

## APPENDIX A

### Search Strategy

#### Medline

Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) <1948 to Present>

Search Strategy:

- 
- 1 exp HIV/ (69450)
  - 2 exp Acquired Immunodeficiency Syndrome/ (69637)
  - 3 exp HIV Seropositivity/ (18551)
  - 4 (human adj2 immun\$).mp. [mp=protocol supplementary concept, rare disease supplementary concept, title, original title, abstract, name of substance word, subject heading word, unique identifier] (83876)
  - 5 (Acquired adj2 immun\$).mp. [mp=protocol supplementary concept, rare disease supplementary concept, title, original title, abstract, name of substance word, subject heading word, unique identifier] (89599)
  - 6 exp Antiretroviral Therapy, Highly Active/ or Antiretroviral.mp. or exp Anti-HIV Agents/ (59860)
  - 7 (ARV or HAART).mp. (9091)
  - 8 exp AIDS-Related Opportunistic Infections/ or exp HIV Infections/ (195888)
  - 9 (opportunism\$ adj2 infect\$).mp. [mp=protocol supplementary concept, rare disease supplementary concept, title, original title, abstract, name of substance word, subject heading word, unique identifier] (33644)
  - 10 or/1-9 (284585)
  - 11 Neurocognitive impairment.mp. or exp AIDS Dementia Complex/ (3317)
  - 12 HIV Associated Dementia.mp. (423)
  - 13 exp dementia/ (96551)
  - 14 (cognitive adj2 impair\$).mp. [mp=protocol supplementary concept, rare disease supplementary concept, title, original title, abstract, name of substance word, subject heading word, unique identifier] (22192)
  - 15 HIV Associated Neurocognitive Disorder.mp. (27)
  - 16 Minor neurocognitive impairment.mp. (1)

- 17 Minor cognitive motor disorder.mp. (32)
- 18 Asymptomatic neurocognitive impairment.mp. (8)
- 19 ((HIV adj2 dementia\$) or encephalopathy).mp. [mp=protocol supplementary concept, rare disease supplementary concept, title, original title, abstract, name of substance word, subject heading word, unique identifier] (32198)
- 20 ((ADC\$ or ANI\$ or HAD\$ or HAND\$ or MCMD\$) adj3 (cogniti\$ or neurocogniti\$ or disorder\$ or impair\$)).mp. [mp=protocol supplementary concept, rare disease supplementary concept, title, original title, abstract, name of substance word, subject heading word, unique identifier] (21050)
- 21 or/11-20 (160294)
- 22 exp "Weights and Measures"/ (180419)
- 23 (detect\$ or diagnos\$ or screen\$).m\_titl. (676595)
- 24 exp neuropsychological tests/ (52021)
- 25 ((neuropsychological or neuro-psychological) adj2 test\$).mp. [mp=protocol supplementary concept, rare disease supplementary concept, title, original title, abstract, name of substance word, subject heading word, unique identifier] (53379)
- 26 or/22-25 (896388)
- 27 10 and 21 and 26 (761)
- 28 from 27 keep 500-761 (262)

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## Cochrane

Database: EBM Reviews - Cochrane Database of Systematic Reviews <2005 to March 2011>, EBM Reviews - ACP Journal Club <1991 to March 2011>, EBM Reviews - Database of Abstracts of Reviews of Effects <1st Quarter 2011>, EBM Reviews - Cochrane Central Register of Controlled Trials <1st Quarter 2011>, EBM Reviews - Cochrane Methodology Register <1st Quarter 2011>, EBM Reviews - Health Technology Assessment <1st Quarter 2011>, EBM Reviews - NHS Economic Evaluation Database <1st Quarter 2011>

Search Strategy:

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 1 (HIV or AIDS).mp. [mp=ti, ot, ab, tx, kw, ct, sh, hw] (11538)

