FIGURE S1. PRISMA flow chart for study selection

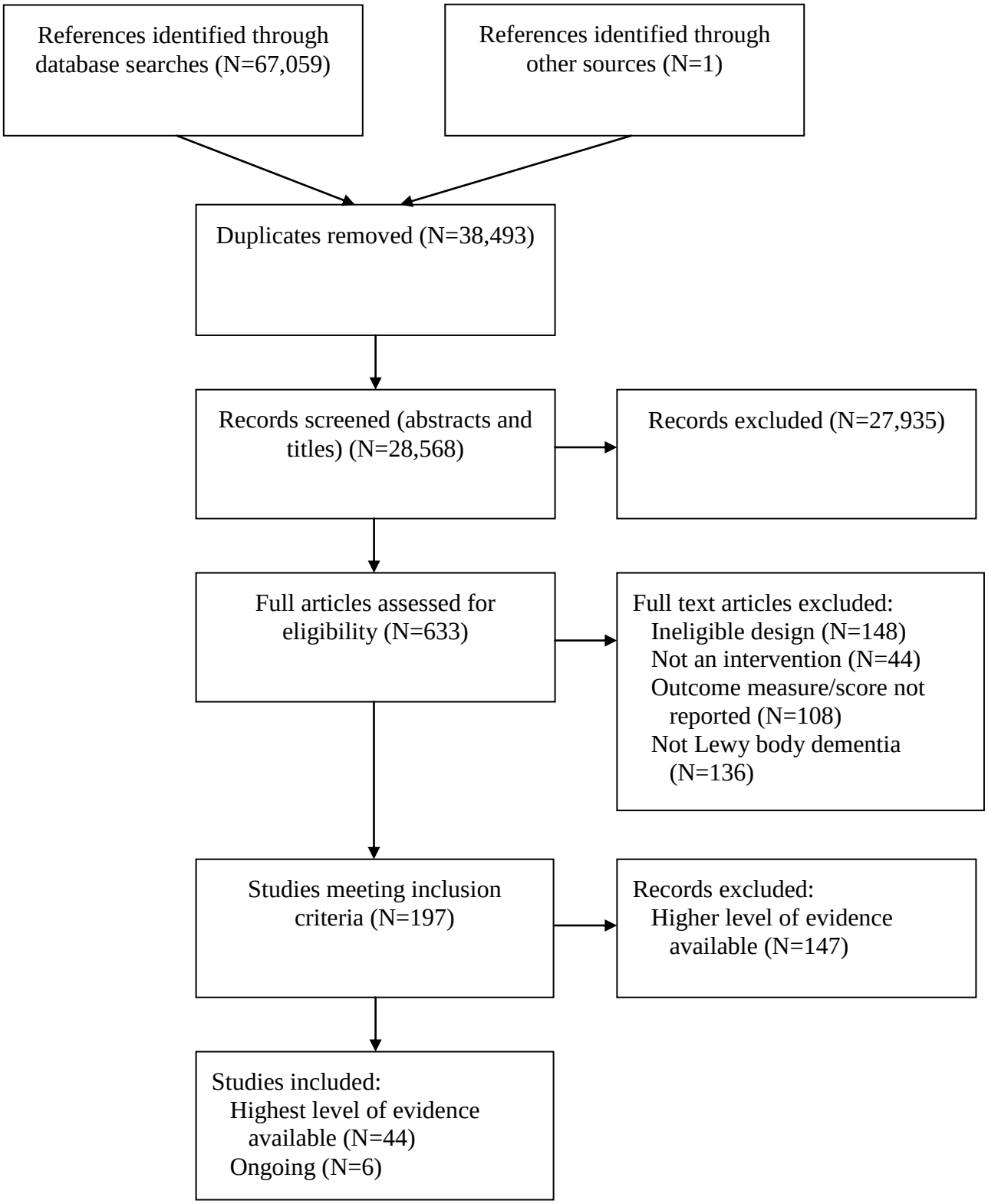

TABLE S1. Characteristics of included studies

Reference	Study quality[a]	Level of evidence[b]	Participants		Study length	Study dose	Outcome measures[c]
			Diagnosis	Numbers			
Donepezil							
Aarsland (16)	Strong	2	PD and cognitive impairment	14	5 months	10mg	Primary: CIBIC+, MMSE, UPDRS-III Secondary: NPI, unspecified neuropsychological tests
Dubois (17)	Strong	2	PDD	173 (placebo) 195 (5mg) 182 (10mg)	6 months	5mg or 10mg	Primary: ADAS-cog, CIBIC+ Secondary: BTA, CGI-PD, DAD, D-KEFS-VFT, MMSE, NPI, SE, UPDRS
Ikeda (20)	Strong	2	DLB	46 (placebo) 47 (5mg) 49 (10mg)	12 weeks	5mg or 10mg	Primary: MMSE, NPI-2 Secondary: NPI-10, UPDRS-III, ZBI
Leroi (18)	Moderate	2	PD and dementia or cognitive impairment secondary to PD	16	18 weeks	10mg	BTA, CSDD, MDRS, DTVMI, H&Y, HVLT-R, MMSE, NART, NPI, TMT-A, TMT-B, UPDRS-ADL, UPDRS-IV, UPDRS-III, UPDRS-IV, VFT
Mori (15)	Strong	2	DLB	35 (placebo) 35 (3mg) 33 (5mg) 37 (10mg)	3 months	3mg, 5mg, or 10mg	CIBIC+, MMSE, NPI-2, NPI-4, NPI-10, WMS-R-A/C, UPDRS-III, VFT, VPTA-FD, VPTA-OFI, WAIS-DS, ZBI
Ravina (19)	Strong	2	PDD	22	10 weeks	10mg	Primary: ADAScog Secondary: BPRS, CGI-C, MDRS, MMSE, UPDRS-III
Satoh (23)	Moderate	3	DLB, visual hallucinations	13	3 months	5mg	BEHAVE-AD-H, MMSE
Minett (24)	Moderate	3	DLB or PDD	9 (DLB) 15 (PDD)	26 weeks	N/A	MMSE, NPI, UPDRS
Rivastigmine							
Emre (22)	Strong	2	PDD	179 (placebo) 362	6 months	12mg	Primary: ADCS-CGI-C, ADAScog Secondary: 10-

