



REGISTRY 3 – data collection / CRF completion guidelines

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**Guidelines of Form Enrollment**

Label	Instructions
Subject category	<p>At risk of HD Family history of HD, no CAG repeat confirmation, no HD diagnosis, motor score ≤ 5 and diagnostic confidence is ≤ 3 or missing</p> <p>Premanifest expansion mutation carrier CAG repeat length on larger allele ≥ 36 and no HD diagnosis and motor score ≤ 5 and HD Diagnostic confidence level < 4 (if in doubt about symptoms, choose premanifest)</p> <p>Manifest HD patient CAG repeat length on larger allele ≥ 36 and HD Diagnostic confidence level > 3 and motor score > 5 (if in doubt about symptoms, choose premanifest)</p> <p>Control, expansion negative CAG repeat length on larger allele ≤ 35, with family history of HD</p>

Guidelines of Form Demographics

Label	Instructions
Gender	Refers to self-reported gender. Please comment if genetic and phenotypic/behavioural gender dissociate.
Ethnicity	<p>The self assigned ethnicity - here operationalised by the area of origin - should be reported. Please ask: 'How would you describe your ethnic background?' and write down the answer of your participants in the field provided.</p> <p>It is understood that 'ethnicity' is not precisely defined. Ethnicity is used here to indicate shared origins, culture and traditions but not in an attempt to propose a taxonomic division of humankind by physical/genetic characteristics as implied by the term 'race'.</p> <p>Examples:</p> <ul style="list-style-type: none">• Caucasian: synonymous to 'white' (e.g. British, French, German, Irish, Italian, Swedish etc.)• African-Black: area of origin south of the Sahara• African-North: area of origin Sahara and north of the Sahara (e.g. Algeria, Egypt, Morocco, Tunisia etc.)• American-Black: people of African descent whose area of origin is within the Americas (e.g. Canada, Caribbean, Brazil, US)• American-Latin: people sharing the latino culture whose area of origin is within the Americas (e.g. Mexico, South-America, US etc.)



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	<ul style="list-style-type: none"> • Asian-West: area of origin e.g. Bangladesh, India, Iran, Iraq, Pakistan etc. • Asian-East: area of origin e.g. China, Japan, Korea etc. • mixed: please indicate as precisely as possible in form of a comment (e.g. asian-white, black-white, mestizo etc.) • other: please indicate as precisely as possible in form of a comment (e.g. aboriginal North-America, aboriginal Australia, semitic etc.)
Handedness	Relies on the self-report of your participant. Note: if a more reliable assessment is desired, please use the Edinburgh-Inventory (supplied as pdf). If your assessment is based on information derived from the Edinburgh Inventory (R.C. Oldfield, 1970), please indicate this fact as a comment .

Guidelines of Form HD Clinical Characteristics

See HDCC additional guidelines

Label	Instructions
HD Clinical Characteristics and Age-of-Onset	Please estimate the earliest age at onset of the symptoms below, independent of whether they are considered to be related or unrelated to HD. For all age-related questions please provide the examiner's best appraisal of onset age (to the nearest whole number), assimilating information from the subject, caregiver, family member and other sources.
HD diagnosed	Please enter date of clinical diagnose, not of the genetical.

Guidelines of Form CAG Analysis

Label	Instructions
Date data obtained	Enter the date of the Genetics Laboratory report on the repeat sizes. The date you enter data onto the eCRF is stored automatically.

Guidelines of Form General Variable Items

See additional guidelines for educations system ISCED.

Label	Instructions
Weight	Please measure (if possible) the actual weight rather than rely on the self report of the participant. Note: weight is recorded in kg (not pounds!).
Height	Please measure (if possible) the actual height rather than rely on the self report of the participant. Note: height is recorded in cm (e.g. 174 cm - not in feet or inches!).
BMI	Calculated automatically



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Occupation	Please indicate as precisely as possible using the self-report of your participant (i.e. in her/his native language). Note: refers to the type of occupation held during most of her/his professional career.
Employment	Note: <ul style="list-style-type: none">• 'not employed' refers to people who do not hold a gainful employment at the time of interview for reasons other than being laid off, e.g. househusband/housewife.• 'unemployed' refers to people who were laid off and who are seeking gainful employment.• 'partially unemployed' refers to people whose employers temporarily reduce working hours and consequently pay less due to shortage of orders instead of laying people off.
Residence	Self-reported categories of residence. Rough guidelines: - village : 0 - 5.000 residents - town : 5.000 - 50.000 residents - city : 50.000 - 10.000.0000
ISCED education level	The highest qualification/degree obtained by attending school/university/any other formal training institution should be marked (irrespective of the length of time required/the route chosen to achieve the respective professional qualification). Note: Please make sure to have the correct language selected (upper right) in order to see the ISCED localized to your education system. Please choose US for USA, Canada and Australia. A pdf explaining the ISCED levels is provided for each country.
Years of education	Will be filled in manually based on the answers given by the participant.

Guidelines of Form Medication Log

Label	Instructions
Drug name	You can either enter the proprietary name (= trade name) used in your respective country or the generic name. Periodically, the drug name will be coded in WHO-DD terminology by language or central coordination.
Indication1	The disorder representing the indication for use of a compound can be given in English or in your native language . Please make sure that you describe the indication as precisely as possible , by making use of the 'comment' field. Periodically, your entries will be coded using the ICD10 terminology by language/central coordination.
Dose/Unit	Enter dose and unit separately, e.g. 100 and mg in the



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	fields provided.
Frequency	Enter 102 to indicate that a drug is prescribed e.g. as 1 tablet in the morning, 0 tablets at noon and 2 tablets in the evening. Use more than 3 numbers if a compound is given more than 3 times a day. To indicate a prescription of 0.5 tablets in the morning, at noon and in the evening, the dosage needs to be adopted accordingly e.g. 0.5 tablets in the morning, 0.5 tablets at noon and 0.5 tablets in the evening of 100 mg should be entered as 111 of 50 mg (dosage/unit).
Route	p.o. - per os p.r. - rectal s.c. - subcutan i.m. - intramuscular i.v. - intravenous td - transderma/topical sl - sublingual inh - inhaled
Ongoing	Either ' Ongoing ' or ' End date ' should be entered. Please review all entries at each visit and enter end dates if the medication is no longer ongoing.

Guidelines of Form Comorbid Conditions

Label	Instructions
Concomitant disorders	Please make sure that you describe the disorder as precisely as possible , e.g. by making use of the comment field in addition.
Ongoing	Either ' Ongoing ' or ' End date ' should be entered. Please review all entries at each visit and enter end dates if the disorder is no longer ongoing.

Guidelines of Form Huntington's Disease Rating Scale '99 - Motor Assessment

Label	Instructions
Date data obtained	Enter the date you perform the examination. The date you document the examination (=enter information in the eCRF) is stored automatically - you therefore need not to take it down/record it.
Motor score (TMS)	Will be calculated automatically.
Motor score (TMS) incomplete	Will be calculated automatically.
Ocular pursuit	Should be assessed over a range of approximately 20° with a target passing slowly at $\leq 10^\circ$ per second, which corresponds to about 2 seconds for moving an object from one shoulder to the other.



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Saccade initiation	Should be tested over a 20° range, as for ocular pursuits. Saccade movement should be elicited by a sound (snapping fingers) or movement (wiggle fingers), but not by a verbal command to look to the right or left.
Saccade velocity	Should be tested at a larger range of approximately 30° so as to be able to detect incomplete range.
Tongue protrusion	Suggestion: Please ask your participants to open their mouth wide while you inspect it using a torch. Then ask your participants to protrude their tongue well beyond their front teeth while keeping their mouth wide open and to keep it out as long as it takes you (as the examiner) to count aloud from 1 to 10. Participants should be made aware that they are not allowed to prevent their tongue from slipping back into the mouth by biting on it.
Finger taps	Participant taps thumb with index finger in rapid succession with widest amplitude possible, each hand separately.
Pronate/supinate-hands	Requires the participant to alternately hit the palmar and dorsal surface of one hand against the palm of the opposite hand. Use the palm of the opposite hand as a target instead of some other surface such as the participant's leg or the table surface. The participant should do this task as quickly as possible over a five-second interval . The task is graded according to the degree of slowing and irregularity.
Luria	Fist-hand-palm sequencing - Say ' <i>Can you do this?</i> ' Examiner puts hand into fist on flat surface (or in lap) and sequences as follows: fist, side, flat (DO NOT REPEAT THIS OUT LOUD). Watch to make sure that participant can mimic each step. Continue to practice Luria 3-step for 1 - 2 minutes. When participant is able to join you then say ' <i>Very good, now keep going, I am going to stop.</i> ' Rest hand and start timing participant's sequences. A sequence is considered correct only if it is unaided by examiner model and in the correct order. Count completed sequences and score. If participant was unable to complete any sequences over a 10-second period, then continue as follows. Say ' <i>Now lets try it again. Put your hands like this. FIST; SIDE; FLAT.</i> ' Watch to make sure the participant can mimic each step. Using the verbal labels, begin the sequences again and ask the participant to ' <i>Do as I do, Fist, Side, Flat</i> ' (repeat this as you continue). Continue to perform Luria 3-step. When participant is able to join you say ' <i>Very good, now keep going, I am going to stop.</i> ' Rest hand and start timing participant's sequences. A sequence is considered correct if it is unaided by examiner model and in the correct order. Count completed sequences and score as above.
Rigidity-arms	Rigidity is judged on passive movement of the arms with the participant relaxed in the sitting position.
Bradykinesia-body	Observe the participant during spontaneous motion such as walking, sitting down, arising from a chair, and executing the tasks required during the examination. This rating reflects the examiner's overall impression of bradykinesia.
Maximal dystonia	Maximal dystonia is defined here as a tendency toward a posture, posturing along an axis. Observe the participant during the examination; i.e., no particular maneuvers are required to illicit these features. Maximal dystonia are typically observed during demanding motor tasks such as tandem gait.



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	When rating dystonia facial dystonia (blepharospasm, jaw opening and closing) should be included in your assessment of the truncal region. Please indicate in a comment what subtypes of dystonia (blepharospasm, torticollis) you included in your rating of truncal dystonia. RUE refers to right, LUE to left upper extremity, RLE to right, LLE to left lower extremity.
Maximal chorea	Maximal chorea is defined here as movement, not posture. Observe the participant during the examination; i.e., no particular maneuvers are required to illicit these features. Maximal chorea is typically observed during demanding motor tasks such as tandem gait. Chorea is rated by specific regions. BOL refers to buccal-oral-lingual, RUE to right, LUE to left upper extremity, RLE to right, LLE to left lower extremity. Please comment whether the chorea you observe is more distal or more proximal (e.g. distal much more than proximal).
Gait	Observe the participant walking approximately 9 meters (10 yards) as briskly as they can, then turning and returning to the starting point.
Tandem walking	The participant is requested to walk ten steps in a straight line with the foot placed (accurately but not quickly) such that the heel touches the toe of the other foot. Deviations from a straight line are counted.
Retropulsion pull test	The participant's response to a sudden posterior displacement produced by a pull on the shoulder while the participant is standing with eyes open and feet slightly apart is assessed. The shoulder pull test must be done with a quick firm tug after warning the participant. The participant should be relaxed with feet apart and should not be leaning forward. If the examiner feels pressure against his/her hands when placed on the participant's shoulders, the examiner should instruct the participant to stand up straight and not lean forward. The examiner should instruct the participant to take a step backward to avoid falling. Examiners must catch participants who begin to fall.

