these are passed, the remainder of the section need not be administered.

The final memory section is given to all subjects.

Mattis Dementia Rating Scale (DRS)




- It assesses a fairly wide range of cognitive abilities and contains a sufficient number of less-demanding items such that more valid and reliable information can be obtained in more severely demented subjects. (Hodges, 2007)
- Besides providing a global measure of various cognitive domains, the total DRS score is found to be a clinically valid measure for staging the impairment of dementia patients. The pattern of scores in the DRS is shown to be able to differentiate controls from mildly demented patients and distinguish mildly from moderately demented Alzheimer's disease patients.
- The pattern of the DRS scores can also show the qualitative difference in the cognitive profiles of different types of dementia.
- It takes about **20-40 minutes** to administer to demented patients.
- The composite score with a **maximum 144 points** is generated from the summation of the 5 subscale scores.

Chinese Version of Mattis Dementia Rating Scale (CDRS)

- The test was translated and validated by [Chan et al. in 2003](#).
- The Chinese version is also considered to be applicable to **Chinese individuals** who speak other dialects, given that all the instructions are written in Chinese and can be read with Mandarin, Cantonese or other dialects.
- Most of the items in the DRS, such as drawing figures, imitating gestures, generating items, are relatively insensitive to cultural differences.
- The total score of CDRS is 141 instead of 144 in the original DRS.
- The influence of age and level of education on the CDRS performance is found to be significant. Adjustment of the CDRS total score for age and education level are recommended. (Chan et al, 2001, 2003)
- Most of the test items can be directly translated from English.

Chinese Version of the Mattis Dementia Rating Scale (CDRS)

- Several items of the original DRS were modified for use in locality (Chan et al, 2001, 2002):

Original DRS	Chinese version DRS	Reasons
1) In (A) part, counting 'A's	Counting '7's	Most of the Hong Kong elderly are not familiar with the English alphabet
2) In (C) part, the difference question <i>cat, dog, car</i> 糲 <i>fish, car, train</i>	 糲 <i>cat, dog, face (貓, 狗, 貌)</i> <i>fish, car, ship (魚, 車, 船)</i>	The Chinese word for face sounds like cat. The Chinese word for train consists of two character, one of which is the character for car.
3) In (C) part, the sentence initiation part, "Make up a sentence with the words 'man' and 'car'".	 Make up any complete sentence	The generally lower education level of elderly individuals in the Chinese population.
4) In (M) part, the orientation question, "Who is the president of the United	 "Recall the name of the present chief executive of the HKSAR."	Suit the societal background in Hong Kong

Chinese Version of the Mattis Dementia Rating Scale (CDRS)

Subscale	Total Score	Cut-off score	Raw score
Attention (A) 燄 誓	37	29	
Initiation/ Perversation (IP) 繞齒/病理性重複測試	37	26	
Construction (C) 棟 壽	6	3	
Conceptualisation (P) 類別概念	39	28	
Memory (M) 記憶力	25	18	
<i>Total Score</i> 總分	141	112	

CDRS

Advantages	Limitations
<p>The total scores appear to be solidly reliable and have good convergent and predictive validity. (Smith et al, 1994)</p>	<p>The test is lengthy and time-consuming.</p>
<p>Seems to accurately assess loss of global cognitive integrity.</p>	
<p>Provides clues regarding time remaining prior to imminent dementia outcomes.</p>	<p>Clinical use on moderate to severe dementia patients is limited because they have a limited concentration span.</p>
<p>Can overcome the drawback of brief cognitive screening tools e.g., floor effects.</p>	
<p>Assessment of a greater number of cognitive domains, a wider range of item difficulty.</p>	<p>Age and level of education must be taken into account when using the DRS to detect abnormal cognitive performance in elderly Chinese individuals.</p>
<p>The ability to differentiate among patients with distinct dementing disorders on the basis of the pattern of subtest scores they achieve. (Chan et al, 2001)</p>	

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