				(treatment)			point, ADCS-ADL, CDRCAS-PoA, D-KEFS-VFT, MMSE, UPDRS-III
McKeith (21)	Strong	2	DLB	61 (placebo) 59 (treatment)	5 months	12mg	Primary: CDRCAS (speed of response), NPI Secondary: ADCS-CGI-C, BDT, COWART, DSST, MMSE, NPI, Stroop, TMT-A, TMT-B, UPDRS
Galantamine							
Edwards (25)	Moderate	3	DLB	50	6 months	24mg	Primary: ADCS-CGI-C, CDRCAS, NPI Secondary: 1-day, ADAScog, ADCS-ADL, CAF, MMSE, PSQI
Litvinenko (26)	Moderate	3	PDD	20 (control) 21 (treatment)	6 months	16mg	10-point, ADAScog, DAD, FAB, MMSE, NPI, UPDRS-III,
Memantine							
Aarsland (29)	Moderate	2	DLB or PDD	35 (placebo) 40 (treatment)	6 months	20mg	Primary: CGI-C Secondary outcome measures: MMSE, NPI, AQT, UPDRS-III
Emre (27)	Strong	2	DLB or PDD	101 (placebo) 98 (treatment)	6 months	20mg	10-point, ACT, ADAScog-ot, ADCS-ADL23, BNT, BFRT, BJLO, CASST, CFT, COWAT, CS-SRT, CS-CRT, DOT, NPI, SIT-C, SIT-I, TMT-A, TMT-B, UPDRS-III, VEPAL, VRRT-DR, VRRT-IR, VRRT-recog, ZBI
Leroi (28)	Moderate	2	PDD	14 (placebo) 11	4 months	20mg	Primary: MDRS Secondary: CIBIC+ MMSE,

				(treatment)			NPI, UPDRS-III
(Ar)modafinil							
Boeve (30)	Moderate	3	DLB	20	12 weeks	150 - 250mg	Primary: ADAScog, ADCS-CGI-C, ESS, MWT Secondary: MMSE, NPI, unspecified measure of ADL, neuropsychological tests (unspecified), unspecified measure of QoL
Varanese (31)	Study 1: Weak Study 2: Weak	4 3	Study 1: DLB or PDD Study 2: DLB or PDD	Study 1: 6 Study 2: 9	Study 1: 18 - 66 weeks Study 2:	Study 1: 150-400mg Study 2: 150mg	Study 1: CGI-S Study 2: DT, PVT, VAS - alertness
Piracetam							
Sano (32)	Weak	2	PDD or PD and cognitive impairment	10 (placebo) 10 (treatment)	6 months	4.8mg	CATEG, COWAT, CPT, global rating of neuropsychological performance, mMMSE, RT, SRT, SIP, UPDRS, WAIS-DS
Levodopa							
Bonelli (33)	Weak	3	DLB, PDD, or PD	20 (DLB) 20 (PDD) 20 (PD)	Acute test: 1 hour Chronic test: not reported	200mg	H&Y, MMSE, UPDRS
Goldman (34)	Moderate	3	DLB	19	3 months (mean)	368mg (mean)	H&Y, UPDRS-Thought, UPDRS-III
Molloy (36)	Weak	3	DLB, PDD, or PD	27 (DLB) 33 (PDD) 31 (PD)	Acute test: 2 hours, Chronic test: 6 months	323 mg (mean)	FT, MMSE, UPDRS-III, WT

Onofrj (35)	Moderate	3	DLB, PD, or ET	24 (DLB) 27 (PD) 34 (ET)	90 – 110 minutes	300mg (mean)	Electromyography, FAB, H&Y, MDRS-2, MMSE, NPI, unspecified measure of REM sleep behaviour disorder, TRGRS, UPDRS-III, unspecified measure of visual hallucinations
Tse (37)	Moderate	2	PDD	5 (control) 6 (withdrawal)	32 days	N/A	Checklist of motoric and behavioural/mental dysfunction, H&Y, MMSE, NABDF, UPDRS-III
Amantadine							
Yablonskaya (38)	Weak		PDD or PD and cognitive impairment	10 (PDD) 15 (PD and cog)	6 months	200mg	FAB, H&Y, MDRS, MMSE, UDPRS
Rotigotine							
Fanciulli (40)	Weak	4	PDD	2	3 months	4mg	HARS, MMSE, RO-DR, RO-IR, RO-P, UPDRS-III, WCST
Strothjohann (39)	Moderate	3	PDD	9	Not reported	8mg	UPDRS
Selegiline							
Portin (41)	Weak	3	PDD or PD	4 (PDD) 3 (PD)	1 month	5mg	BWVT, CM-DR-M, CM-DR-M, Kim, MST, WAIS-DR, VST, clinical interview and observations of emotional change
Clozapine							
Lee (42)	Moderate	4	PDD or dementia	8 (PDD) 8 (dementia)	PDD = 1 month (mean) Other dementia = 36 days (mean)	PDD = 41mg (mean) Other dementia = 48mg (mean)	Primary: CGI-S Secondary: BARS, CMAI-SF, MMSE

Olanzapine							
Cummings (43)	Moderate	2	DLB	10 (placebo) 5 (5mg) 7 (10mg) 7 (15mg)	6 weeks	5, 10 or 15mg/day	BPRS, NPI-NH
Moretti (44)	Moderate	3	DLB, PDD, AD, FLD, or VaD	4 (DLB) 3 (PDD) 34 (AD) 17 (FLD) 10 (VaD)	6 months	10mg	BEHAVE-AD; CIRS; CSDD; Katz-ADL; IADL; MMSE; NPI; RSS; 10-point; TPT; visuospatial test (unspecified); WAIS-R-WFs; WAIS-R-WFp
Quetiapine							
Kurlan (49)	Strong	2	DLB, PDD, or AD	20 (placebo) 20 (treatment)	10 weeks	300mg	Primary: BPRS Secondary: ADCS-ADL, ADCS-CGI-C, MMSE, NPI, RMDSD, UPDRS
Prohorov (48)	Moderate	4	PDD or PD	20 (PDD) 19 (PD)	10 months	Up to 600mg	MMSE, UPDRS-III
Takahashi (47)	Weak	4	DLB	9	2 months	According to clinical response	MMSE, NPI, SAS
Risperidone							
Culo (51)	Moderate	2	DLB, AD	17 (DLB) Not reported (AD)	3 months	0.5mg	CGI-C, E-BEHAVE-AD, MMSE, NPI-NH, SIB, UKU
Workman (50)	Weak	3	PDD	9	37 days (mean)	1.9mg/day (mean)	BPRS, CMAI, HRS-D, MMSE, RSSE
Citalopram							
Culo (51)	Moderate	2	DLB, AD	14 (DLB) Not reported (AD)	3 months	10mg	CGI-C, E-BEHAVE-AD, MMSE, NPI-NH, SIB, UKU
Duloxetine							
Vasile (52)	Weak	3	PDD	8 (duloxetine)	6 months	45mg	CGII, HRS-D, , MADRS, MMSE
Clonazepam							
Massironi (53)	Weak	4	DLB	3	1 month	0.3 – 0.5mg	Number of nights with RBD episode
Ramelteon							
Kasanuki (54)	Weak	4	DLB	4	2 months	8mg	Primary: ESS, NPI, PSQI Secondary: Barthel, MMSE, UPDRS-III, ZBI
Gabapentin							
Fujishiro (55)	Weak	4	DLB	1	3 months	300mg	IRLSS, MMSE, UPDRS CGIS
Hawkins (56)	Weak	4	PDD, AD, mixed	1 (PDD) 8 (AD)		1800mg	

			dementia, VaD, TBI, ABD, dementia NOS	7 (mixed) 3 (VaD) 3 (TBI) 1 (ABD) 1 (dementia NOS)			
Zonisamide							
Odawara (57)	Weak	4	DLB	3	3 months	25mg	Barthel, GDS, IADL, MMSE, NPI, UPDRS-III, ZBI MMSE, UPDRS-III
Tombini (58)	Weak	4	PDD	1	1 year	200mg	
Yokukansan							
Kawanabe (60)	Weak	3	PDD or PD	7 (PDD) 7 (PD)	2 months	7.5mg	Barthel, MMSE, NPI, UPDRS-III Barthel, IADL, MMSE, NPI
Mizukami (59)	Weak	2	DLB, AD, or mixed dementia	15 (DLB) 78 (AD) 13 (mixed)	8 weeks	22.5mg	