Guidelines of Form Huntington's Disease Rating Scale '99 - Behavioral Assessment

Label	Instructions
Date data obtained	Enter the date you obtained the pertinent information . The date you enter data on the eCRF is stored automatically - you therefore do not need to record it.
Behavioural score	Will be calculated automatically.
Behavioural score incomplete	Will be calculated automatically.
Sub-scores	Will be calculated automatically.
Behavioral Assessment	Instructions: Please rate the frequency and severity of the behaviour for the <u>past month</u> . Frequency and severity should be uniquely assessed as independent qualifiers of positively affirmed behavioural symptoms. Frequently occurring behaviours do not indicate a high severity rating (e.g., presence of anxiety may be constant but mild in impact). Severity is indicative of the behaviour's impact on the individual's ability to



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	carry out daily activities. ["I will now ask you about experiences that most individuals have at some point in life. I will ask you to help me gauge how frequently and severely these experiences occur."]
Depressed mood	Please ask: <i>In the past month have you been feeling sad (or down or blue)? Has your mood affected your daily activities? Have you found yourself doing something you would ordinarily enjoy and realized you were not having any fun?</i> Evidence of sad mood from behavioural observation includes sad voice or expression, tearfulness.
Low self-esteem/guilt	Please ask: <i>In the past month have you been feeling badly about yourself? Have you found yourself thinking or saying that you are a failure, or blaming yourself for things?</i> Evidence of low self-esteem/guilt includes self-blame without justification, self-deprecation including feelings of being a bad or unworthy person, feeling like a failure.
Anxiety	Please ask: <i>In the past month have you found yourself feeling worried about things?</i> Evidence of anxiety includes worrying, panic, feeling frightened or fearful for no apparent reason.
Suicidal thoughts	Please ask: <i>Since your last visit, have you found yourself thinking that life is not worth living or that you would be better off dead? Have you thought about hurting yourself or killing yourself? Are you planning to hurt yourself or kill yourself? Have you taken any steps toward carrying out your plan?</i>
Disruptive or aggressive behavior	Please ask: <i>Since the last visit, have you had any emotional or temper outbursts? Have you had times when you lost control of yourself? Have you hit or shoved or thrown things or expressed your temper in a physical way? Have you used threats or hostile words?</i> This item is used to rate loss of temper and impaired self-restraint. Threatening behavior includes physical violence or aggression, verbal outbursts, threatening, foul or abusive language.
Irritable behavior	Please ask: <i>In the past month, have you felt impatient? Do you behave in a demanding way? Do others say you behave in a demanding way or have a short fuse or are overly sensitive?</i> Note that this item is used to rate the ease with which the subject loses his/her temper rather than how extreme the behavior is once self-control is lost.
Perseverative/obsessional thinking	Please ask: <i>Within the past month, have you found yourself getting stuck on certain ideas? Within the past month, have you been bothered by thoughts, images or fears that keep coming back even if you try not to have them?</i> This item is used to rate inflexibility or perseveration of thinking.
Compulsive behaviour	Please ask: <i>In the past month, have you found yourself doing certain things over and over again? Are you unable to resist doing some of these things? For example, do you wash your hands again and again, or count up to a certain number, or check that the door is locked over and over to make sure that you have done it correctly?</i> This item is used to rate repetitive, purposeful, and intentional behaviors.
Delusions	Please ask: <i>I'm going to ask you about unusual experiences that people sometimes have. Since the last visit, has it ever seemed like people are out to get you or perhaps are controlling you? Has it seemed like you have any special</i>



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	powers or importance, or that books, TV, and radio statements are referring to you? Are there any other unusual things you experience that I have not asked about? Delusions are fixed false beliefs that are not culturally shared.
Hallucinations	Please ask: Since the last visit, have you heard things that other people could not hear, such as noises or the voices of people whispering or talking? Did you ever have vision or see things that other people could not see? How about any other strange sensations in your body: skin, smell, or taste? Hallucinations are perceptions without a physical stimulus (e.g., hearing voices when no one is in the room).
Apathy	Please ask: Within the past month, have you found that you have lost interest in things that used to be important to you? Do you sit around a lot doing nothing? Are you just as interested as always in trying new things, starting new projects? Apathy is a lack of interest or emotional involvement in things, and can be distinguished from anhedonia which refers to inability to experience pleasure. Apathy is reflected behaviorally by neglecting hygiene, being inactive, sitting around doing nothing, doing nothing unless told to do it by someone else, saying little in conversation, failing to initiate conversation. This question should definitely be addressed to an informant if possible.
Behavioral Milestones	These items assess whether the participant has reached certain behavioral milestones.
Does the examiner believe the participant is confused?	Confusion is defined as intermittent or persistent disorganized thinking, perceptual disturbances or disorientation to time, place, or person.
Does the examiner believe the participant is demented?	Dementia is defined as progressive impairment in memory, abstract thinking or judgement that interferes with work or usual social activities and relationships.
Does the examiner believe the participant is depressed?	Depression is defined as persistent depressed mood, anhedonia, or vegetative signs sufficient to interfere with daily functioning.

Guidelines of Form Huntington's Disease Rating Scale '99 - Problem Behaviour Assessment-s

See paper form – PBA-s

Guidelines of Form Huntington's Disease Rating Scale '99 - Functional Assessment

Label	Instructions
Date data obtained	Enter the date you obtained the pertinent information. The date you enter data on the eCRF is stored automatically - you therefore do not need to record it.
Functional Assessment Score	Will be calculated automatically
Could subject engage in gainful employment in his/her accustomed work	If the subject is no longer able to work at the job he/she had for the majority of his/her life, answer 'no'. For example, if the person worked in a fast food chain as a cashier and after developing HD was forced to leave that job and worked in a



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	less demanding job, the answer would be 'no' to gainful employment in accustomed work. If the subject is a homemaker who never worked for pay, the probe for this person might be: 'Can the subject manage the household today as well as he/she always has or must they have assistance to do so?' If assistance is now required, the answer would be 'no'.
Could subject engage in any kind of gainful employment?	Gainful employment means that the person is paid for their services. This is judged as potential capacity, not whether the person is actually working.
Could subject engage in any kind of volunteer or non-gainful work?	Volunteer or non-gainful work means the person is not paid for their services.
Could subject manage his/her finances (monthly) without any help?	An informant or a subject may report that the subject has always had difficulty managing monthly finances without any help. To help to determine whether the subject could perform this activity unassisted, the probe might be: 'Compared to today, do you think he/she could have managed the monthly finances better a year ago?' Alternatively, the probe could be 'Do you think he/she could have managed the monthly finances better before he/she had some of the symptoms/signs of HD?' these probes which highlight change in function may help to determine the subject's capacity to perform at the present time.
Could subject shop for groceries without help?	Shopping for groceries without help means going into the store obtaining groceries without assistance . If the subject requires help carrying bundles, but can otherwise handle the task, the answer is 'yes'.
Could subject handle money as a purchaser in a simple cash (shop) transaction?	The person should be able to go to a shop and come back with the correct change.
Could subject supervise children without help?	Supervising children means physically as well as cognitively caring for children who could not otherwise be left alone. This does not mean infants.
Could subject operate an automobile safely and independently?	Operating an automobile safely and independently means the subject can drive without others feeling afraid to drive with the subject and showing good judgment. If the person has never learned how to drive, please file a comment indicating 'Not applicable'.
Could subject do his/her own housework without help?	Housework activities might include cooking, vacuuming, dusting, taking out the rubbish, and doing dishes. If a subject never did any housework, ask about picking up after themselves (e.g., doing light dusting or making the bed) and hanging up his/her clothes. Housework might also extend to light gardening if that was the subject's responsibility.
Could subject do his/her own laundry (wash/dry) without help?	If the subject only folds laundry and does nothing else, the answer is 'no'.
Could subject prepare his/her own meals without help?	Preparing meals can include making a sandwich, heating up soup or using the microwave, as long as the person does it himself/herself. A probe might be 'if the subject were left alone, would he/she able to prepare his/her own meals?'
Could subject use the telephone without help?	Using a telephone without help means the ability to make outgoing calls and answer the telephone
Could subject take his/her own medications without help?	If the subject has the pills in a dispenser but he/she is able to remember to take them by himself/herself, then the answer is 'yes'. If the subject cannot physically handle medications without assistance, the answer is 'no'.



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Could subject feed himself/herself without help?	If the subject cannot cut his/her own food without assistance, then the answer to ability to feed himself/herself without help is 'no'.
Could subject dress himself/herself without help?	If the subject must have clothes laid out, but he/she can dress properly (i.e., enough to be presentable), the answer is 'yes'.
Could subject bathe himself/herself without help?	If the subject requires assistance getting into the shower/tub, but then bathes himself/herself, the answer is 'yes'.
Could subject use public transportation to get places without help?	Public transportation includes bus and train. If there is no public transportation the question should be; 'If public transportation were available, could he/she use it without assistance?' en-us Public transportation includes bus and train. If there is no public transport, the question should be; 'If public transportation were available, could he/she use it without assistance?'
Could subject walk to places in his/her neighbourhood without help?	Walking to places in the neighborhood without help implies not getting lost. A probe might be 'would he/she be able to find his/her way home if he/she was out on one of the streets in the neighborhood?'
Could subject walk without falling?	Falling should occur at least once a week for a 'no' answer. A one-time fall does not indicate a 'no' answer.
Could subject walk without help?	Required use of a walker or a cane is 'help'. In other words, if the subject cannot walk without an assistive device, the answer is 'no'.
Could subject's care still be provided at home?	Care at home implies only whether the person is capable of living at home, rather than in the equivalent of institutional care.
Subject's independence in %	Independence is given as percentage of normal in five percent graduations; each bullet indicates a five percent increment. If you select a bullet, the percentage will appear in the field Independence Scale.