- 2 acquired immun\$ syndrome.mp. [mp=ti, ot, ab, tx, kw, ct, sh, hw] (1468)
- 3 human immunodeficiency virus.mp. [mp=ti, ot, ab, tx, kw, ct, sh, hw] (3015)
- 4 neurocognitive test\$.mp. [mp=ti, ot, ab, tx, kw, ct, sh, hw] (62)
- 5 neurocogn\$.mp. [mp=ti, ot, ab, tx, kw, ct, sh, hw] (559)
- 6 (or/1-3) and (or/4-5) (22)
- 7 (or/1-3) and dementia.mp. [mp=ti, ot, ab, tx, kw, ct, sh, hw] (144)
- 8 (measure\$ or scale\$ or diagnos\$).mp. [mp=ti, ot, ab, tx, kw, ct, sh, hw] (211617)
- 9 7 and 8 (109)
- 10 1 and 9 (104)
- 11 2 and 10 (14)
- 12 3 and 9 (21)
- 13 6 or 11 or 12 (46)

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## EMBASE

Database: EMBASE <1980 to 2011 Week 14>

Search Strategy:

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- 1 exp human immunodeficiency virus/ or exp human immunodeficiency virus 1/ or exp human immunodeficiency virus 2/  
(104780)
  - 2 aids.mp. or exp acquired immune deficiency syndrome/ (162326)
  - 3 exp highly active antiretroviral therapy/ or exp didanosine/ or exp lamivudine/ or exp RNA directed DNA polymerase inhibitor/  
or exp antiretrovirus agent/ or exp acquired immune deficiency syndrome/ or exp zalcitabine/ or exp zidovudine/ or  
Antiretroviral therapy.mp. or exp antiviral agent/ (580844)
  - 4 exp opportunistic infection/ or exp encephalitis/ (72525)
  - 5 1 or 2 or 3 or 4 (724121)
  - 6 exp dementia/ or exp intellectual impairment/ (263013)
  - 7 ((neurocog\$ or cognit\$) adj2 (dementia\$ or impair\$ or disorder\$)).mp. [mp=title, abstract, subject headings, heading word, drug  
trade name, original title, device manufacturer, drug manufacturer] (44413)

- 8 hiv encephalopathy.mp. or exp HIV associated dementia/ (585)
- 9 (adc\$ or ani\$ or had\$ or hand\$).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer] (6479334)
- 10 6 or 7 or 8 or 9 (6684036)
- 11 5 and 10 (243175)
- 12 (weights and measures).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer] (1905)
- 13 (neuropsychologic\$ adj2 (test\$ or screen\$ or score\$)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer] (31798)
- 14 (neuro-psychologic\$ adj2 (test\$ or screen\$ or score\$)).mp. (56)
- 15 (scale or score).m\_titl. (44871)
- 16 12 or 13 or 14 or 15 (78191)
- 17 11 and 16 (947)
- 18 remove duplicates from 17 (734)

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## PsychINFO

Database: PsycINFO <1987 to March Week 2 2011>

Search Strategy:

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- 1 exp hiv/ or exp aids/ or exp aids dementia complex/ (24940)
  - 2 ((HIV adj2 virus) or infect\$).mp. [mp=title, abstract, heading word, table of contents, key concepts] (23180)
  - 3 opportunistic infections.mp. (230)
  - 4 (human adj2 immun\$ adj2 virus).mp. [mp=title, abstract, heading word, table of contents, key concepts] (3881)
  - 5 ((acquired\$ adj2 immun\$) and syndrome).mp. [mp=title, abstract, heading word, table of contents, key concepts] (3190)
  - 6 exp HIV/ and exp Antiviral Drugs/ (1068)
  - 7 (HAART or antiretroviral\$).mp. [mp=title, abstract, heading word, table of contents, key concepts] (2702)
  - 8 or/1-7 (36895)
  - 9 exp Cognitive Ability/ or exp Cognitive Impairment/ or exp Neuropsychological Assessment/ or neurocognitive impairment.mp.