[a] Study quality based on the Quality Assessment Tool for Quantitative Studies Study quality based on the Quality Assessment Tool for Quantitative Studies

[b] Based on Oxford Centre for Evidence-Based Medicine: 1 = systematic review of RCTs or N-of-1 trials, 2 = RCT or observational study with dramatic effect, 3 = non-randomised controlled trial or follow up study, 4 = case series or case control

[c] 1-day = One-day fluctuation Scale; 10-point = Ten-Point Clock Drawing Task; ABD = anorexic brain damage; ACT = Alternating Categories Test; ADCS-ADL = Alzheimer's Disease Cooperative Study - Activities of Daily Living scale; ADCS-CGI-C = Alzheimer's Disease Cooperative Study - Clinical Global Impression of Change; ADAScog-ot = Alzheimer's Disease Assessment Scale – Cognitive Subscale, Orientation; Barthel = Barthel Index for Activities of Daily Living; BARS = Brief Agitation rating Scale; BDT = Block Design Test; BEHAVE-AD-H = Behavioral Pathology in Alzheimer's Disease Rating Scale – category B (hallucinations); BFRT = Benton Facial Recognition Test; BJLO = Benton Judgement of Line Orientation Test; BNT = Boston Naming Test; BPRS = Brief Psychiatric Rating Scale; BTA = Brief Test of Attention; BWVT = Bourdon-Wiersma Vigilance Test; CAF = Clinical Assessment of Fluctuation; CASST = CogState Set Shifting Task; CDRCAS = Cognitive Drug Research Assessment System; CDRCAS-PoA = Cognitive Drug Research Computerized Assessment System - Power of Attention Tests; CFT = Category Fluency Test; CATEG = Category Naming; COWAT = Controlled Word Association Test; CPT = Continuous Performance Task; CGI-C = Clinical Global Impression of Change; CGI-I = Clinical Global Impression-Improvement; CGIC-PD = Clinical Global Impression of Change– Parkinson's Disease scale; CGI-S = Clinical Global Improvement Scale; CIBIC+ = Clinician's Interview Based Impression of Change Plus Caregiver Input; CIRS = Clinical Insight Rating Scale; CMAI = Cohen-Mansfield Agitation Inventory; CMAI-SF = Cohen-Mansfield Agitation Inventory – Short Form; CM-DR-M = modified Cronholm and Molander delayed recall test; CM-IR-M = modified Cronholm and Molander immediate recall test; CSDD = Cornell Scale for Depression in Dementia; CS-SRT = CogState Simple Reaction Time; CS-CRT = CogState Choice Reaction Time; DAD = Disability Assessment for Dementia; D-KEFS-VFT = Delis–Kaplan Executive Function System Verbal Fluency Test; DOT = Digit Ordering Test; DSST = Digit Symbol Substitution Task; DT = computerised detection task (reflexive attention); DTVMI = Developmental Test of Visual-motor Integration; E-BEHAVE-AD = Empirical Behavioral Pathology in Alzheimer's Disease scale; ESS = Epworth Sleepiness Scale; ET = essential tremor; FAB = Frontal Assessment Battery; FLD = frontal lobe dementia; FT = Measurement of finger tapping times; GSD = Geriatric Depression Scale; HARS = Hamilton Anxiety Rating Scale; H&Y = Hoehn and Yahr scale; HRS-D = Hamilton Rating Scale for Depression- 17 items; HVLT-R = Hopkins Verbal Learning Test-Revised; IADL = Instrumental Activities of Daily Living; IRLSS = International Restless Leg Syndrome Scale; Katz-ADL = Katz Index of Activity of Daily Living; Kim = Modified Kim's Test; LMT = Logical Memory Test; MADRS = Montgomery Asberg Depression Rating Scale; MDD = major depressive disorder; MDRS = Mattis Dementia Scale; MDRS-2 = Dementia Rating Scale – 2; MMSE = Mini-Mental State Examination; mMMSE = Modified Mini-Mental State Examination; MST = motor speed test; MWT = Maintenance of Wakefulness Test; NABDF = Nursing Assistant Behavioral Detection Form; NART = National Adult Reading Test;

NINCDS/ADRDA = National Institute of Neurological and Communicative Disorders and Stroke/Alzheimer's Disease and Related Disorders Association; NOS = not otherwise specified; NPI = Neuropsychiatric Inventory; NPI-NH = Neuropsychiatric Inventory – Nursing Home; NRS = Neurobehavioral Rating Scale; PSQI = Pittsburgh Sleep Quality Index; PVT = computerised psychomotor vigilance task (sustained attention); QoL = quality of life; RBD = REM sleep behavior disorder; RMDSD = Rochester Movement Disorders Scale for Dementia; RO-DR = Rey-Osterrieth-delayed recall; RO-IR = Rey-Osterrieth-immediate recall; RO-P = Rey-Osterrieth-picture; QTC = a quick test of cognitive speed; SRT = Selective Reminding Test; RSS = Relative Stress Scale; RSSE = Rating Scale for Side Effects; RT = Reaction Time; SAS = Simpson- Angus Scale; SE = Schwab and England scales; SIB = Severe Impairment Battery; SIP = Sickness Impact Profile; SIT-C = Stroop Interference Test Congruent; SIT-I = Stroop Interference Test Incongruent; SPES = Short Parkinson's Evaluation Scale; TBI = traumatic brain injury; TMT-A = Trail Making Test Part A; TMT-B = Trail Making Test Part B; TPT = Ten Proverb Test; UKU = Udvalg for Kliniske Undersfgelser Side Effect Rating Scale; UPDRS = Unified Parkinson's Disease Rating Scale; UPDRS-III = Unified Parkinson's Disease Rating Scale – Motor subscale; UPDRS-IV = Unified Parkinson's Disease Rating Scale – Complications of Therapy subscale; UPDRS-Thought = Unified Parkinson's disease Rating Scale – Thought Disorder item; VAD = vascular dementia; VAS-alertness = visual analogue scale of alertness; VEPAL = Verbal Paired Associates Learning Test; VFT = Verbal Fluency test; VPTA-FD = Visual Perception Test for Agnosia – Form Discrimination subscale; VPTA-OFI = Visual Perception Test for Agnosia – Overlapping Figure Identification subscale; VRRT-DR = Verbal Recall Test Delayed; VRRT-IR = Verbal Recall Test Immediate; VRRT-recog = Verbal Recognition Test; VRT = Visual Reproduction Test; VST = visuographic speed test; WAIS-DS = Wechsler adult intelligence scale Digit Span Test; WAIS-R-WFp = Wechsler adult intelligence scale-Revised Phonological Word Fluency Test; WAIS-R-WFs = Wechsler adult intelligence scale-Revised Semantic Word Fluency Test; WAIS-DS = Wechsler Adult Intelligence Test – Symbol Digit Modalities subscale; WCST = Wisconsin card sorting task; WMS-R = Wechsler Memory Scale – Revised; WMR-R-A/C = Revised Wechsler Memory Scale – Attention/Concentration subscale; WT = Walk Time Test; ZBI = Zarit Burden Inventory