Guidelines of Form Huntington's Disease Rating Scale '99 - Functional Capacity

Label	Instructions
Date data obtained	Enter the date you obtained the pertinent information. The date you enter data on the eCRF is stored automatically - therefore you do not need to record it.
Functional score	Will be calculated automatically.
Occupation	The participant's capacity to engage satisfactorily in gainful or voluntary works is assessed regardless of whether or not the participant is actually working. Normal refers to gainful employment, actual or potential, with usual work expectations. Reduced capacity refers to full or part-time gainful employment with lower than usual work expectations (relative to the participant's training and education), but with satisfactory performance. Marginal refers to a capacity only for part-time employment, actual or potential with low work expectations. Unable refers to a participant who would be unable to work, even with considerable assistance and oversight.
Finances	Assessed by surveying the participant's involvement in personal and family finances including balancing a checkbook, paying bills, budgeting, shopping, etc. Normal capacity refers to satisfactory handling of these basic financial tasks. Requires



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	slight assistance refers to mild difficulties which would require the assistance/supervision of a family member or financial advisor. Requires major assistance refers to a participant who would require extensive supervision in handling routine financial tasks. Unable refers to a participant who would be unable to carry out these financial tasks, even with considerable assistance and supervision.
Domestic chores	Refers to the participant's capacity to carry out routine domestic tasks such as cleaning, laundering, dishwashing, table setting, cooking, lawn care, answering mail, maintaining a calendar, etc. Normal capacity refers to a full capacity without assistance. Impaired refers to impaired capacity requiring only slight assistance or supervision. Unable refers to marked incapacity requiring major assistance.
ADL	Refers to the traditional areas of 'activities of daily living' (ADL) including eating, dressing and bathing. Normal refers to full capacity. Minimal impairment refers to impaired capacity requiring only slight assistance. Gross tasks only refers to impaired capacity requiring moderate assistance and supervision. Total care refers to major incapacity requiring total assistance and supervision.
Care level	Refers to the most appropriate care environment to meet the participant's capacity, whether at home , at home or chronic care facility or full skilled nursing care (24 hours a day supervision).

Guidelines of Form Huntington's Disease Rating Scale '99 - Cognitive Assessment

See cognitive manual

Guidelines of Form Huntington's Disease Rating Scale '99 - Clinical Summary

Label	Instructions
Date data obtained	Enter the date you obtained the pertinent information. The date you enter data on the eCRF is stored automatically - therefore you do not need to record it.
Do you believe that this participant has manifest HD?	With a confidence level $\geq 99\%$ and based on UHDRS (Motor, Cognitive, Behavioral, Functional components)

Appendices

See HDCC additional guidelines
See additional guidelines for education system ISCED.
See paper form PBA-s
See cognitive manual



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Guidelines for the HD Clinical Characteristics: Age at Onset questions for EHDN REGISTRY Patients

This questionnaire will capture essential and detailed information on when signs and symptoms that may or may not be related to HD first appear. Take into account the patient's whole medical history, and record the onset of signs and symptoms regardless of whether the patient feels they are related to their HD.

Use the suggested wording below as a guide, but ask any other questions you need to try and date the onset as accurately as possible. Ask the patient first, then the carer (explain to the carer at the beginning that you will give them a chance to state their views after you have first heard from the patient) and finally record your own judgement about onset, taking account of what has been said by both patient and carer, and also what you can find in the case notes (or any other independent sources of information). It is not uncommon to find a record by a genetic counsellor, who saw the patient and noticed choreiform movements, or an interview with a relative who mentioned that the family think the patient is affected, and this information may pre-date the estimates of either the patient or the carer who is acting as your informant on this occasion. Use your own judgement about the evidence, but avoid making guesses based only on your own experience of how long the average patient would need to be affected to reach this stage in the illness.

As a general principle for dating symptom onset, try to identify any landmark events in the patient's life (such as holidays, moving house, or births, marriages, deaths in the family, etc) which might help to anchor the onset date by asking whether the onset of the symptom was before or after that particular landmark.

“They have always been like that”

Patients or carers may sometimes find it difficult to pin down when some symptoms started – reporting, for example, that the patient has “always” been an irritable person. In these cases, you need to probe further, asking for examples of irritable behaviour as a child, or an adolescent, or trying to identify when the irritability was first noticed as being outside normal limits, or caused problems, for example, leading to a change in how others treated the patient.



Motor symptoms

When did you first notice any physical changes, such as fidgety movements, clumsiness or loss of balance? Can you remember a particular occasion when this happened and you first realised you might be developing the family illness? What were you doing at the time? Where were you? Did you mention it to anyone else?

Depression

Have you ever suffered from depression for a period of 4 weeks or more? Was there ever a time you felt so low that you thought about ending it all? Have you ever been treated with antidepressants? When was the first time this happened to you (doesn't necessarily have to have been medicated in the first or any subsequent instance)?

Irritability

"Irritability" refers to the ease with which the subject loses his/her temper, rather than the degree to which self-control is lost once the subject is angry (this is captured in the "aggression" item).

Have you ever had spells when you have been bad-tempered, moody or cranky for a period of 4 weeks or more? Have you ever had times when you became cross very easily, or had difficulty keeping control of your temper? When did this begin? How bad was the worst ever episode? How did it affect the people around you? Do you think they treated you differently?

Aggression

Have you ever had any aggressive outbursts? Times when you have lost control of your temper, perhaps shouted, or slammed doors, or kicked furniture? How bad was the worst ever episode? When did this first occur?

Apathy

Have you noticed any change in your level of motivation? For example, has there ever been a period when you lost interest in things that usually matter to you, or could not be bothered with activities you usually enjoy, or needed pushing to get around to jobs that need to be done, or spent a lot of time sitting around doing nothing? Did this ever happen at a time when you were not also feeling depressed? When did you first notice this change?

Perseverative or Obsessive/Compulsive Behaviours

Have you ever been troubled by repetitive thoughts, fears or mental images that came back over and over again, or had urges to do something over and over (e.g. double-checking, counting things, or washing your hands repeatedly)? Or perhaps found yourself unable to stop thinking about something, getting stuck on ideas or actions, so that friends said you were getting it out of proportion, or getting a 'bee in your bonnet', or were 'obsessed'? If so, how bad was the worst ever episode? When was the first time this happened to you?



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Presence of Psychosis

Has the patient ever reported symptoms resembling schizophrenia e.g. paranoid thinking, delusions and hallucinations, such as hearing voices? If so when was the first episode? Has anyone in the patient's family ever experienced paranoid thoughts or hallucinations, or been diagnosed with schizophrenia?

Cognitive Symptoms

Have you ever noticed any problems with your memory, or your ability to concentrate on things? Have you found it more difficult than it used to be to organise things, or perhaps noticed that it takes longer to get things done nowadays? Has anybody commented on this, or maybe criticised your performance at work or when doing chores at home? Can you remember the first time this happened? (Probe as above and look for evidence such as job changes etc. which might suggest early cognitive difficulties).

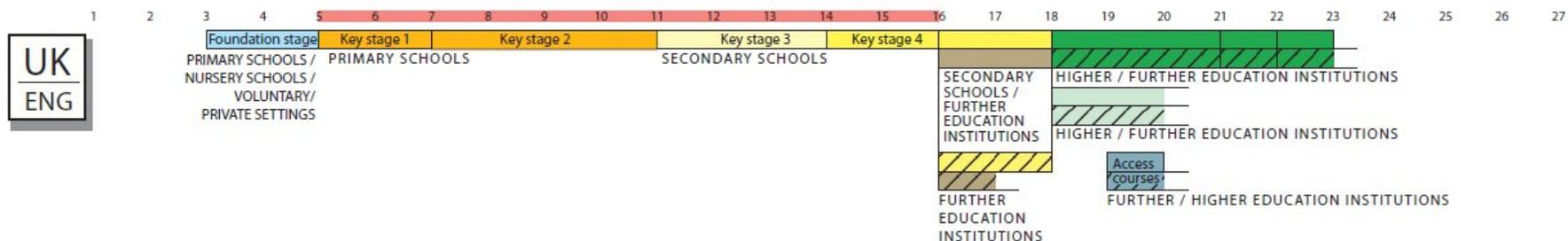
Suicidal Ideation

Have you ever felt like life was not worth living, or felt like you wanted to end it all? When was the first time this happened? Did you mention it to anyone else? Have you ever acted on these thoughts, or tried to harm yourself?

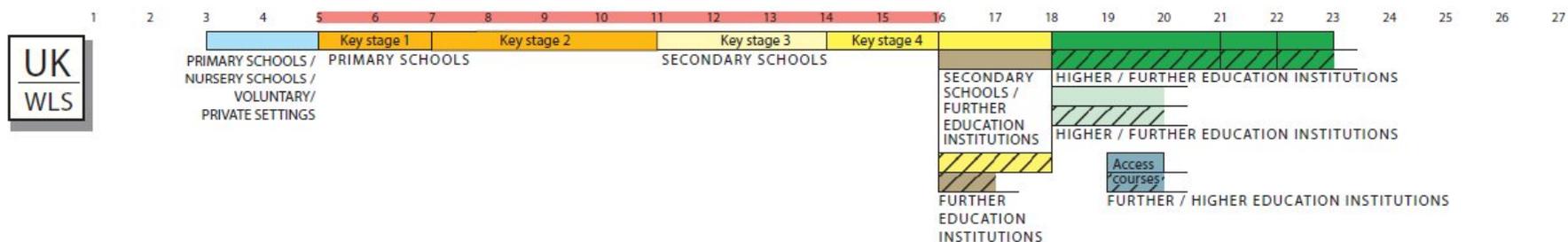
Organisation of the education system in England, Wales, Northern Ireland and Scotland (ISCED 1997)

ISCED '97	Explanation	United Kingdom
ISCED 0	Pre-primary education is defined as the initial stage of organised instruction. It is school- or centre-based and is designed for children aged at least 3 years.	Nursery schools/classes Pre-Primary, 3-5yrs
ISCED 1	This level begins between 5 and 7 years of age, is compulsory in all countries and generally lasts from four to six years.	Primary schools (Key stage 1 and 2), 5-11yrs
ISCED 2	This continues the basic programmes of the primary level, although teaching is typically more subject-focused. Usually, the end of this level coincides with the end of full-time compulsory education.	Secondary schools (key stage 3) Comprehensive school College, formerly 'O' levels, 11-16yrs
ISCED 3	This level generally begins at the end of compulsory education. The entrance age is typically 15 or 16 years. Entrance qualifications (end of compulsory education) and other minimum entry requirements are usually needed. Instruction is often more subject-oriented than at ISCED level 2. The typical duration of ISCED level 3 varies from two to five years.	Secondary schools (Key stage 4) Sixth Form 'A' levels, 14 or 15 or 16 – 18yrs
ISCED 4	These programmes straddle the boundary between upper secondary and tertiary education. They serve to broaden the knowledge of ISCED level 3 graduates. Typical examples are those designed to prepare pupils for studies at ISCED level 5 or for direct labor market entry.	Work based training BTEC awards/NVQs/HNC/Ds
ISCED 5	Entry to these programmes normally requires the successful completion of ISCED level 3 or 4. This level includes tertiary programmes with an academic orientation (type A) which are largely theoretically based and tertiary programmes with an occupational orientation type B) which are typically shorter than type A programmes and geared for entry into the labor market.	Undergraduate degree Professional qualifications (e.g, dentistry, law, medicine) Masters Degree
ISCED 6	This level is reserved for tertiary studies that lead to an advanced research qualification (Ph.D. or doctorate).	PhD/Doctorate