- (65115)
- 10 aids dementia complex.mp. or exp AIDS Dementia Complex/ (240)
- 11 exp Dementia/ or dementia.mp. (44300)
- 12 ((neurocognitive or cognitive) adj2 (disorder\$ or impair\$)).mp. [mp=title, abstract, heading word, table of contents, key concepts] (24820)
- 13 (HIV adj2 (encephelopath\$ or dementia\$ or decline\$)).mp. [mp=title, abstract, heading word, table of contents, key concepts] (395)
- 14 ((ADC\$ or ANI\$ or HAD\$ or HANDS\$ or MCMD\$) adj3 (cognit\$ or neurocognit\$ or disorder\$ or impair\$)).mp. (8955)
- 15 or/9-14 (111299)
- 16 (detect\$ diagnos\$ or screen\$).m\_titl. (8353)
- 17 exp Neuropsychological Assessment/ or neuropsychological test.mp. (12018)
- 18 16 or 17 (20050)
- 19 8 and 15 and 18 (277)

\*\*\*Lilacs search strategy not included because all results were also found in Medline results

## APPENDIX B

**Table 3a. Characteristics of Studies on Brief Screening Tools for HIV Associated Neurocognitive Disorders**

Author, Date; Location	Design	Recruitment Method	Participants (Mean Age; Mean Years Education; Percent Male)	Tools Examined
Berguis, 1999; USA	Cross-Sectional	Convenience Sampling	Age: 38 Education: 14 Male: 93%	HIV Dementia Scale (HDS); Executive Interview (EXIT)
Diehr, 2003; San Diego, USA	Cross-Sectional	Convenience Sampling	Age: 40 (normative sample); 34 (validation sample) Education: 14 (normative sample); 14 (validation sample) Male: 61% (normative sample); 90% (validation sample)	Paced Auditory Serial Addition Task (50, 100 and 200 item)
Dunlop, 1993; Oslo, Norway	Cross-Sectional	Convenience Sampling	Age: 36 (CDC IV); 37 (CDC II/III); 35 (controls) Education: 14 (CDC IV); 15 (CDC II/III); 14 (Controls) (all numbers are medians, not means) Male: 100%	Total Reaction Time

Dunlop; 1992; Oslo, Norway	Cross-Sectional	Convenience Sampling	Age: 36 (HIV+, CDC IV Stage); 37 (HIV+, CDC II and III stage); 35 (HIV-) Education: 14 (HIV+, CDC IV Stage); 15 (HIV+, CDC II and III stage); 14 (HIV-) (all numbers are medians, not means) Male: 100%	Simple Visual Reaction Time Simple auditory reaction time; Movement reaction time; Choice reaction time; Complex reaction time.
Koski, 2011; Montreal, Canada	Cross-Sectional	Convenience Sampling	Age: 47 Education: 16 Male: 92%	Montreal Cognitive Assessment (MoCA) and Computerized Tests
Kovner, 1992; New York State, USA	Cross-Sectional	Convenience Sampling	Age: 35 (HIV+ AIDS); 31 (HIV+ not AIDS); 35 (HIV-) Education: 12 (HIV+ AIDS); 12 (HIV+ not AIDS); 13 (HIV-) Male: 60% (HIV+ AIDS); 55% (HIV+ not AIDS); 30% (HIV-)	Dementia Rating Scale (DRS)
Kvalsund, 2009; Lusaka, Zambia	Cross-Sectional	Convenience Sampling	Age: 35 (HIV+); 32 (HIV-) Education: 7 (HIV+); 8 (HIV-) Male: 38% (HIV+); 40% (HIV-)	Mini-Mental State Examination; HIV Dementia Scale; Color Trails 1
Maj, 1993; Munich, Germany and Kinshasa, Congo	Cross-Sectional	Random Sampling	Age: 32 (Kinshasa HIV+); 29 (Kinshasa HIV-); 31 (Munich HIV+); 27 (Munich HIV-) Education: 12 (Kinshasa HIV+); 12 (Kinshasa HIV-); 12 (Munich HIV+); 14 (Munich HIV-) Male: 50% (Kinshasa HIV+); 50% (Kinshasa HIV-); 50% (Munich HIV+); 50% (Munich HIV-)	WHO/UCLA Auditory Verbal Learning Test and the Color Trails 1 and 2
Martin, 1995; Chicago, USA	Cross-Sectional	Convenience Sampling	Age: 39 (HIV+); 40 (HIV-) Education: 13 (HIV+); 13 (HIV-) Male: 75% (HIV+); 94% (HIV-)	Delayed Recognition Span Test; Symbol-Digit Modalities Test; Trail Making Test
McManis, 1993; San Antonio, USA	Cross-Sectional	Convenience Sampling	Age: 28 (HIV+); NR (HIV-) Education: NR Male: 64% (HIV+); 67% (HIV-)	Roy-Osterrieth Complex Figure Copy (ROC) and Memory (ROM) Test
Messinis, 2007; Patras, Thessaloniki, Athens, Greece	Cross-Sectional	Convenience Sampling	Age: 45 (Healthy HIV+); 30 (Detoxified Heroine Addicts); 38 (HIV+); NR (Retest HIV-) Education: 13(Healthy HIV+); 11 (Detoxified Heroine Addicts); 14 (HIV+); 15 (Retest HIV-) Male: 44% (Healthy HIV+); NR (Detoxified Heroine Addicts); NR (HIV+); 43% (Retest HIV-)	Ruff 2 and 7 Selective Attention Tests
Njamnshi, 2008; Yaonde, Cameroon	Cross-Sectional	Convenience Sampling	Age: 37 (HIV+); 37 (HIV-) Education: 11 (HIV+); 13 (HIV-) Male: 31% (HIV+) 31% (HIV-)	International HIV Dementia Scale
Nokes, 2007; New York, USA	Cross-Sectional	Convenience Sampling	Age: 55 Education: NR Male: 78%	Mental Alternation Test