FIGURE S2A. Forest plot of global outcomes on the Alzheimer's Disease Cooperative Study - Clinical Global Impression of Change (continuous): donepezil + rivastigmine vs. placebo. Five studies, n = 954

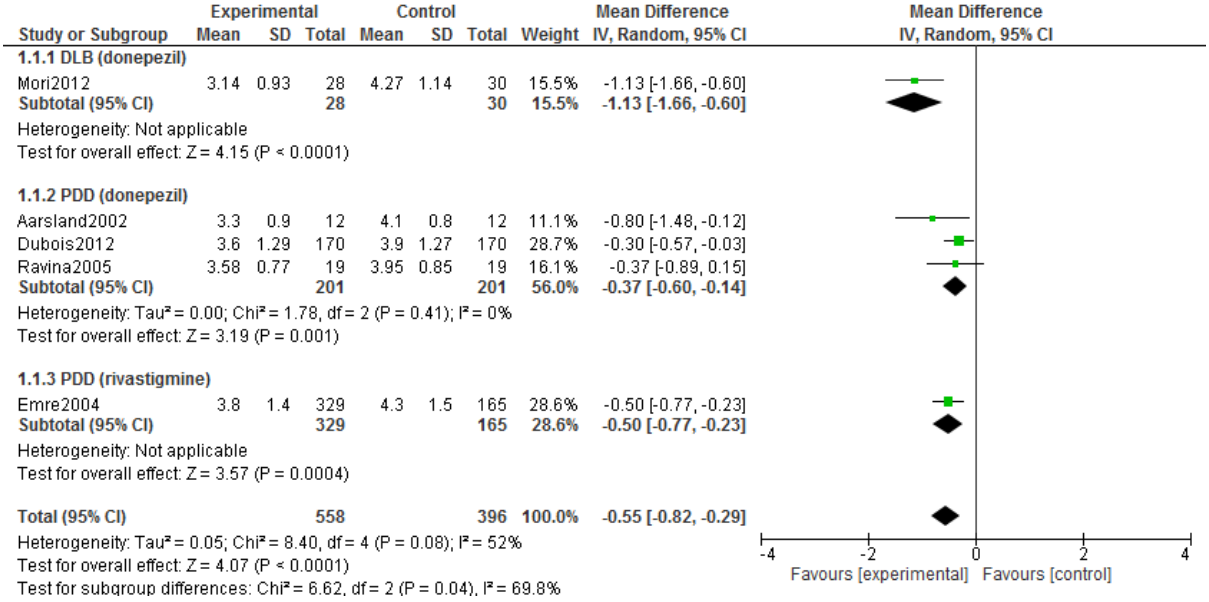

FIGURE S2B. Forest plot of neuropsychiatric symptoms on the NPI-4: donepezil + rivastigmine vs. placebo. Two studies, n = 167

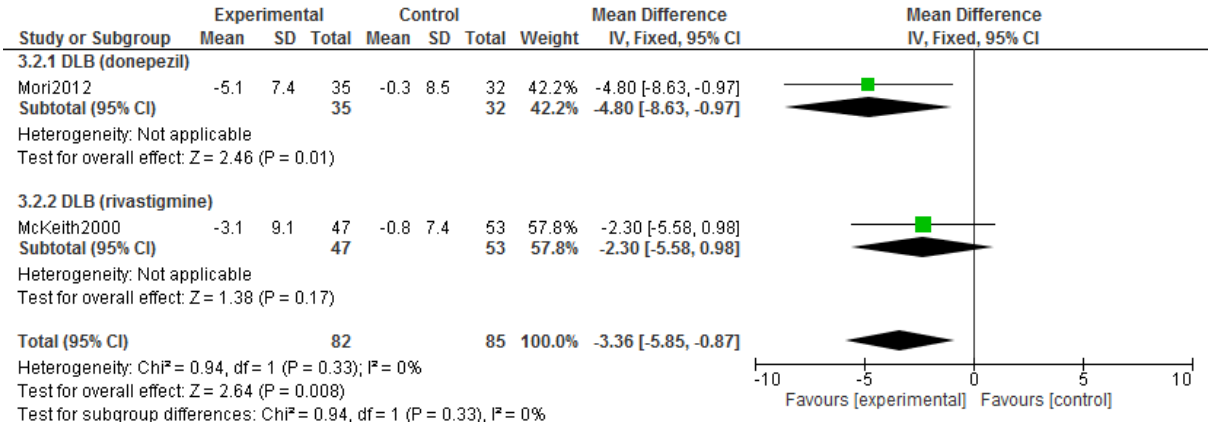

FIGURE S2C. Forest plot of activities of daily living on the Alzheimer's Disease Co-operative Study - Activities of Daily Living Inventory, Disability Assessment for Dementia, and Unified Parkinson's Disease Rating Scale – Activities of Daily Living: donepezil + rivastigmine vs. placebo. Three studies, n = 854

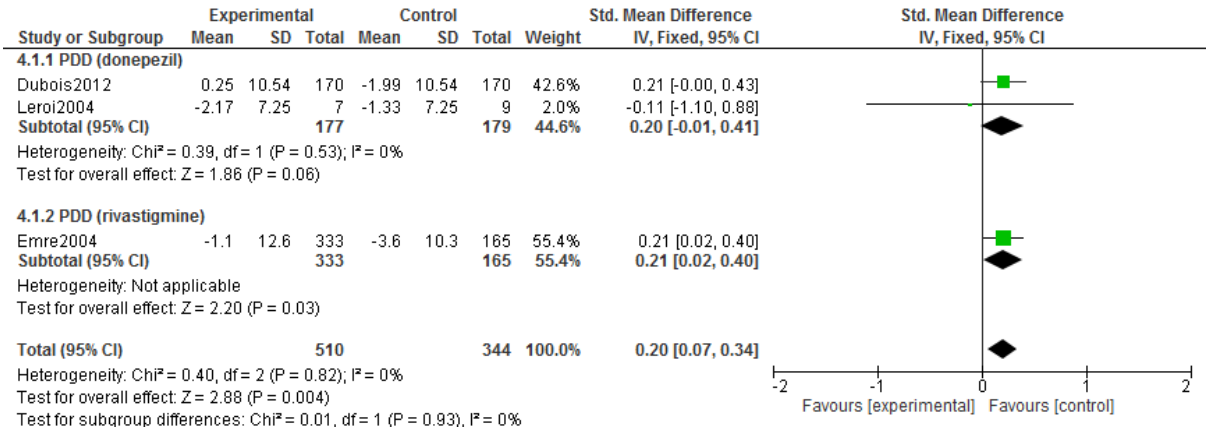

FIGURE S2D. Forest plot of adverse events: donepezil + rivastigmine vs. placebo. Eight studies, n = 1262