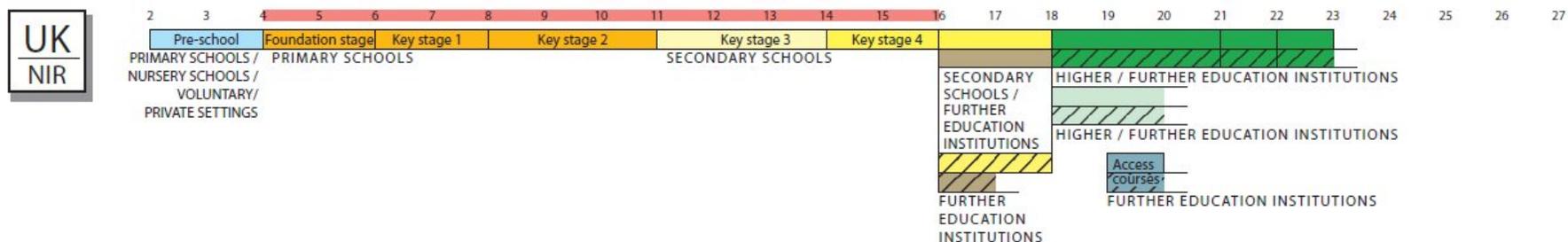
Organisation of the education system in England, 2007/08



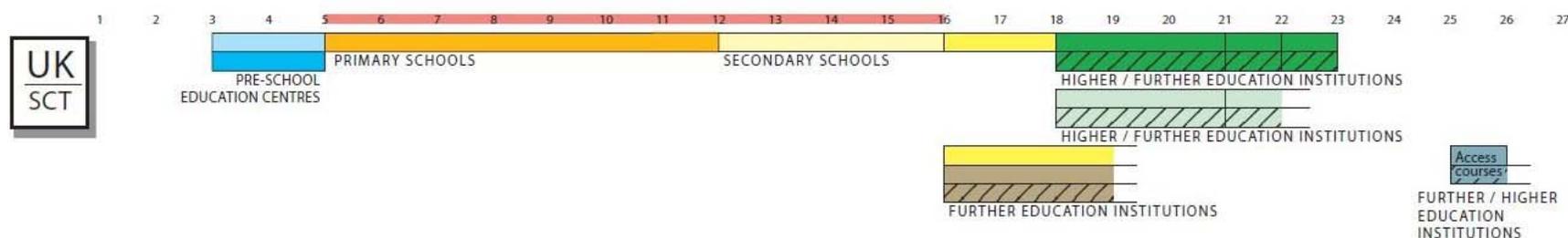
Organisation of the education system in Wales, 2007/08



Organisation of the education system in Northern Ireland, 2007/08



Organisation of the education system in Scotland, 2007/08



 Pre-primary education – ISCED 0 (for which the Ministry of Education is not responsible)	 Pre-primary – ISCED 0 (for which the Ministry of Education is responsible)	
 Primary – ISCED 1	 Single structure – ISCED 1 + ISCED 2 (no institutional distinction between ISCED 1 and 2)	
 Lower secondary general – ISCED 2 (including pre-vocational)	 Lower secondary vocational – ISCED 2	
 Upper secondary general – ISCED 3	 Upper secondary vocational – ISCED 3	
 Post-secondary non-tertiary – ISCED 4		
 Tertiary education – ISCED 5A	 Tertiary education – ISCED 5B	
Allocation to the ISCED levels:  ISCED 0	 ISCED 1	 ISCED 2
 Compulsory full-time education	 Compulsory part-time education	
 Part-time or combined school and workplace courses	 Additional year	
 Compulsory work experience + its duration	 Study abroad	

Source: Eurydice.



REGISTRY V3
PROBLEM BEHAVIOURS ASSESSMENT - SHORT (PBA-s)

Date .. (DD.MM.YYYY) Pseudonym --

All items must be completed. Use U if information is unavailable. Use N if information is not applicable.

PROBLEM BEHAVIOURS ASSESSMENT - SHORT FORM (PBA-s)

Ratings should be based on all available information including the clinician's impression from observation of the patient together with report of the patient and a knowledgeable informant. If possible, try also to interview the relative without the patient present before completing these ratings.

Rate the patient's average behaviour over the past 4 weeks, using the general guidelines below together with the detailed scoring criteria and examples specified in the accompanying manual. If the symptom has NOT been present in the past 4 weeks, or the rating for the past month does not adequately reflect symptom severity in the interval since the patient's last assessment, use the third box to rate the WORST level of severity during the interval since patient was last seen.

Severity

- 0 = absent
- 1 = slight, questionable
- 2 = mild (present, not a problem)
- 3 = moderate (symptom causing problem)
- 4 = severe (almost intolerable for carer)

Frequency

- 0 = never / almost never
- 1 = seldom (less than once/week)
- 2 = sometimes (up to 4 times a week)
- 3 = frequently (most days / 5,6 or 7 times a week)
- 4 = daily / almost daily for most (or all) of day
- 9 = not known or not applicable



**REGISTRY V3
PROBLEM BEHAVIOURS ASSESSMENT - SHORT (PBA-s)**

Date (DD.MM.YYYY) Pseudonym

All items must be completed. Use U if information is unavailable. Use N if information is not applicable.

Severity: Frequency: Worst:

DEPRESSED MOOD:

Suggested prompts:

Start the interview with an open ended question “*Have you noticed any change in your mood since the last visit?*” and then continue with more specific questioning as follows:

- *In the past four weeks, have you been feeling sad? (or blue, or low in spirits?)*
- *Have you found yourself doing something you would ordinarily enjoy and realised you are not having fun? (Evidence of sad mood from behavioural observation includes sad voice or expression, tearfulness)*
- *(if yes to either of the above) Has your mood affected your daily activities?*
- *Does the depressed mood come and go or does it seem always to be there? Is there any change throughout the day? Can you snap out of it if someone tries to cheer you up?*

- 0 absent
- 1 questionable
- 2 low mood is present intermittently but does not interfere with everyday function; rate 2 if subject can easily enjoy amusing activities or visits from friends.
- 3 subject feels sad much of the time and takes no pleasure from things that he/she usually enjoys, but may still be able to cheer up sometimes with a big effort; rate 3 if low mood has definite effect on subject’s lifestyle, e.g. unable to enjoy company of friends or amusing diversions.
- 4 subject feels sad and utterly miserable all day, takes no pleasure from things that he/she usually enjoys, does not cheer up anytime.
- 8 unable to assess because condition too advanced (e.g. mute and immobile)



**REGISTRY V3
PROBLEM BEHAVIOURS ASSESSMENT - SHORT (PBA-s)**

Date (DD.MM.YYYY) Pseudonym

All items must be completed. Use U if information is unavailable. Use N if information is not applicable.

Severity: Frequency: Worst:

SUICIDAL IDEATION:

Suggested prompts:

- *In the past four weeks, have you felt that life was not worth living or that you wouldn't care if you didn't wake in the morning?*
- *have you found yourself thinking that life is not worth living or that you would be better off dead?*
- *Have you thought about harming yourself or even making an attempt at suicide?*
- *Are you planning to hurt yourself or kill yourself? Have you taken any steps towards carrying out your plan?*

- 0 absent
- 1 questionable; also rate 1 if subject plans suicide at a later date when disease is more severe but obtains comfort from this as means to retain control of destiny
- 2 sometimes very pessimistic with fleeting suicidal ideation
- 3 subject has pervasive and distressing feelings of hopelessness and more prolonged or frequent suicidal ideation, but has not yet acted on this in any way
- 4 subject has attempted suicide or has made preparations such as saving up tablets or planning ways to avoid discovery when doing it
- 8 unable to assess because condition too advanced (e.g. mute and immobile)



**REGISTRY V3
PROBLEM BEHAVIOURS ASSESSMENT - SHORT (PBA-s)**

Date (DD.MM.YYYY) Pseudonym

All items must be completed. Use U if information is unavailable. Use N if information is not applicable.

Severity: Frequency: Worst:

ANXIETY:

Suggested prompts:

- *In the past four weeks, have you found yourself getting worried about things? (Evidence of anxiety includes worrying, panic, feeling frightened or fearful for no apparent reason).*
-
- *Have you been worrying a great deal?*
- *What is it like when you worry?*
- *Have you often felt on edge, or keyed up, or mentally strained?*
- *Have you had difficulty in relaxing?*
- *Do your muscles feel tensed up?*
- *When people get anxious or panicky they often feel their heart beating fast or they start shaking or sweating or can't get their breath. Have you had feelings like that?*

- 0 absent
- 1 questionable, vague unease (also rate 1 if subject's only worry or anxiety is about prognosis of HD)
- 2 subject experiences intermittent worry or anxiety, but symptom is not severe enough to cause significant distress or interfere with everyday activities; rate 2 for mild anticipatory anxiety prior to social events or unfamiliar activities e.g. hospital appointments
- 3 unpleasant anxiety is present much of the time, and has a significant impact on subject's behaviour (e.g. avoids going to places or events associated with provoking anxiety)
- 4 worry, anxiety or panic are present all the time and have a major impact on subject's lifestyle (e.g. agoraphobia such that subject cannot leave home without an escort)
- 8 unable to assess because condition too advanced (e.g. mute and immobile)



**REGISTRY V3
PROBLEM BEHAVIOURS ASSESSMENT - SHORT (PBA-s)**

Date (DD.MM.YYYY) Pseudonym

All items must be completed. Use U if information is unavailable. Use N if information is not applicable.

Severity: Frequency: Worst:

IRRITABILITY:

(This item is used to rate the ease with which the subject loses his/her temper, rather than the degree to which self-control is lost once the subject is angry (the latter is rated in the next item). It should also be used to record irritable moods which might have developed into an angry outburst if the carer had not acted with increased tact or discretion)

Suggested prompts:

- *In the past four weeks, have you been irritable, bad-tempered, moody or 'cranky'?*
- *Do you think you get cross more easily than you used to?*
- *(if yes to above) How does this affect the people around you? Do you think they treat you differently when you are like that?*

- 0 no more irritable than the average person
- 1 questionable or trivial; within normal limits but worse than he/she used to be
- 2 definitely more irritable than is reasonable but not to an extent which causes significant problems or distress for other household members; rate 2 if subject appeared to be in a bad mood, but rater considered that subject might have become angry if not treated with tact
- 3 subject very irritable and loses temper over trivial matters; household members have to be careful what they say and do to avoid problems; rate 3 if subject's appearance and behaviour suggestive of angry mood, such that outbursts would almost certainly have occurred if care had not been taken to placate subject or to keep out of his/her way
- 4 subject very irritable and loses temper without any obvious reason at all; living with him/her is like walking on eggshells



**REGISTRY V3
PROBLEM BEHAVIOURS ASSESSMENT - SHORT (PBA-s)**

Date (DD.MM.YYYY) Pseudonym

All items must be completed. Use U if information is unavailable. Use N if information is not applicable.

