

Data supplement to O'Dwyer et al. Association of anticholinergic burden with adverse effects in older people with intellectual disabilities: an observational cross-sectional study. Br J Psychiatry doi: 10.1192/bjp.bp.115.173971

Fig. DS1 Flow chart

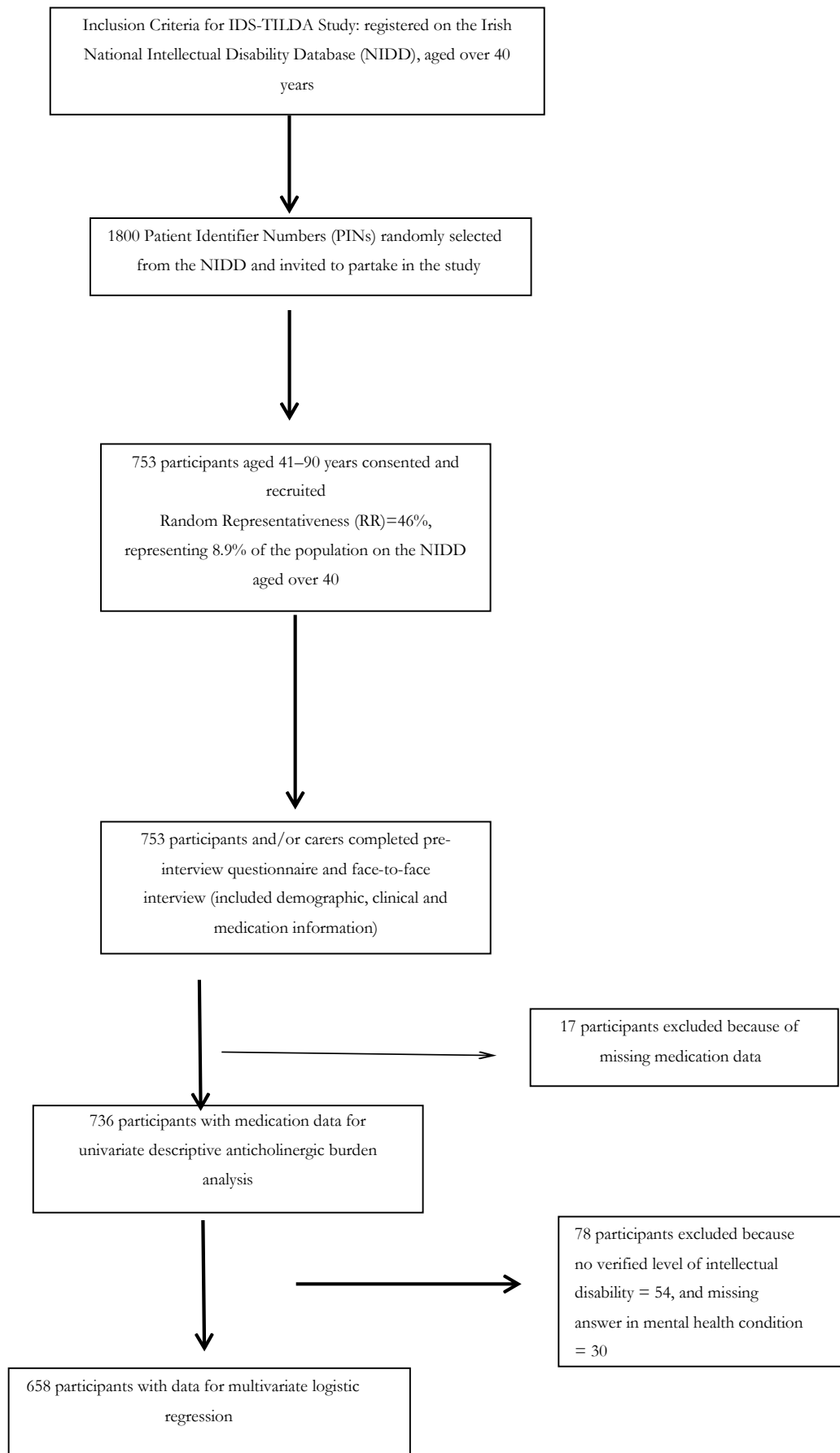
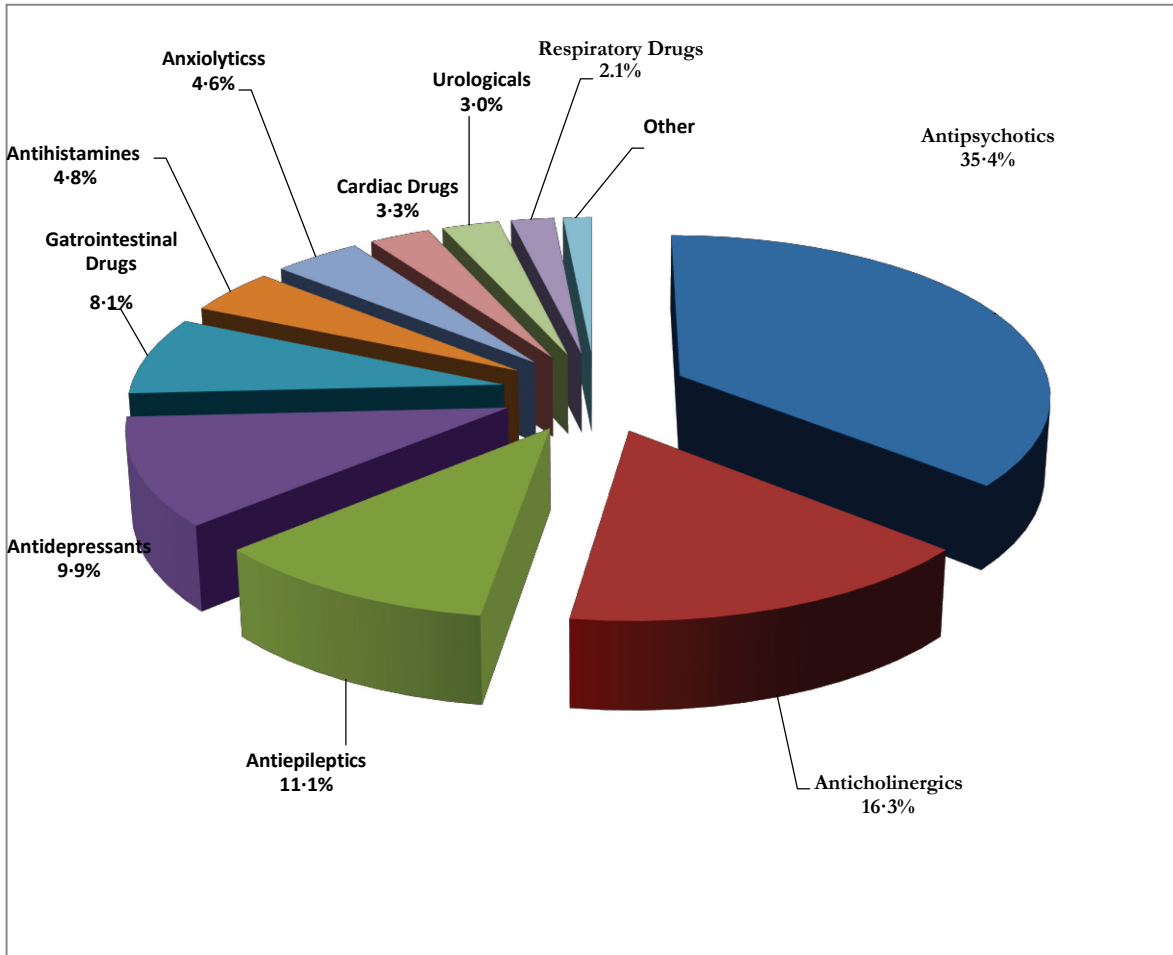