Ogunrin, 2009; Benin City, Nigeria	Cross-Sectional	Convenience Sampling (randomly chosen from a clinic)	Age: NR Education: NR Male: 40% (HIV+ asymptomatic); 43% (HIV+ symptomatic); 40% (HIV- negative controls)	Modified HIV Dementia Scale (without anti-saccadic subtest)
Parker, 1995; Southern California, USA	Cross-Sectional	Convenience Sampling	Age: 38 (HIV+); 33 (HIV-) Education: 15 (HIV+); 15 (HIV-) Male: 100%	University of Southern California Episodic Memory Test
Riedel, 2006; Pune, India	Cross-Sectional	Convenience Sampling	Age: 36 (HIV+); 29 (HIV-) Education: 8 (HIV-); 8 (HIV-) Male: 87% (HIV+); 12% (HIV-)	International HIV Dementia Scale
Skinner, 2009; Edmonton and Calgary, Canada	Cross-Sectional	Convenience Sampling	Age: 47 (HIV+, other neurological disorders); 53 (HIV+ HAND); 50 (HIV-) Education: 14 (HIV+, other neurological disorders); 13(HIV+ HAND); 15 (HIV-) Male: 85%(HIV+, other neurological disorders); 92%(HIV+ HAND); 54% (HIV-)	HIV Dementia Scale International HIV Dementia Scale Mini-Mental State Examination Symbol-Digit; Trail Making Tests A and B; Grooved Pegboard
Waldrop-Valverde, D., 2010; Chandigarh, India	Cross-Sectional	Convenience Sampling	Age: 30 Education: NR Male: 54%	International HIV Dementia Scale
Woods, 2005; San Diego, USA	Cross-Sectional	Not Specified	Age:44 (HIV+); 44 (HIV-) Education: 14 (HIV+); 15 (HIV-) Male: 81% (HIV+); 72% (HIV-)	Hopkins Verbal Learning Test Revised
Worth, 1993; Boston, USA	Cross-Sectional	Convenience Sampling	Age: 42 (ADC); 31 (HIV-) Education: 14 (ADC); 17 (HIV-) Male: 93% (ADC); 81% (HIV-)	Computer-Based Reaction Time Test

**Table 3b. Study Outcome in Literature on Screening Tools for HIV-Associated Neurocognitive Disorders**

Study (Author, Date; Location)	Screening Tool	Sample Size (Total; By Group)	Impairment Evaluated (Type(s); Classification System)	Tool Characteristics (Person can Administer; Time to Administer; Materials Needed)	Main Findings
Berguis, 1999; USA	HIV Dementia Scale (HDS); Executive	103	Type: HIV-Associated Dementia Classification: modified	Person: NR Time: NR Materials: NR	Cutoff scores of $\leq 10$ for HDS and $\geq 11$ for the EXIT optimized sensitivity and specificity. Education level was related to performance for