Severity: Frequency: Worst:

ANGRY OR AGGRESSIVE BEHAVIOUR:

Suggested prompts:

- *In the past four weeks, have you had any emotional or angry outbursts?*
- *Have you had times when you lost control of your temper?*
- *Have you hit, shoved or thrown things or expressed your temper in a physical way?*
- *Have you used threats or hostile words?*

0 normal

1 questionable

2 verbal outbursts which are outside socially acceptable limits but do not cause significant problems or distress for other household members; for example, rate 2 if subject becomes angry with self or inanimate objects when confronted with frustrating situations due to disability, such as failure when attempting to rewire a plug.

3 Temper tantrums are severe enough to cause significant distress for other household members and/or practical difficulties caring for the subject; rate 3 when verbal hostility or anger is directed towards another person (e.g. shouting, sarcastic name-calling, use of foul or abusive language). Also rate 3 if there are explicit verbal threats of violence to another person, or behaviour causing a justifiable fear of personal violence (e.g. subject approaches too close, raises fist, mild pushing). Also rate 3 for violence towards property.

4 subject has temper tantrums so severe that relationship with carers is compromised, creating risk that subject will be rejected; rate 4 if there has been any kind of actual physical assault (includes pushing, shoving, hitting, biting, scratching, kicking) or threatening behaviour involving weapons.



**REGISTRY V3
PROBLEM BEHAVIOURS ASSESSMENT - SHORT (PBA-s)**

Date (DD.MM.YYYY) Pseudonym

All items must be completed. Use U if information is unavailable. Use N if information is not applicable.

Severity: Frequency: Worst:

LACK OF INITIATIVE (APATHY):

Suggested prompts:

- *In the past four weeks, have you found that you have lost interest in things that used to be important to you? Are you just as interested as always in trying new things, starting new projects?*
- *Do you have to be pushed to get started on chores that need doing? Do you leave it to friends to take the initiative for organising social activities? Do you sit around a lot doing nothing?*

- 0 symptom absent
- 1 questionable
- 2 Subject no longer tries new things; may need gentle prompting to initiate hobbies or pastimes which he/she usually enjoys; makes less effort to keep up with friends and relatives; tends to put off household tasks which were previously part of normal daily routine and may need gentle prompting to do these things
- 3 needs quite overt prompting to take part in hobbies or pastimes which he/she used to enjoy, or to carry out routine daily household tasks; makes little or no effort to keep up with friends and leaves it to others to initiate any social contacts; able to take part in (and apparently enjoy) conversation, but tends to follow and is less likely to initiate a change of subject
- 4 no longer performs any household tasks, even if prompted repeatedly; never initiates activities, and displays no interest in hobbies or pastimes; markedly impoverished speech, rarely initiates new topics of conversation except in relation to own needs; active choices limited to selecting TV programmes to watch, and perhaps switching on or changing channel to do this)
- 8 unable to assess because condition too advanced (e.g. mute and immobile)

(This item will usually be rated 9 (data missing) in the absence of a reliable informant)



**REGISTRY V3
PROBLEM BEHAVIOURS ASSESSMENT - SHORT (PBA-s)**

Date (DD.MM.YYYY) Pseudonym

All items must be completed. Use U if information is unavailable. Use N if information is not applicable.

Severity: Frequency: Worst:

PERSEVERATIVE THINKING OR BEHAVIOUR:

Suggested prompts:

- *In the past four weeks, have you found yourself getting stuck on certain ideas or actions?*
- *Have your family or friends complained that you are getting obsessed about something, or going on about it more than you should, or doing something over and over again?*

- 0 symptom absent
- 1 questionable
- 2 mild perseverative behaviours or abnormal preoccupations are present but do not interfere with everyday life or cause significant distress for subject or carers; rate 2 if carer reports that subject tends to come out with comments which refer to an earlier topic of conversation, or when rater observes perseverative phenomena during examination (e.g. continues tandem walking after test completed).
- 3 abnormal preoccupations or repetitive behaviours occupy a significant proportion of subject's attention and cause distress for subject or practical problems for carers; for example, rate 3 if carers report that subject will not let matter drop after an argument, and keeps returning to the same contentious issue all day, or has repetitive behaviours (see below) which cause some interference with everyday care.
- 4 abnormal preoccupations occupy most of subject's attention for several days at a time, causing major problems or distress for subject and carers, or subject cannot be diverted from repetitive behaviours (pacing, smoking, repeatedly visiting the toilet) which interfere significantly with everyday care.
- 8 unable to assess because condition too advanced (e.g. mute and immobile)

(This item will usually be rated 9 (data missing) in the absence of a reliable informant)



REGISTRY V3
PROBLEM BEHAVIOURS ASSESSMENT - SHORT (PBA-s)

Date (DD.MM.YYYY) Pseudonym

All items must be completed. Use U if information is unavailable. Use N if information is not applicable.

Severity: Frequency: Worst:

OBSESSIVE-COMPULSIVE BEHAVIOURS:

Obsessive-compulsive phenomena are described in the DSM-IV as follows:

- Recurrent or persistent thoughts, impulses or images that are experienced, at some time during the disturbance, as intrusive and inappropriate, and that cause marked anxiety or distress
- The thoughts, impulses or images are not simply excessive worries about real-life problems
- The person attempts to ignore or suppress such thoughts, impulses or images, or to neutralise them with some other thought or action
- The person recognises that the obsessional thoughts, impulses or images are a product of his or her own mind (not imposed from without)
- Repetitive behaviours (e.g. hand-washing, ordering, checking) or mental acts (e.g. praying, counting, repeating words silently) that the person feels driven to perform in response to an obsession, or according to rules that must be applied rigidly
- The behaviours or mental acts are aimed at preventing or reducing distress or preventing some dreaded event or situation; however, these behaviours or mental acts are not connected in any realistic way with what they are designed to neutralise, or are clearly excessive

- 0 symptom absent
- 1 questionable or trivial
- 2 obsessional thoughts or mild compulsive behaviours which do not interfere with everyday life or cause subject significant distress; rate 2 if subject has mild obsessive-compulsive traits such as double checking (a small number of times) that doors are locked or ashtrays empty at night.
- 3 obsessive-compulsive behaviours are present to a degree which interferes with everyday life or causes significant distress for subject; rate 3 if subject displays mild ritualistic behaviours such as hand-washing, turning lights on and off repetitively or 'evening-up' after touching things by touching with the other hand too.
- 4 obsessional phenomena cause serious distress, are time consuming (>1 hour/day) or significantly interfere with the person's normal routine, occupational functioning or usual social activities or relationships



**REGISTRY V3
PROBLEM BEHAVIOURS ASSESSMENT - SHORT (PBA-s)**

Date (DD.MM.YYYY) Pseudonym

All items must be completed. Use U if information is unavailable. Use N if information is not applicable.

Severity: Frequency: Worst:

DELUSIONS / PARANOID THINKING:

(Any abnormal beliefs, including unfounded jealous suspicions and accusations of infidelity, should be rated here)

Suggested prompt:

- *I am going to ask you about unusual experiences that people sometimes have. In the past four weeks, has it ever seemed like people are out to get you or perhaps controlling you? Has it seemed like you have special powers or importance, or that books, TV and radio statements are referring to you? Are there any other unusual things you experience that I have not asked you about?*

Suggested additional prompts:

- *Have you felt that people were unduly interested in you or that things were arranged to have special meaning or even that harm might come to you? Can you describe that?*
- *Have there been any other odd or unpleasant experiences of any kind recently?*
- *This would need to be followed by a further exploration of the delusion to establish whether it really is a fixed false belief*

- 0 symptom absent
- 1 questionable or trivial
- 2 overvalued ideas (not amounting to true delusions) are present for some part of the day but do not affect subject's behaviour
- 3 overvalued ideas are present for much of the day, and subject behaves as if these beliefs were true, although he/she can be persuaded (with difficulty) that he/she is mistaken;
- 4 delusions: false beliefs, held with unshakeable conviction, which are not shared by other members of subject's social and cultural group and have been present continuously for at least 7 days
- 8 unable to assess because condition too advanced (e.g. mute and immobile)

(This item will usually be rated 9 (data missing) in the absence of a reliable informant)



**REGISTRY V3
PROBLEM BEHAVIOURS ASSESSMENT - SHORT (PBA-s)**

Date (DD.MM.YYYY) Pseudonym

All items must be completed. Use U if information is unavailable. Use N if information is not applicable.

Severity: Frequency: Worst:

HALLUCINATIONS:

Suggested prompts:

- *In the past four weeks, have you heard things that other people could not hear such as noises or voices of people whispering or talking?*
- *Did you ever have visions (when you were awake) or see things that other people could not see?*
- *How about any other strange sensations in or on your body?*
- *Have you noticed any strange smell or taste that other people seem unable to detect?*

- 0 symptom absent
- 1 questionable or trivial
- 2 subject reports experiencing hallucinations (when asked) but these do not appear to cause any distress or affect subject's behaviour
- 3 hallucinations which affect subject's behaviour (e.g. looking for source of hidden voices or putting cotton wool in ears) but do not appear to cause much distress
- 4 subject is clearly distressed by hallucinations and preoccupied with them
- 8 unable to assess because condition too advanced (e.g. mute and immobile)

Modality of hallucinations: auditory visual tactile olfactory gustatory



**REGISTRY V3
PROBLEM BEHAVIOURS ASSESSMENT - SHORT (PBA-s)**

Date . . (DD.MM.YYYY) Pseudonym - -

All items must be completed. Use U if information is unavailable. Use N if information is not applicable.

Severity: Frequency: Worst:

DISORIENTED BEHAVIOUR:

Suggested prompts:

- *Can you tell me what day of the week it is today? What time is it (morning / afternoon / evening)? Do you know the date? Where are we now?*
- *In the past four weeks, have there been any spells when you were muddled or confused and got these things wrong?*

- 0 symptom absent
- 1 questionable or trivial (e.g. subject gets day wrong ± one day, or fails to recognise people when meeting them out of their normal context)
- 2 subject does not seem to be fully aware of surroundings or the passage of time, but this does not cause significant practical problems
- 3 evidence of confusion at night (subject appears disoriented in time, place or person to an extent that causes practical problems for carers) but normal during daylight hours
- 4 subject is confused and disoriented all the time, unaware of time of day / day of week / date and wrongly identifying surroundings or the people around him (e.g. mistakes nursing home for a prison and nursing staff as prison warders) and consequently resists efforts of carers to look after him/her.
- 8 unable to assess because condition too advanced (e.g. mute and immobile)



REGISTRY V3
PROBLEM BEHAVIOURS ASSESSMENT - SHORT (PBA-s)

Date .. (DD.MM.YYYY) Pseudonym --

All items must be completed. Use U if information is unavailable. Use N if information is not applicable.