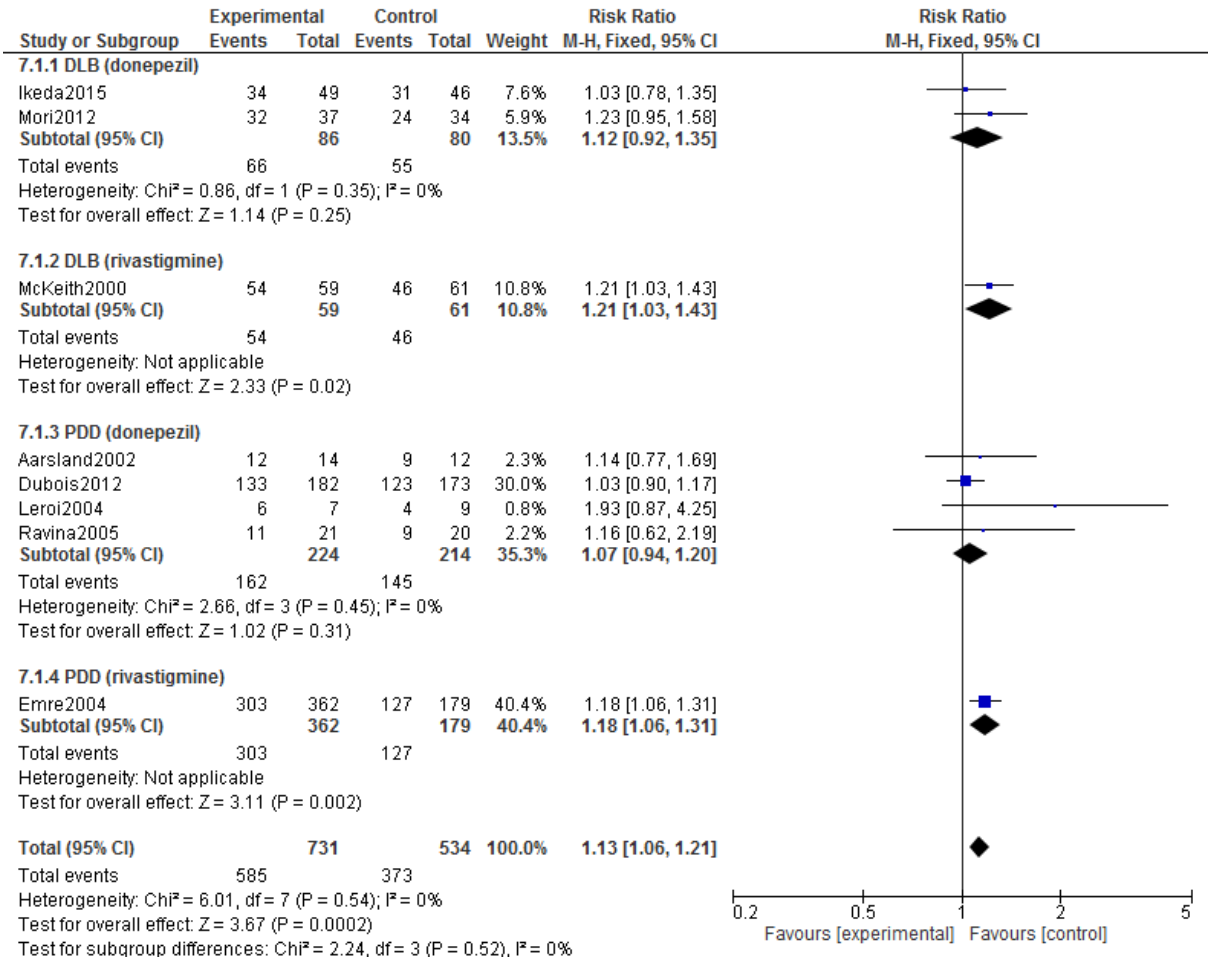

FIGURE S2E. Forest plot of withdrawals due to any cause: donepezil + rivastigmine vs. placebo. Eight studies, n = 1265