	Interview (EXIT)		AAN 1991		<p>both tests. Using separate logistic regression analysis, the HDS and the EXIT were significant individual predictors of dementia. When entered together, the EXIT was the only significant predictor of dementia.</p> <p>The HDS and the EXIT show promise as brief, well-tolerated screening tools for HIV dementia in ill patients. HDS was more sensitive, but EXIT added additional predictive power over HDS in identifying dementia.</p>
Diehr, 2003; San Diego, USA	Paced Auditory Serial Addition Task (50, 100 and 200 item)	1346; 560 (HIV- normative); 786 (HIV+ validation)	Type: Neurocognitive Deficits and Impairments (attention/concentration, working memory, speed of information processing) Classification: "NP impaired" and "NP normal" based on comprehensive neuropsychological battery	Person: NR Time: 6 minutes for 50-item, 8 minutes for 100-item, 11 minutes for 200-item test. Materials: NR	200-item PASAT is sensitive to various forms of cognitive dysfunction. Short forms have equivalent clinical accuracy, though some accuracy may be lost using the 50-item form in higher-functioning individuals.
Dunlop, 1993; Oslo, Norway	Total Reaction Time	49; 19 (CDC IV Stage), 15 (CDC II and III stage); 15 (HIV-)	Type: Neurocognitive Deficits or Impairment (reaction time) Classification: slow responder was defined as a patient slower than the slowest of the controls.	Person: NR Time: NR Materials: personal computer with regularly calibrated time measuring system; diode or computer screen; liquid crystal display; designed response units with calibrated response buttons	A motor component has been added to tests of reaction time (total simple visual reaction time, total simple auditory reaction time, total choice reaction time, total complex reaction time), defining the new parameter as total reaction time. Total Reaction time found to be particularly sensitive to discriminating between HIV positive patients and controls. Total reaction time had a better discriminatory ability than standard reaction time, particularly for patients with early disease.
Dunlop; 1992; Oslo, Norway	Simple Visual Reaction Time; Simple auditory reaction time; Movement reaction time; Choice reaction time; Complex reaction time	49; 19 (CDC IV Stage), 15 (CDC II and III stage); 15 (HIV-)	Type: Neurocognitive Deficits or Impairment (Reaction Time/Slow Response)  Classification: NR	Person: NR Time: NR Materials: Computer, programmable peripheral interface, light-emitting diode	All five tests showed statistically significant differences in speed between the CDC IV group and the controls. Did not single out one test as superior, but a combination of tests may seem most useful: the simple visual reaction time test (classic reaction time), the movement test (single out largest number of slow responders), and complex reaction time test (difference between CDC II/III group and controls)



Koski, 2011; Montreal, Canada	Montreal Cognitive Assessment (MoCA) and Computerized Tests	75 (HIV+)	Type: Neurocognitive Deficits or Impairment (working memory, frontal lobe function, emotional expression, reaction time to stimulus, phonetic verbal fluency, digit span) Classification: NR	Person: NR Time: NR Materials: Computer	The MoCA was found to adequately measure cognitive ability as a single, global construct in this HIV-positive cohort, although it showed poorer precision for measuring patients of higher ability. Combining the additional tests with the MoCA resulted in a battery with better psychometric properties that also better targeted the range of abilities in this cohort.
Kovner, 1992; New York State, USA	Dementia Rating Scale	43 Intravenous drug abusers (IVDAs); 10 (HIV+ AIDS), 11 (HIV+ not AIDS), 22 (HIV-)	Type: Abnormal /normal Classification: Mattis Dementia Rating Scale (DRS) score, Mattis, 1976	Person: NR Time: NR Materials: NR	ANACOVA without inclusion of past alcohol use showed statistically significant differences in DRS scores across groups, with HIV- having significantly high scores than each HIV+ group. Significant differences persisted when past alcohol use was included. All subjects with abnormal DRS scores were HIV+. All HIV-negative subjects had normal DRS scores while 43 % of the positive group obtained such scores. The DRS reliably identifies neuropsychological impairment, and may be a useful screening tool in this population.
Kvalsund, 2009; Lusaka, Zambia	Mini-Mental State Examination; HIV Dementia Scale; Color Trails 1	63; 48 (AIDS); 15 (HIV-)	Type: Cognitive Impairment Classification: >2 SDs below the comparison mean on the MMSE	Person: non-physician healthcare workers Time: NR Materials: NR	Significant group differences for all instruments between HIV+ and HIV-; MMSE was easiest to administer and had best face validity
Maj, 1993; Germany, Kinshasa, Congo	WHO/UCLA Auditory Verbal Learning Test; the Color Trails 1 and 2	48; 12 (HIV+ from Kinshasa); 12 (HIV- from Kinshasa); 12 (HIV+ from Munich), 12 (HIV-	Type: Neurocognitive Deficits or Impairments (verbal memory, time motor control, rapid visual search, sustained and selective attention, cognitive flexibility) Classification: For each test Z score exceeding the mean of the relevant seronegative group by at	Person: NR (Experienced neuropsychologist in this study). Time: NR Materials: NR	The percentage of impaired subjects on each new test was significantly higher in the HIV-1 seropositive group compared to the seronegative group, both in Munich and Kinshasa. The data obtained suggest that the tests are culture fair to assess various functional domains, that they are sensitive to HIV-associated cognitive impairment, and that this sensitivity "holds" across different cultures.