PHARMACOTHERAPY:

Does the subject require pharmacotherapy for irritability?

1 yes

0 no



**REGISTRY V3
PROBLEM BEHAVIOURS ASSESSMENT - SHORT (PBA-s)**

Date .. (DD.MM.YYYY) Pseudonym --

All items must be completed. Use U if information is unavailable. Use N if information is not applicable.

CODES FOR INFORMANT DETAILS:

IS INFORMANT A RELATIVE?

- 1 spouse or partner
- 2 parent
- 3 sibling
- 4 child
- 5 other relative
- 6 friend or neighbour
- 7 professional care worker
- 8 other
- 9 no informant - subject came alone

IS INFORMANT A HOUSEHOLD MEMBER?

- 1 household member (i.e. relative or friend who lives with subject)
- 2 not a household member but has frequent contact with subject (most days)
- 3 not a household member and sees subject less than three or four times a week
- 4 staff of residential care home or hospital

(categories 2 and 3 could apply to family, friends or professional care workers. A paid carer who stays with subject at home for three hours every weekday would be rated as 2).



EUROPEAN **HUNTINGTON'S DISEASE** NETWORK

EHDN Neuropsychological Assessment Protocol

Manual for Test Administration and Scoring



EUROPEAN **HUNTINGTON'S DISEASE** NETWORK

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Background Information

This manual contains the instructions for administration and scoring of the European Huntington's Disease Network (EHDN) Neuropsychological Battery. The manual is intended to provide clear, concise instructions for test administration and scoring and was developed following a period of consultation within the EHDN Cognitive Working Group in order to identify areas of potential ambiguity that could detract from the reliability and validity of data collected. In preparing this manual, reference was made to existing materials written for the UHDRS and PREDICT-HD protocols.

EHDN Neuropsychological Battery

The battery consists of a variety of tests that were selected by the EHDN Cognitive Working Group on the basis of their proven sensitivity to longitudinal change and potential utility in clinical trials. As such, the battery is not intended to provide a comprehensive neuropsychological assessment.

EHDN Neuropsychological Battery: Full Assessment

The full EHDN Neuropsychological Battery consists of the following tests:

- Letter Fluency
- Mattis Dementia Rating Scale (DRS-2) ¹
- Hopkins Verbal Learning Test (Revised) ²
- Symbol-Digit Modalities Test
- Stroop Test
- Trail Making Test
- Category Fluency (Animals)

The entire battery takes approximately 30-45 minutes to administer.

EHDN Neuropsychological Battery: Short Assessment

If administration of the full EHDN Neuropsychological Battery is precluded by time constraints the EHDN Short Neuropsychological Battery may be administered. This shortened battery takes approximately 10-15 minutes to administer and consists of the following tests:

- Letter Fluency
- Symbol-Digit Modalities Test
- Stroop Test
- Category Fluency

¹ For REGISTRY the DRS-2 is available in Dutch, English, French, German, Italian and Spanish.

² For REGISTRY the HVLT-R is available in Dutch, English, French, German, Italian, Norwegian and Spanish.



EUROPEAN HUNTINGTON'S DISEASE NETWORK

The EHDN Short Neuropsychological Assessment is the minimum cognitive assessment required for the EHDN Registry Protocol.

Order of administration

The battery should be administered in the following order:

	Assessment Type	
	Full	Short
Letter Fluency	1	1
Mattis Dementia Rating Scale (DRS-2)	2	
Hopkins Verbal Learning Test (immediate recall)*	3	
Symbol-Digit Modalities Test	4	2
Stroop Test	5	3
Trail-Making Test	6	
Hopkins Verbal Learning Test (delayed recall and recognition)*	7	
Category Fluency	8	4

* The interval between immediate and delayed recall on the HVLT should be 20-25 minutes.

General Administration Guidelines

- The assessment should be carried out in a comfortable and quiet room with the examiner and participant seated facing each other across a table.
- The following materials are required: test sheets and materials, pen, pencil and stopwatch.
- Time limits should be strictly adhered to. It is not advisable to use a wristwatch to time tests, as accurate timing is difficult using this method.
- Ensure that the participant has reading glasses and functioning hearing aid if required. Record this information on the CRF.
- For each participant, record on the CRF whether their first language is English. If not, record the approximate age at which the participant learned English.
- For each test, ensure that the participant understands the test instructions before beginning. If in doubt, repeat the instructions.



EUROPEAN **HUNTINGTON'S DISEASE** NETWORK

- It is advised that relatives or others accompanying the participant should not be present during the assessment as they can be a source of distraction. If this is unavoidable or the participant refuses to carry out the tasks without them they should be seated out of the participants view and asked to remain silent during the assessment.
- Similarly, if clinical observers (e.g. medical students) are present during the assessment they should be seated out of the participants view and asked to remain silent during the assessment.
- The examiner should be thoroughly familiar with the test instructions and should not need to read from the instructions during assessments.



Letter Fluency

In this task, participants are asked to generate as many words as possible beginning with a specified letter. One minute is allowed for each of three letters: F, A and S.

Instructions

Say: ***"I'm going to say a letter of the alphabet, and I want you to tell me as many different words as you can think of that start with that letter. For example, if I say "R" you might say "rain", "radio" or "run". I don't want you to use words that start with capital letters, like names of people or places, for example "Richard" or "Rochdale". Also, don't use the same word again with a different ending – such as "run", and "running". Any questions?"***

Answer any questions the participant has and when you are satisfied that they understand the task, say: ***"The first letter is "F". Ready? Go!"***

Begin timing. Write down all words given by the participant, even if they are incorrect or repetitions. Should the participant give up before the minute is over, encourage him/her to continue. If they are silent for 15 seconds or more, prompt them by saying: ***"Remember, tell me the words that begin with the letter F"***

Stop the participant at the end of one minute.

For the second letter and third letter, continue by saying: ***"Now I would like you to tell me as many words as you can think of that begin with the letter ___"*** [If rule-violation errors have occurred, remind the participant which items are not allowed] ***"Ready? Go!"***

Scoring

- Since rapid transcription of words is often untidy and can be difficult to read, scoring should be completed immediately, while the participant's responses are fresh in the mind.
- The score is the total number of admissible responses beginning with the correct letter across the three trials. The total score divided into 15-second intervals is also recorded on the scoring form.
- If the participant repeats a word that has already been produced, count only the first occurrence as correct and score the rest as perseverative errors.
- All other incorrect responses (e.g. words beginning with the wrong initial letter, proper nouns, etc) are scored as intrusion errors.
- Vernacular, commonly used slang and expletives are scored as correct.
- Foreign words in common, everyday usage are scored as correct.
- Homonyms (e.g. forth / fourth, see / sea) are both scored as correct if the participant indicates the alternative usage.
- Proper nouns (e.g. names of people, places, countries, days of the week, months of the year) are scored as incorrect.



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- Brand names are scored as incorrect, unless they are used generically (e.g. frisbee, hoover)
- Plurals (e.g. apple, apples) and multiple forms of a verb (fall, falling, fell; swim, swimming, swam) are scored as incorrect. Count the first occurrence of the word as correct and score subsequent variations as intrusion errors. Alternative word endings are scored as correct when a new word is created (e.g. further, furthermore; fool, foolish). As a rule of thumb, words with separate and distinct definitions in a dictionary can be scored as correct.
- Numbers beginning with the correct letter can be scored as correct (five, fifteen, fifty) but count only the first two in a series (e.g. seventy-one, seventy-two) as correct.



Category Fluency (Animals)

In this task, participants are asked to name as many animals as possible in one minute.

Instructions

Say: ***"I would like you to tell me as many different animals as you can think of, as quickly as you can. Keep going until I say stop. Do you have any questions?"***

Do not spontaneously provide any cues or examples. Answer any questions the participant has and when you are satisfied that they are ready, say: ***"Ready? Go!"***

Begin timing. Write down all words given by the participant, even if they are incorrect or repetitions. Should the participant give up before the minute is over, encourage him/her to continue.

If they are silent for 15 seconds or more, prompt them by saying: ***"Remember, tell me the names of animals"***

Stop the participant at the end of one minute.

Scoring

- Since rapid transcription of words is often untidy and can be difficult to read, scoring should be completed immediately, while the participant's responses are fresh in the mind.
- The score is the total number of admissible responses produced in one minute. The total score divided into 15-second intervals is also recorded on the scoring form.
- If the participant repeats a word, count the first occurrence only as correct and score the remainder as perseverative errors.
- If the participant produces words that are unrelated to the animal category these should be scored as intrusion errors.
- All members of the animal kingdom (i.e. insects, birds, fish, reptiles etc) are admissible.
- If a superordinate term (e.g. 'bird') is produced in isolation, count it as correct. However if superordinate and subordinate (e.g. bird, robin, sparrow) terms are produced discount the superordinate response (but do not count as an error) and count the subordinates as correct, regardless of the order in which they are produced (e.g. bird, robin, sparrow = 2 points; robin, sparrow, bird = 2 points).
- Discount breed subspecies (e.g. types of dog) but do not score as errors. Allow other subspecies (e.g. types of bird, fish, bears etc).
- If male/female form alternatives are produced count the first occurrence as correct and discount subsequent variations but do not score as errors.



Hopkins Verbal Learning Test (HVLT-R)

The HVLT-R consists of a 12 item word list composed of 4 words from each of 3 semantic categories. For REGISTRY there are 3 alternative forms available, which should be administered at consecutive annual assessments to avoid practice effects. In English, forms I, II and III will be used.

Instructions

1. Immediate Recall (3 trials)

Say: ***"I am going to read you a list of 12 words. Listen carefully, because afterwards I'll ask you to tell me as many of them as you can remember, in any order. Do you have any questions?"***

Answer any questions the participant has, and proceed when you are satisfied that they understand the instructions. Read the list at a slow, even pace, approximately one word every two seconds. Then say: ***"Okay, now tell me as many words as you can remember."***

Record the order in which the participant recalls the words (1, 2, 3, etc) in the box marked 'ORD'. Place a tick in the box marked 'REP' for each item repetition. Intrusions (items not present in the list) should be recorded verbatim in the empty boxes beneath the totals.

If the participant falls silent you may prompt them by asking if they can recall any more words. Move on to the next trial when they cannot produce any more items.

Trials 2 and 3 should be conducted similarly. Say: ***"I am going to read the list of words again. When I am finished, tell me as many as you can remember, including those that you said before."***

2. Delayed recall and recognition

The delayed recall trial should be administered approximately 20-25 minutes after the third learning trial.

Say: ***"Do you remember when I read out that list of words to you earlier? I would like you to tell me as many of them as you can remember."***

Responses should be recorded on the standard response form in the same manner as on the previous learning trials. The recognition trial should be administered immediately following the delayed recall trial. Say: ***"I'm going to read some more words to you now. Some of them were on the list I read earlier, and some were not. As I read each word say 'yes' if you think that the word was on the list I read earlier and 'no' if not."***

Read the 24 words, across the rows from left to right, pausing after each word for the participant's response. If the participant reports that they do not know, encourage them to guess. Place a tick in the box next to the word if the participant says 'yes' and a cross if they say 'no'.