Fig. DS2 Contribution of therapeutic classes to total Anticholinergic Cognitive Burden (ACB) scale score in the population.

Figure adapted from Lanctôt *et al*⁵³



* The contribution of each medication class was estimated from the number of people reporting use of medications of that class multiplied by its score (1–3) on the Anticholinergic Cognitive Burden (ACB) scale, divided by the population cumulative ACB scale score.

⁵³ Lanctôt K, O'Regan J, Schwartz Y, Swardfager W, Saleem M, Oh PI, et al. Assessing cognitive effects of anticholinergic medications in patients with coronary artery disease. *Psychosomatics* 2014; **55**: 61–8.

Table DS1 Anticholinergic medications reported in study and Anticholinergic Cognitive Burden (ACB) scale scores

<i>ACB Category 3 (Definite)</i>		<i>ACB Category 2 (Definite)</i>	<i>ACB Category 1 (Possible)</i>		
<i>Antipsychotics</i>	Antihistamines	Antipsychotics	Antipsychotics	Cardiac Therapies	Respiratory Drugs
Olanzapine Chlorpromazine Quetiapine Trifluoroperazine Pericyazine*	Chlorpheniramine Promethazine Hydroxyzine	Zuclopentixol *	Risperidone Haloperidol Aripiprazole Fluphenazine * Flupentixol * Sulpride * Amisulpride* Benperidol *	Atenolol Furosemide Nifedipine Warfarin Dipyrimidole Metoprolol Captopril Digoxin Isosorbide Doxazosin* Bendroflumethiazide * Hydrochlorothiazide *	Ipratropium * Tiotropium * Theophylline
Antidepressants Paroxetine Trimipramine Amitriptyline Clomipramine Doxepin	Gastrointestinal preparations Scopolamine Atropine	Anti-epileptics Carbamazepine	Antidepressants Escitalopram* Citalopram * Mirtazepine* Venlafaxine Trazadone	Gastrointestinal preparations Loperamide Prochlorperazine * Ranitidine Mebeverine * Alverine Colchicine	Coricosteroids, for systemic use Prednisolone
			Anxiolytics		
		Analgesics	Alprazolam	Muscle Relaxant	
		Nefopam	Diazepam (oral)	Baclofen *	

<i>ACB Category 3</i>		<i>ACB Category 2</i>		<i>ACB Category 1</i>	
<i>Anticholinergics</i> Biperidin* Procyclidine* Benzatropine	<i>Urologicals/antispasmodics</i> Tolterodine Solifenacin Oxybutynin Festoteridine	<i>Muscle Relaxants</i> Tizinadine*		<i>Analgesics</i> Codeine	<i>Antihistamines</i> Cetirizine Desloratidine Loratidine Alimemazine Cinnarizine*

*Added by consensus

All other medicines listed in the ACB scale but not reported in the data-set:

ACB 1: Asenapine, Chlortalidone, Clidinium, Clorazepate, Disopyramide, Fentanyl, Fluvoxamine, Hydralazine, Ioperidone, Paliperidone, Quinidine, Triamterine

ACB 2: Amantadine, Belladonna, Cyclobenapine, Cyproheptadine, Loxapine, Meperidine, Methotrimeprazine, Molindone, Oxcarbamazepine, Pimozide

ACB 3: Amoxapine, Brompheniramine, Carbinoxamine, Clemastine, Clozapine, Darifenacin, Desipramine, Dicylomine, Dimenhydrinate, Diphenhydramine, Fluvoxate, Meclizine, Methocarbamol, Nortriptyline, Orphenadrine, Perphenazine, Propantbeline, Propiverine, Tribexypbenidyl, Trosopium

Table DS2 Demographic and clinical characteristics by Anticholinergic Cognitive Burden (ACB) scale score categories

Characteristic	Total Population (n=736)	No-anticholinergic exposure (n=214)	ACB 1-4 (n=308)	ACB 5+ (n=214)	p-value*
Demographics					
Gender					
Male	330 (44.8)	105 (31.8)	119 (36.1)	106 (32.1)	0.013
Female	406 (55.2)	109 (26.8)	189 (46.6)	108 (26.6)	
Age group					
40-49 years	266 (36.1)	95 (35.7)	103 (38.7)	68 (25.6)	<0.001
50-64 years	336 (45.7)	102 (30.4)	143 (42.6)	91 (27.1)	
65+ years	134 (18.2)	17 (12.7)	62 (46.2)	55 (41.8)	
Level of ID †					
Mild	163 (23.9)	56 (34.4)	66 (40.5)	41 (25.2)	<0.001
Moderate	316 (46.3)	109 (34.5)	118 (37.3)	89 (28.2)	
Severe/profound	203 (29.8)	30 (14.8)	99 (48.8)	74 (36.5)	
Residential setting					
Independent	122 (16.6)	75 (61.5)	36 (29.5)	11 (9.0)	<0.001
Community group home	265 (36.0)	82 (30.9)	124 (46.8)	59 (22.3)	
Residential	349 (47.4)	57 (16.3)	148 (42.4)	144 (41.3)	
Polypharmacy Status					
No polypharmacy	341 (46.3)	181 (53.1)	138 (38.1)	22 (6.7)	<0.001
Polypharmacy (5+ medicines)	395 (53.7)	33 (8.4)	170 (43.0)	192 (48.6)	
Conditions					
Eye disease	380 (51.6)	128 (33.7)	157 (41.3)	95 (25.0)	<0.001
Mental Health‡	356 (50.4)	22 (6.2)	168 (47.2)	166 (46.6)	<0.001
Neurological **	268 (36.4)	53 (19.8)	132 (49.3)	83 (31.0)	<0.001
Gastrointestinal	198 (26.9)	32 (16.2)	88 (44.4)	78 (39.4)	<0.001
Endocrine	162 (22.0)	49 (30.2)	67 (41.4)	46 (28.4)	0.94
Joint Disease	153 (20.8)	36 (23.5)	72 (47.1)	45 (29.4)	0.21
Hypertension	112 (15.2)	26 (23.2)	43 (38.4)	43 (38.4)	0.06
Heart Disease	89 (12.1)	22 (24.7)	42 (47.2)	25 (28.1)	0.49