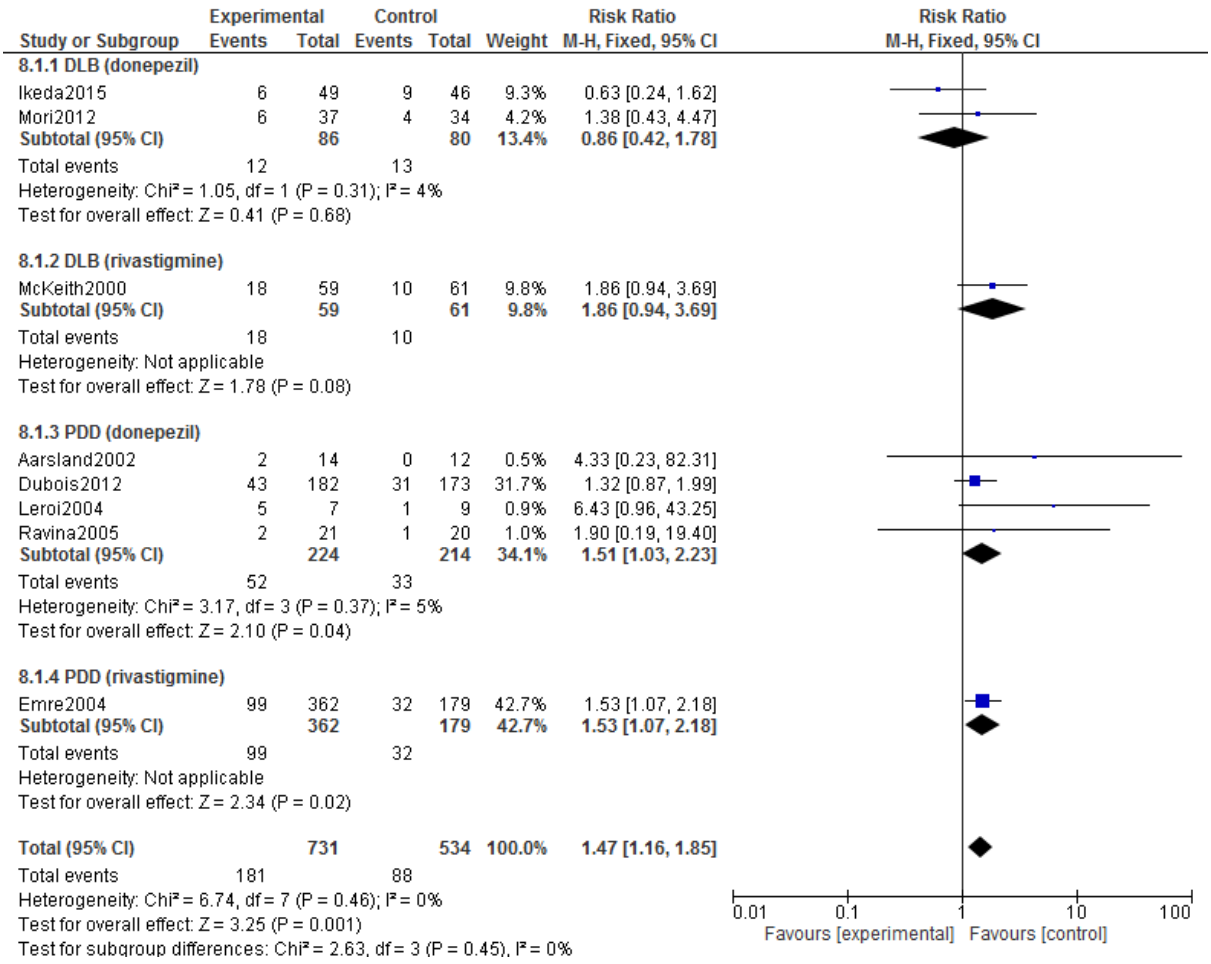

FIGURE S2F. Forest plot of motor function on the Unified Parkinson's Disease Rating Scale–III: donepezil vs. placebo. Four studies, n = 145

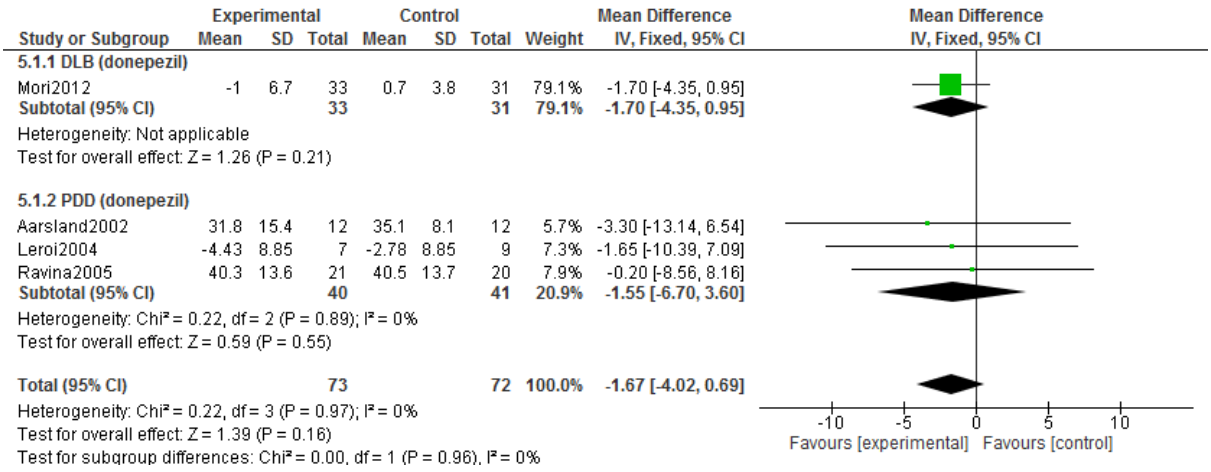

FIGURE S3A. Forest plot of global outcomes on the Alzheimer's Disease Cooperative Study - Clinical Global Impression of Change (absence of deterioration): memantine vs. placebo. Two studies, n =253

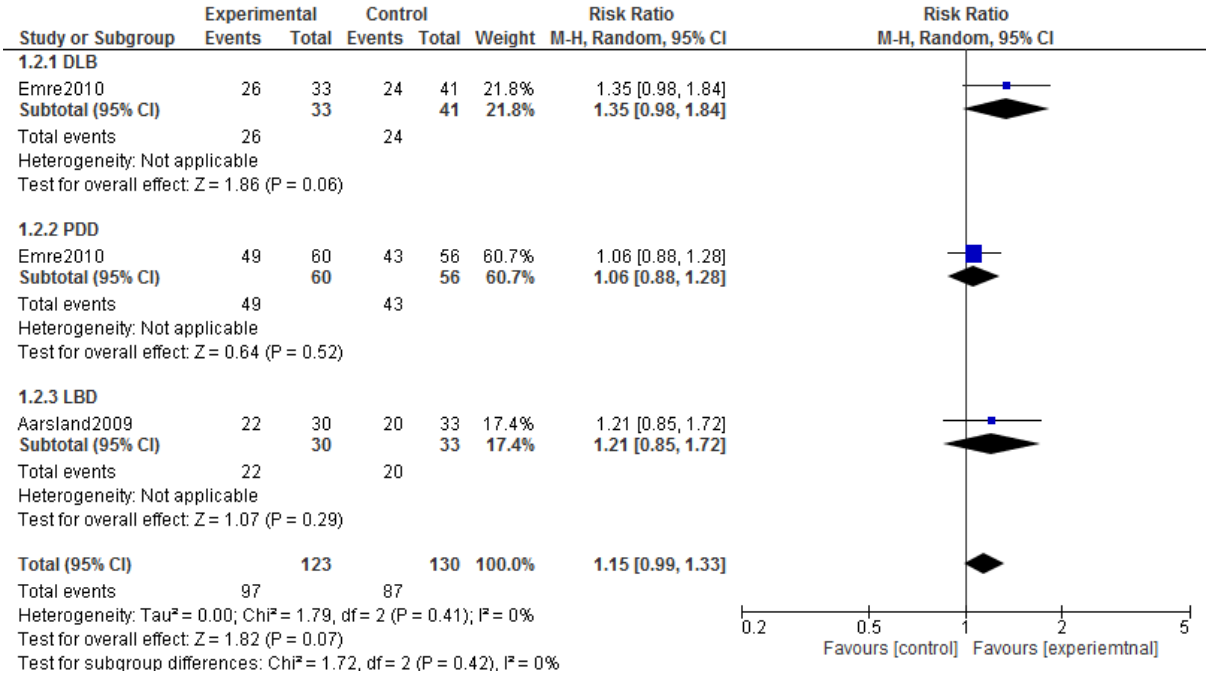

FIGURE S3B. Forest plot of global outcomes on the Alzheimer's Disease Cooperative Study - Clinical Global Impression of Change (continuous): memantine vs. placebo. Two studies, n = 257