Scoring



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- For each recall trial, record the a) total correct, b) total repetitions, c) total intrusions.
- For the recognition trial, record the total number of true positives (sum of ticked upper case items) and the number of false positives (sum of ticked lower case items).
- Also record separately the false positive scores for semantically related (indicated by an asterisk) and none semantically related (no asterisk) distracters.

Notes

- Do not count 'thinking aloud' as repetition errors (i.e. if the participant repeats the list quietly to themselves).
- If a participant gives a word and immediately corrects themselves, commenting that they have already said the word, it should not be counted as a repetition.
- If a participant asks if they have already said a word they should be asked if they want you to put it down as an answer. If they then say yes, and have previously given the word, count it as a repetition.
- If the participant appears to mishear a word (e.g. recalls 'hut' as 'hook'), do not count as correct or as an intrusion on the first trial but attempt to improve articulation on the next presentation. If they continue to produce the wrong word it should be recorded as an intrusion error on subsequent trials.
- All three presentation trials should be administered, even if the participant recalls all 12 words on the first or second trial.



Symbol-Digit Modalities Test

In this pencil and paper task the participants are presented with a sheet of symbols that are matched to numbers on a key. Participants are required to match symbols and digits by writing the appropriate number under consecutive symbols.

Instructions

Place the response sheet in front of the participant and say: ***“Please look at the boxes at the top of the page. As you can see, each box in the top row has a symbol in it, and each box below has a number. Now look at the next line of boxes.”*** (point to the first line of boxes without numbers). ***“You are to fill in each empty box with the number that goes with each symbol, according to how they are paired up at the top of the page.”*** (point to the key) ***“For example, if you look at the first symbol...”*** (point to the first symbol on the first line of boxes without numbers) ***“...and then check the key, you will see that this symbol is paired with the number ‘1’*** (indicate the pairing in the key) ***“So you would write a ‘1’ in this box”*** (write a ‘1’ in the box). ***“The next symbol” (point) “is paired with ‘5’, so you should put a ‘5’ in the box.”*** (write ‘5’ in the second box) ***“Now, what number goes in this box?”*** (point to the third box). The participant should say ***“2”***. If not, explain the error and repeat the instructions as necessary.

When you are satisfied that the participant understands the task, say: ***“Now for practice, fill in the boxes up to this double line...”*** (point to the double line) ***“... and then stop.”***

Immediately correct any errors during the practice period, and explain the error to the participant. Instructions may be repeated as necessary until the participant understands the task. If the participant is not able to complete the practice items or clearly does not understand the task, do not administer the remainder of the test.

After the practice items, continue the test by saying: ***“When I say ‘go’, I want you to carry on writing in the numbers, just like you have been doing until I tell you to stop. Remember to work as quickly as you can, moving from one line to the next, without skipping any of the boxes. If you make a mistake, don’t erase it, just write the correct answer over the error. Are you ready? Go.”***

Start timing and at the end of 90 seconds say ***“Stop!”*** and ensure they do not carry on working. If the participant skips a box, alert them to this on their first omission only.

Scoring

- The following should be recorded: a) total number correct within the 90 second test period. (i.e. not including practice items), and, b) total number of errors (i.e. where the participant has written the wrong number).
- Self corrected errors should be counted as correct.
- Do not count omissions as errors, but do not include in the total correct score.
- In order to not penalise participants for impaired motor control, poorly legible items should be scored correct provided they can be recognised after checking the response with the participant.



Stroop Task

This test comprises three parts, and should always be administered in the same order:

1. Colour Naming
2. Word Reading
3. Interference

Instructions

1. Colour Naming

Place the 'Colour Naming' card in front of the participant.

Indicate the top row of practice items and say: "***Please read across the line, naming the colours you see, either red, green, or blue.***"

Occasionally a subject will incorrectly identify a colour (e.g. call a blue rectangle 'purple'). Indicate to the subject that the three colours used in the test are red, green and blue. If the subject cannot discriminate the colours or use the appropriate labels, do not administer the test.

Continue by pointing to the second line and say: "***Begin here, and go across the rows from left to right without skipping any. Tell me the colours as quickly as you can. Keep going until I tell you to stop. Ready? Go!***"

Begin timing. Stop after 45 seconds.

2. Word reading

Place the 'Word Reading' card in front of the participant.

Indicate the top row of practice items. Say: "***Please read across the line, telling me the words that you see.***"

If a subject cannot read, terminate this test. Continue by pointing to the second line and say: "***Begin here, and go across the rows from left to right without skipping any. Read the words as quickly as you can. Keep going until I tell you to stop. Ready? Go!***"

Begin timing. Stop after 45 seconds.

3. Interference

Place the 'Interference' card in front of the participant.

Indicate the top row of practice items and say: "***This card has words written in coloured ink, but you can see that each word is in the wrong colour of ink. For example, here the word 'red' is written in blue ink*** (point to the first word of the top line) ***and the word 'green' is written in red ink. Please read across the top line, telling me the colour of ink that each word is written in. Ignore the words; just tell me the colour of the ink that you see.***"



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Additional review of the instructions to name ink colours and not read the words may be necessary. Should the participant fail to show an understanding of the task after several attempts, discontinue the task. Note, however, that most participants will make one or two errors on the practice line as they acquire the proper "test set". Do not consider such minor slips to be indicative of failure to comprehend the task. When it is clear that the subject understands the task, continue by pointing to the second line and say: ***"Begin here, and go across the rows from left to right without skipping any. Remember to ignore the words and simply tell me the colours of ink that you see. Go along the lines as quickly as you can. Keep going until I tell you to stop. Ready? Go!"***

Begin timing. Stop after 45 seconds.

Scoring

- For each part of the test, record the total number of items completed within 45 seconds.
- Self corrected errors should be scored as part of total correct, but also recorded separately. Three separate and independent scores should be recorded: total correct, total errors and self corrected errors.
- In order that participants are not penalised for impaired oculo-motor function, line / item omissions should not be counted as errors. The examiner should attempt to keep up with the patient as far as possible if they skip items or switch lines, if necessary, reverting to transcribing responses rather than ticking boxes.

Notes

- Finger tracking is permitted. However, participants should not be informed of this unless they explicitly ask. Ensure that participants do not partially mask words in order to make the Interference condition less difficult. Participants should not use a card / sheet of paper to keep their place.
- Should a participant make consecutive errors from the beginning of the Interference test phase the timer should be stopped, the instructions repeated and the task restarted once the patient understands the task. Otherwise, errors should not be corrected outside of the practice trials.
- If the participant reaches the end of the card before the 45-second interval has passed they should be re-directed to the top of the items by pointing and the simple instruction "continue here" should be given.



Trail Making Test

This pencil and paper task consists of two parts (A & B). The stimuli consist of randomly placed numbers (A) and numbers and letters (B) that the participant must connect in sequence by drawing a continuous line with a pencil. Both parts begin with a brief sample for instruction purposes.

Instructions

Part A instructions

Place the Part A sample in front of the participant and say: "**As you can see, on this page are some numbers. Begin at number one...**" (point to 1) "**...and draw a line from one to two**" (point to 2) "**from two to three...**" (point to 3), "**...from three to four...**" (point to 4) **and so on, in order, until you reach the end**' (point to the shaded circle '8'). "**Draw the lines as quickly as you can. Ready? Go!**"

Discontinue the test if the participant does not understand the instructions or cannot complete the sample. If the participant makes any mistakes on Sample A, point them out, help them to correct it, then tell them to continue from the last correctly sequenced number. When it is clear that the participant understands, proceed to Part A.

Place Part A in front to the participant and say: "**On this page are numbers from one to twenty five. Do this page in the same way. Begin at number one...**" (point) "**...and draw a line from one to two...**" (point) "**...and so on, in order, until you reach the end**" (point). "**Remember, work as quickly as you can. Ready? Go!**"

Start timing. If the participant makes a mistake, point it out immediately, return him/her to the last correct circle, and continue from that point. Do not stop timing until the participant has completed the test. Discontinue the task after 240 seconds (4 minutes) if the participant has not completed it.

Part B instructions

Place the Part B sample in front of the participant and say: "**This one is similar, except that it has both numbers and letters. Begin at number one...**" (point) "**...and draw a line from one to 'A'...**" (point), "**...then from 'A' to two...**" (point) "**...from two to 'B'...**" (point) "**'B' to three...**" (point) "**...and from three to 'C'...**" (point) "**...and so on, in order, until you reach the end**" (point to the shaded circle 'D'). "**So, your task is to go from number to letter to number to letter and so on, in order. Ready? Go!**"

Monitor the participant's progress on the sample. If they make a mistake, point it out immediately and help him/her to correct it. When it is clear that he/she understands, proceed to Part B. Discontinue the test if the participant does not understand the instructions or cannot complete the sample.

Place Part B in front to the participant and say: "**This page has numbers and letters again. Do this page same way, going from one (point) to 'A'...**" (point) "**...then from 'A' to two...**" (point), **and so on, in order, until you reach then end**' (point). "**Remember, you have to alternate between numbers and letters in the right order. Draw the lines as quickly as you can. Ready? Go.**"



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Start timing. If they make a mistake, point it out immediately, return him/her to the last correct point and continue the test from that point. Do not stop timing until the participant has completed the test. Discontinue the task after 240 seconds (4 minutes) if the participant has not yet completed it.

Scoring

- Record the time in seconds needed to complete part A and part B. This includes the time taken to correct any errors. If the participant was unable to complete the task within the 240 time limit, 240 should be recorded as the total score.
- The total correct score is the total number of connected circles. If the participant completed the task within the time limit this will always be 25.
- If the participant did not complete the task within the time limit please count the number of connected circles. Beginning at **1**, count the total number of circles that have been connected by lines. Note: this includes lines that were re-drawn after the participant was alerted to errors by the examiner. For example, if a patient reaches **22** on Part A, or **K** on Part B, their total correct score will be **22**, irrespective of any corrected errors.
- The total error score is the number of incorrect lines drawn by the participant (e.g. from **6 – 8** on Part A or **4 – 5** on Part B). This does not self-corrected errors, only those that the participant was alerted to by the examiner.