		from Munich)	least 1.5 SDs		
Martin, 1995; Chicago, USA	Delayed Recognition Span Test (DRST); Symbol-Digit Modalities Test; Trail Making Test	179; 96 (HIV+), 83 (HIV-)	Type: Neurocognitive Deficits or Impairment (spatial working memory); psychomotor tasks Classification: NR	Person: NR Time: NR Materials: NR	HIV+ subjects had significantly shorter spatial spans and DRST total scores. Scores on the TMT and SDMT did not discriminate between HIV+ and HIV- groups. DRST is a promising measure of HIV-related cognitive dysfunction in substance abusers who are often non-specifically impaired on psychomotor tasks.
McManis, 1993; San Antonio, USA	Rey-Osterrieth Complex Figure Copy (ROC) and Memory (ROM) Test	116; 67 (HIV+), 49 (HIV-)	Type: Neurocognitive deficits or impairments (subtle cognitive impairment: memory and psychomotor skills) Classification: NR	Person: Clinician Time: NR Materials: NR	HIV+ individuals scores significantly worse than HIV- matched individuals on the ROC (p=0.05), effect size=0.39) but not on the ROM test, and this difference corresponds to only a moderate effect size (0.39). While cognitive deficits may occur early in asymptomatic HIV disease, the ROC/ROM test is not a useful screening tool for clinicians.
Messinis, 2007; Patras, Thessaloniki, Athens, Greece	Ruff 2 and 7 Selective Attention Tests	267; 23 (HIV+), 26 (detoxified opiate addicts HIV-), 218m(healthy HIV-)	Type: Neurocognitive deficits or impairments (selective visual attention) Classification: Automatic detection and controlled search scores, Ruff and Allen, 1996	Person: NR Time: 5 Minutes Materials: NR	Test appeared to discriminate adequately between performance of detoxified opiate addicts and HIV+ patients and healthy controls; both groups performed more poorly than their respective control group. HIV+ group achieved poorer scores than controls on automatic detection speed, automatic detection accuracy, controlled search accuracy, but not on controlled detection speed.
Njamnshi, 2008; Yaonde, Cameroon	International HIV Dementia Scale	408; 204 (HIV+), 204 (HIV-)	Type: HAD/HACI (HIV-associated Cognitive Impairment), psychomotor speed task, memory recall Classification: IHDS =<10	Person: Health professional Time: 5 minutes Materials: Watch with a second hand	HIV+ subjects had a significantly lower IHDS means scores compared to HIV- subjects. Abnormal scores found in 21.1% of HIV+ subjects and 2.5% of HIV-negative subjects.
Nokes, 2007; New York, USA	Mental Alternations Test	81	Type: Neurocognitive Deficits or Impairment (letter/number recognition, visual scanning, cognitive flexibility, processing speed, working memory, motor skills, sequencing	Person: NR Time: 1 minute Materials: Watch	A cut-off score of less than or equal to 12 was able to distinguish dementia patients from age and education matched normals. Primary language was the only variable that was significantly related to cognitive impairment measured by the MAT scale.