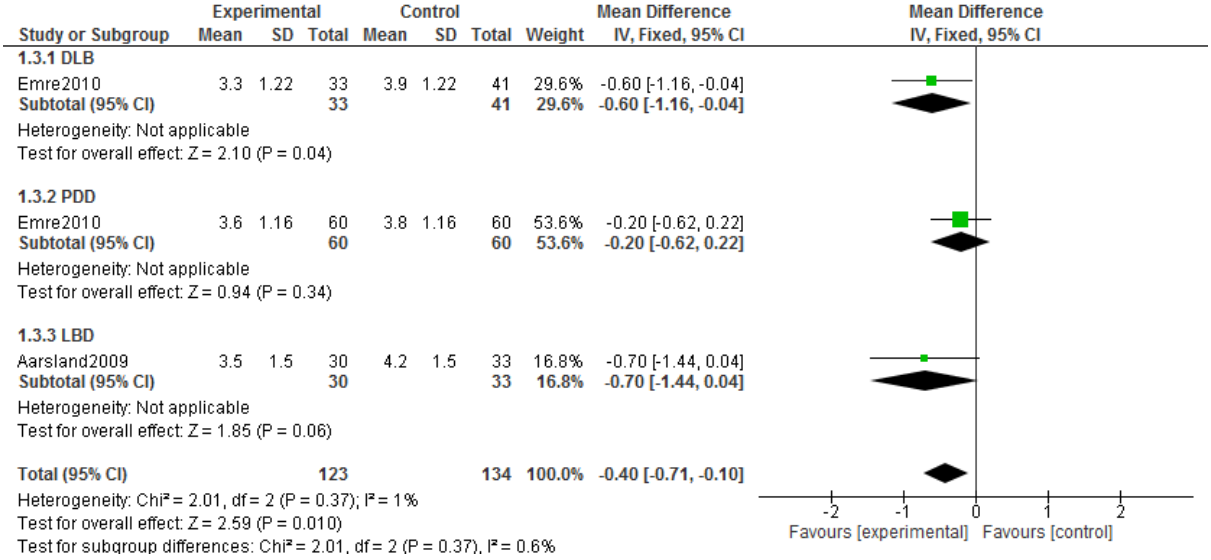

FIGURE S3C. Forest plot of cognitive functioning on the MMSE: memantine vs. placebo. Two studies, n = 88

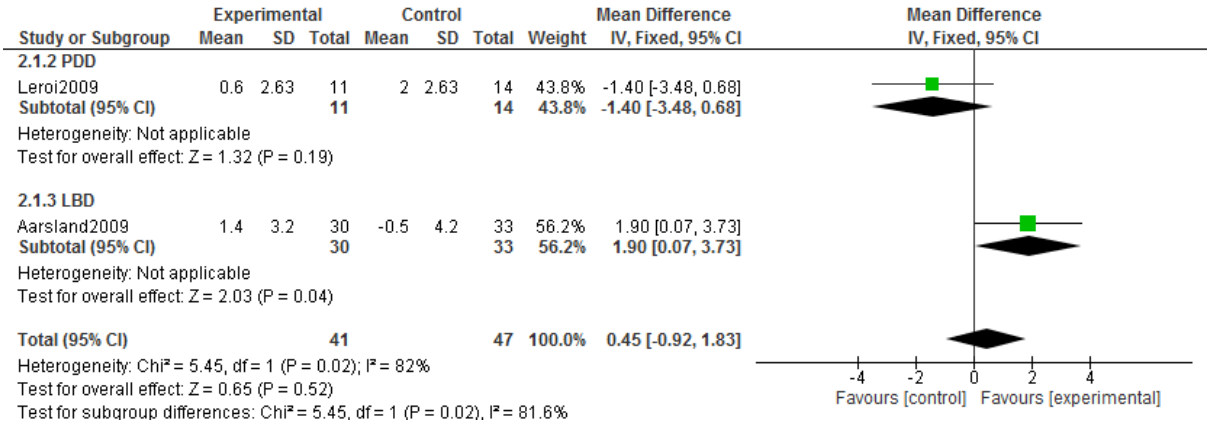

FIGURE S3D. Forest plot of neuropsychiatric symptoms on the NPI-10: memantine vs. placebo. Three studies, n = 283

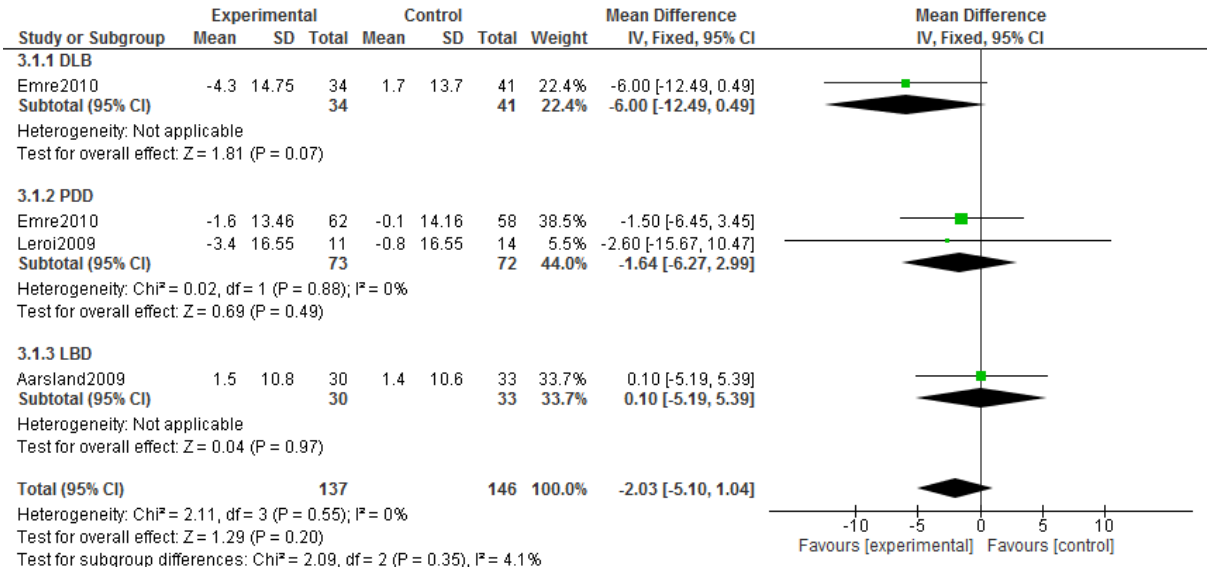

FIGURE S3E. Forest plot of activities of daily living on the Alzheimer's Disease Co-operative Study - Activities of Daily Living Inventory and Disability Assessment for Dementia: memantine vs. placebo. Two studies, n = 254