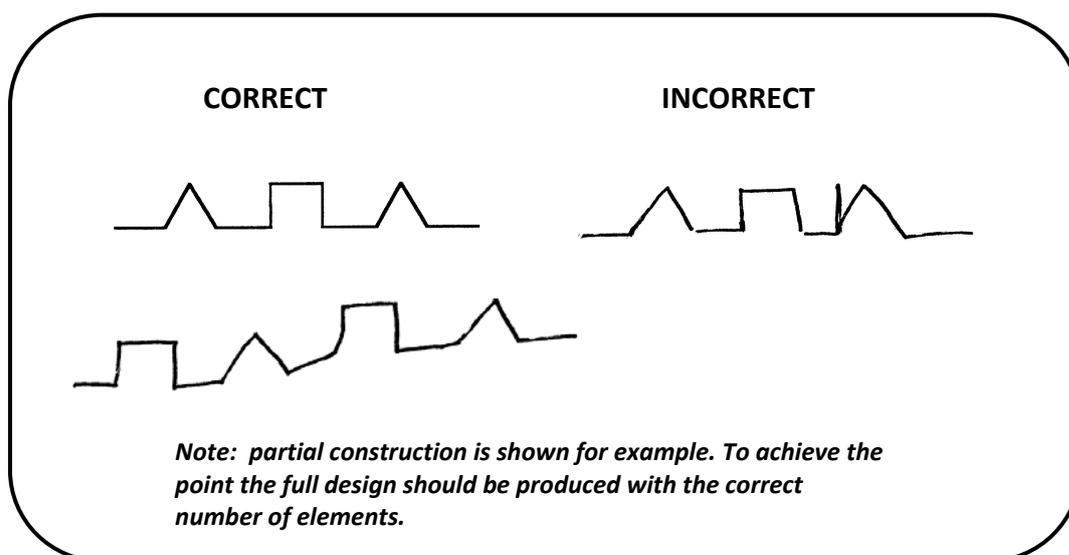
Dementia Rating Scale-2

The DRS-2 (Mattis Dementia Rating Scale) consists of 36 tasks and 32 stimuli, which yield 5 subscale scores: Attention (8 items), Initiation/Perseveration (11 items), Construction (6 items), Conceptualization (6 items), and Memory (5 items). The DRS tasks are presented in a fixed order. Within each subscale the most difficult tasks are presented first. Generally, if the first one or two tasks in a subscale are performed well, subsequent tasks in the subscale are credited with a correct performance. This significantly reduces the total testing time for individuals with relatively intact cognitive functioning. The DRS can be administered in approximately 15-20 minutes in relatively mildly affected individuals and up to 40 minutes in those who are more severely affected.

Scoring Graphomotor Design and Construction Design in HD

In order not to penalise patients for their movement disorder a liberal scoring system should be used, as noted in the DRS-2 manual. Below are some examples to guide scoring.

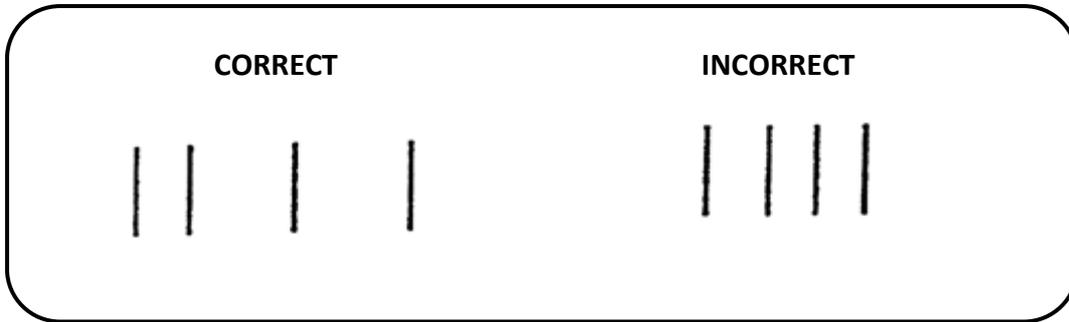
L. Graphomotor Design 1



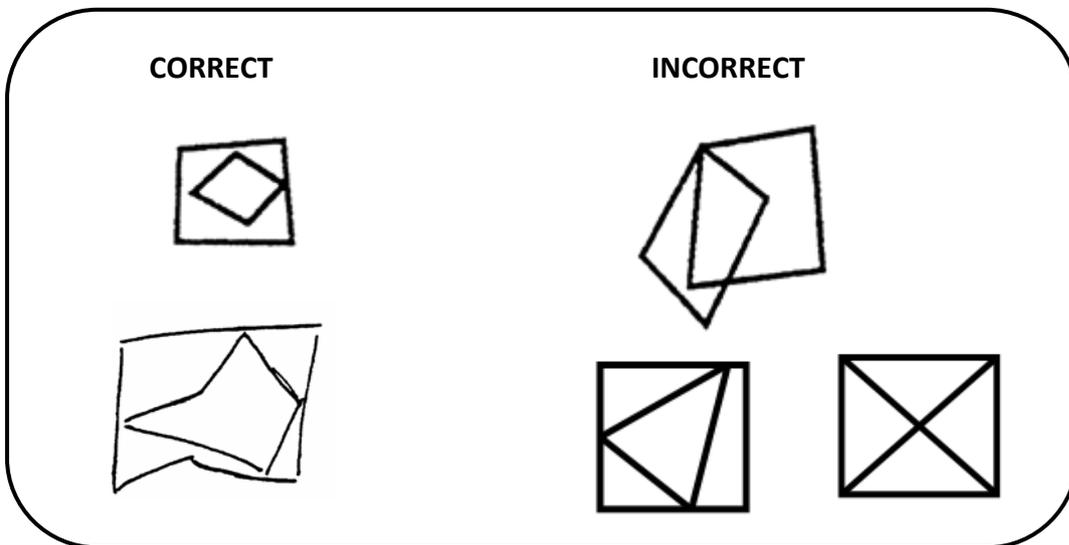


EUROPEAN **HUNTINGTON'S DISEASE** NETWORK

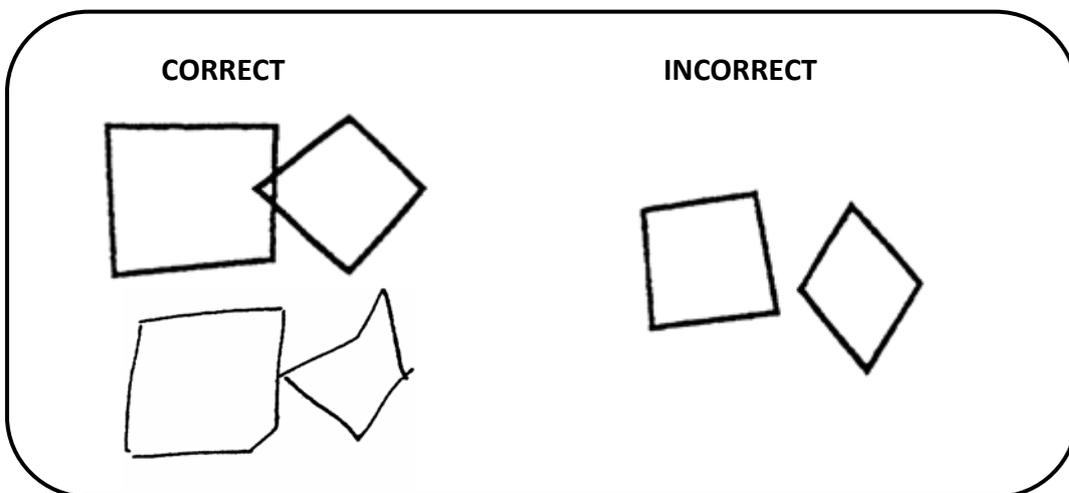
P. Construction Design 1



Q. Construction Design 2

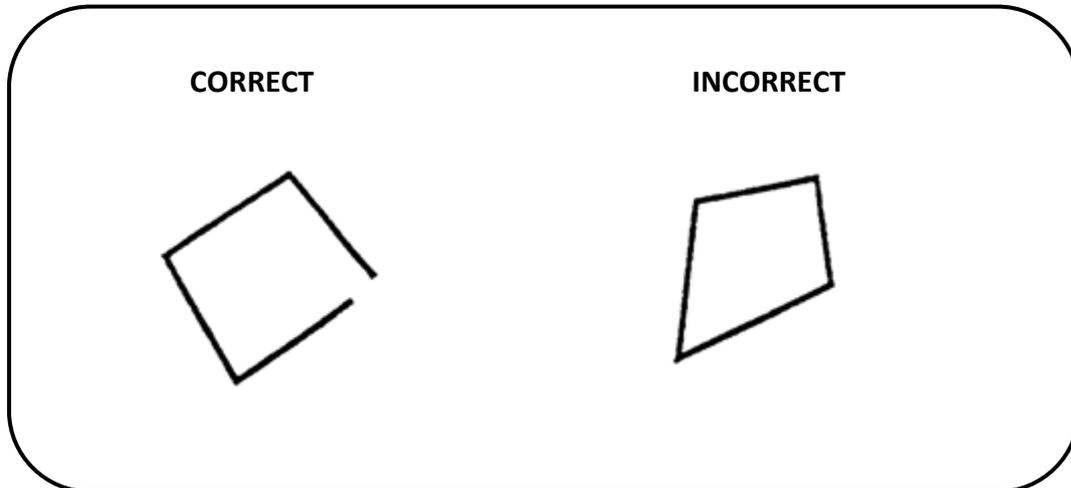


R. Construction Design 3

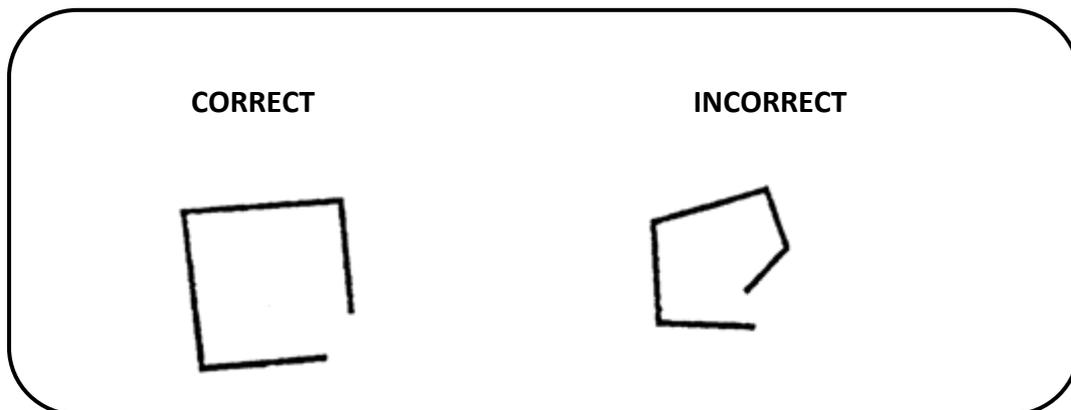




S. Construction Design 4



T. Construction Design 5



Item U: Production of Signature

In order not to penalise patients for movement disorder credit the point if either the firstname or surname are recognisable.

Similarities (subscale: Conceptualisation)

Item W: Similarities

If the participant gives only a concrete response, score 1 point but give the following prompt:

"They are also both fruit"



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If the participant scores 0 on this item give the following prompt:

“Both are fruit. Both can be eaten”

Proceed to the following three pairs but do not provide any further cues.