			ability) Classification: NR		
Ogunrin, 2009; Benin City, Nigeria	Modified HIV Dementia Scale	240; 80 (HIV+ asymptomatic); 80 (HIV+ symptomatic); 80 (HIV-)	Type: Neurocognitive Deficits or Impairment (Memory registration, psychomotor speed, memory recall, construction) Classification: DSM 4 <sup>th</sup> edition dementia, 2000	Person: Non-professional trained health care provider Time: NR Materials: Pen and Paper	Using a cut-off score of 9, the HDS was found to have a sensitivity of 0.97 and specificity of 0.80. The HDS has shown to be a sensitive screening tool for people with HIV/AIDS in Sub-Saharan Africa but it was insensitive to memory impairment in asymptomatic HIV+ patients.
Parker, 1995; Southern California, USA	University of Southern California Repeatable Episodic Memory Test	50; 36 (HIV+), 14 (HIV-)	Type: Neurocognitive Deficits or Impairment (Memory) Classification: NR	Person: NR Time: 10 minutes Materials: NR	USC-REMT offers promise as a clinical research instrument. Practice effects were absent from some measures and small for other.
Riedel, 2006; Pune, India	International HIV Dementia Scale	96; 48 (HIV+), 48 (HIV-)	Type: Cognitive deficits (memory recall, motor speed, psychomotor speed) Classification: NR	Person: Trained non-neurologist Time: 2-3 minutes Materials: Watch with second hand	Using a cut-off of 10, HIV+ subjects had significantly lower IHDS scores compared to HIV- subjects.
Skinner, 2009; Edmonton, Canada	HIV Dementia Scale; International HIV Dementia Scale; Mini-Mental State Examination; Symbol-Digit, Grooved Pegboard and Trail Making A and B	46; 13 (HIV-); 20 (HIV+ with other neurological disorders); 13 (HIV+ HAND)	Type: MND; HAD Classification: American Academy of Neurology Criteria 1996	Person: NR Time: NR Materials: NR	Poorer performance by HIV+HAND subjects compared with the other two groups. Mean HDS and IHDS scores were lower for HIV+HAND compared to other groups; no differences in MMSE for HIV+ groups. MMSE is a weak tool for diagnosing HAND. HDS and IHDS demonstrate better efficiencies, although cut-off values for the HDS require reassessment in the era of effective ARV therapy.
Waldrop-Valverde, D., 2010; Chandigarh, India	International HIV Dementia Scale	295; 193 (HIV+); 102 (HIV-)	Type: HAD/ Neurocognitive Deficits or Impairments (memory Registration, motor speed, psychomotor speed) Classification: Sacktor 2005	Person: NR Time: NR Materials: NR	Only education was significantly associated with performance on the IHDS. Compared to those with <high-school education, participants with high-school education had 3.4x greater odds of scoring above the cut-off. Those with >high-school education had 5.2 greater odds of scoring above impairment cut-off. HIV-negative

					individuals and HIV-positive individuals who were in early stages of infection performed similarly.
Woods, 2005; San Diego, USA	Hopkins Verbal Learning Test Revised	71; 42 (HIV+); 29 (HIV-)	Type: Neurocognitive Deficits or Impairments (Verbal learning, memory) Classification: NR	Person: Psychometrist in this study Time: NR Materials: NR	The HIV-1 sample demonstrated poorer overall performance on the HVLTR total and delayed recall measures relative to demographically comparable controls. Findings indicate that HIV-1 disease is associated with deficient executive control of encoding and retrieval within verbal episodic memory.
Worth, 1993; Boston, USA	Computer-Based Reaction Time Test	75; 42 (mild to moderate ADC); 33 (HIV-)	Type: ADC Classification: Memorial Sloan Kettering ADC clinical staging system (Price, 1988)	Person: Self-Administered Time: 10 minutes Materials: Personal computer	The performance of the ADC group was significantly worse than that of the control group on all four RT measures, but not all tasks were equally sensitive. Two tests of sequential RT were best discriminators, ROC analysis optimal cut off z-score was 1.0 for both tests. Computer-based RT, using these two measures of sequential RT, may provide a sensitive method of detecting HIV-1-associated cognitive deficits.