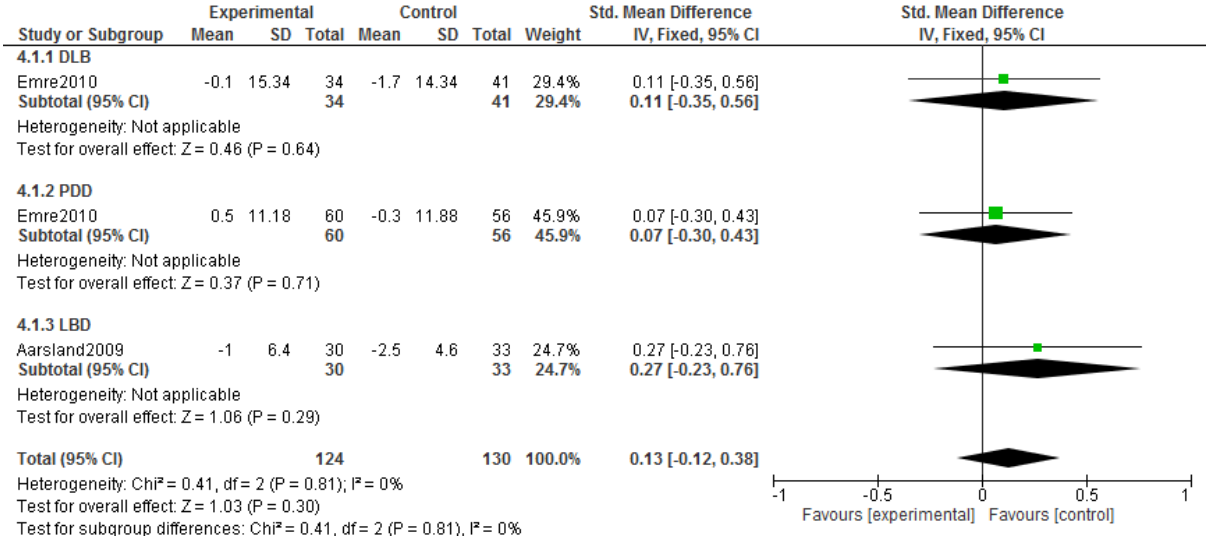

FIGURE S3F. Forest plot of adverse events: memantine vs. placebo. Three studies, n = 295

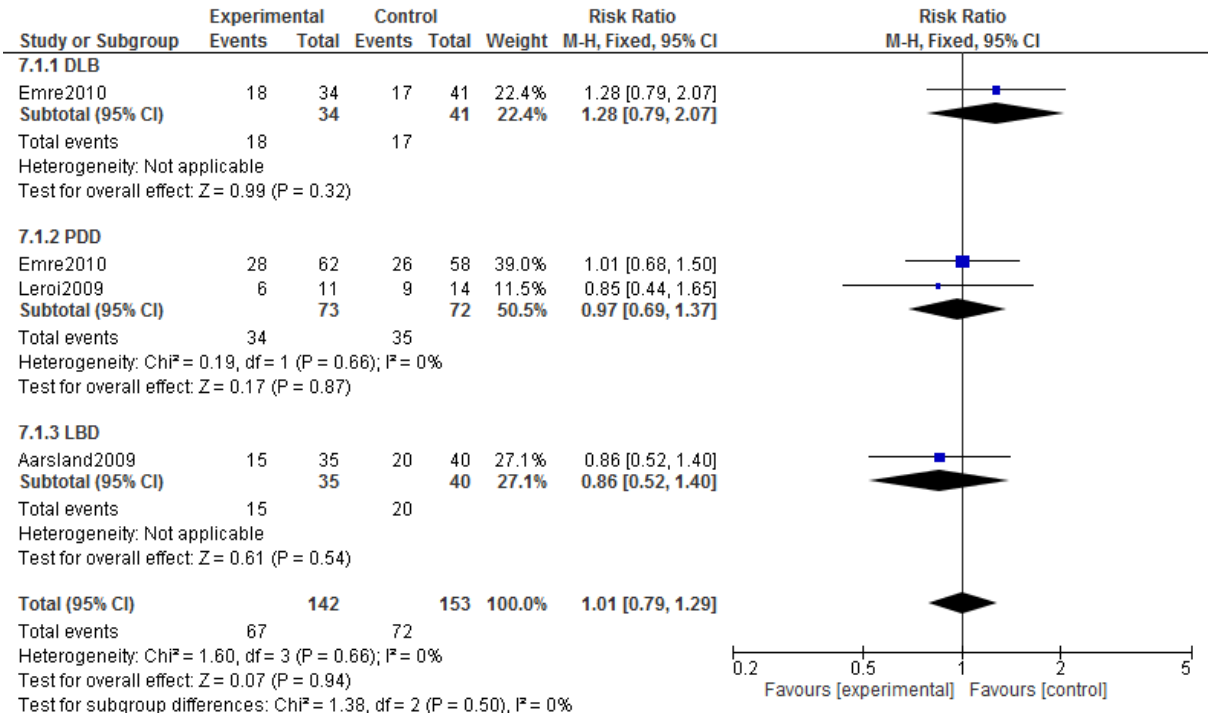

FIGURE S3G. Forest plot of withdrawals due to any cause: memantine vs. placebo. Three studies, n = 295

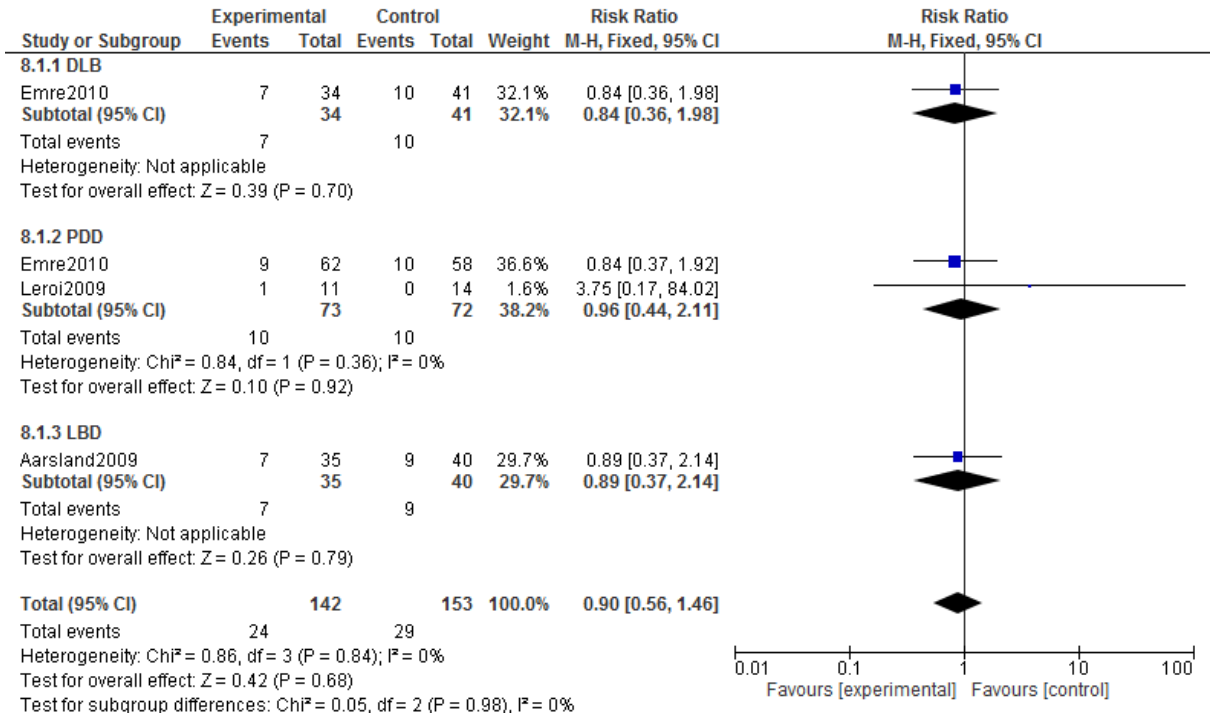

FIGURE S3H. Forest plot of motor function on the Unified Parkinson's Disease Rating Scale -III: memantine vs. placebo. Three studies, n = 278