Data are n (%). *From χ^2 test. †54 Level of ID not verified. ‡ 30 Don't know/missing data.

**Neurological disease includes epilepsy, cerebral palsy, multiple sclerosis, Parkinson's disease, Spina bifida, muscular dystrophy, Alzheimer's disease, dementia, organic brain syndrome or senility and serious memory impairment

p<0.10 is significant for entry into multinomial logistic regression

Table DS3 Frequently reported Anticholinergic Cognitive Burden (ACB) scale medicines by those with anticholinergic exposure (n=522)

Medicine (ATC Code)	Type	N (%)	Rank
ACB 3			
Olanzapine (N05AH03)	Atypical antipsychotic	101 (19.3)	3
Biperiden (N04AA02)	Anticholinergic	85 (16.3)	4
Chlorpromazine (N05AA01)	Typical antipsychotic	70 (13.4)	6
Haloperidol (N05AD01)	Typical antipsychotic	44 (8.4)	8
Procyclidine (N04AA04)	Anticholinergic	37 (7.0)	9
Quetiapine (N05AH05)	Atypical antipsychotic	27 (5.2)	12
Paroxetine (N06AB05)	SSRI antidepressant	25 (4.8)	14
ACB 2			
Carbamazepine (N03AF01)	Mood-stabilising antiepileptic	127 (24.3)	1
ACB 1			

Risperidone (N05AX08)	Atypical antipsychotic	111 (21·3)	2
Diazepam* (N05BA01)	Benzodiazepine anxiolytic	82 (15·7)	5
Loperamide (A07DA03)	Anti-diarrhoeal	56 (10·7)	7
Escitalopram (N06AB10)	SSRI antidepressant	35 (6·7)	9
Furosemide (CA03CA01/ C03DB01)	Diuretic	33 (6·3)	10
Ipratropium (R03BB01)	Inhaled anticholinergic	31 (5·9)	11
Citalopram (N06AB04)	SSRI antidepressant	25 (4·8)	13
Alprazolam (N05BA12)	Benzodiazepine anxiolytic	22 (4·2)	15

*Oral diazepam (rectal preparations excluded)

Table DS4 Study Comparisons

Study	Population	ACB 1 medicines	ACB 2-3 medicines	ACB score 5+	Rank order of most frequent anticholinergic (AC) medicines (with corresponding ACB scores)
Present Study (2015)	736 people with ID aged 41-90 years	70% had an ACB score of 1+	50% had a definite AC medicine	29% had an ACB score 5+	1.Carbamazepine(2) 2.Risperidone(1) 3.Olanzapine(3) 4.Biperiden(3)
<i>Use of medications with anticholinergic activity and injurious falls in community-dwelling adults aged 50 years and older Richardson et al. (2015)³⁴</i>	6,666 Irish community dwelling adults over 50 years	26% had an ACB 1 medicine	4% had a definite AC medicine	Not reported	1.Hydrochlorothiazide(1) 2.Atenolol(1) 3.Bendroflumethiazide(1)
<i>Anticholinergic medication use and cognitive impairment in the older population: the medical research council cognitive function and ageing study Fox et al. (2011)²⁰</i>	12,423 community and institutional dwelling adults aged 65 years and older in England and Wales	48% had an ACB score of 1+	4% had medicines with definite AC activity	2% had an ACB score 5+	1.Furosemide(1) 2.Dextropropoxyphene(1) 3.Atenolol(1), 4.Nifedipine(1)
<i>Total anticholinergic burden and risk of mortality and cardiovascular disease over 10 years in 21,636 middle-aged and older men and women of EPIC-Norfolk prospective population study Myint et al (2014)³³</i>	21,636 adults aged 40-79 years from general practice registers in England	12.5% had an ACB score of 1	6.1% of the population had a score of 2-3	1.3% had a score of ACB 3+	Not reported