

Online Resource 3: Studies investigating medication harm in older populations						
Author/Year	Type of Study	Setting/ location	Population/age group/ (n=)	Type of medication harm	Method of detection	Medications implicated (%)
Australian studies						
Chan et al./ 2001 [26]	Prospective, cross-sectional survey	Public hospital/ Tasmania	≥75yrs admitted to hospital / (n=219)	ADE	Patient interview	CV (48.4% of ADEs) CNS (20.5%) Anti-inflammatories (10.6%) AT (5.7%) Others (15.6%)
Burgess et al. / 2005 [50]	Retrospective secondary data analysis of case series	Public and private hospitals/ WA	>60yrs admitted between 1981 and 2002/ (n= 43,380)	ADR	ICD codes	CV (17.5% of patients with ADRs) Analgesics, antipyretics and antirheumatics (16.5%) Agents affecting blood constituents (9%) Antibiotics (9%)
Paradissis et.al./ 2017 [22]	ROS	Metropolitan teaching hospital/ Brisbane	≥65yrs admitted to internal medical wards/ (n=164)	ADRin and ADRad	TT with expert panel consensus	<u>ADRin:</u> CV (41.7% of patients with ADRin) Haematological Anti-infectives CNS, Opioids and other <u>ADRad:</u> CV (48% of patients with ADRad) Haematological Other CNS
Parameswaran et al. /2017 [60]	Prospective, cross-sectional study	Two public hospitals/ Tasmania	≥65yrs admitted to hospital/ (n=1008)	ADR	Expert consensus through detailed MRR and	CV (59.5% of the drugs implicated in causing ADRs): Diuretics (23.9%) ACE-I (16.4%)

					patient interview	BB (7.1%) Antidepressants (6.9%) ATs (6.9%)
Mullan et al/ 2019 [64]	ROS	Illawarra health information platform database/ NSW	≥65yrs with and without dementia hospitalised between 1 Jan 2012 and 31 Dec 2016 / (n=228,165 admissions)	MM	ICD codes	<u>With dementia:</u> Anticoagulants (15.7% of MM) Opioids (8.6%) Antipsychotics and neuroleptics (5.5%) AntiHTN (3.9%) BB (3.4%) Insulin (2.7%) Antidepressants (2.7%) ACE-I (2.5%) BZD (2.2%) <u>Without dementia:</u> Anticoagulants (20.7%) Opioids (10%) Glucocorticoids (5.9%) Antineoplastics (5.3%) AntiHTN (4.7%) BB (4.1%) Cardiac glycosides (2.6%) Diuretics (2.1%) Insulin (2.1%) ACE-I (2.0%)
International studies						
Doucet et al./ 2002 [77]	POS	Geriatric unit at Univeristy hospital/ France	≥70 years/ (n=2814)	ADE	MRR and expert review	CV (43.7%) Psychotropic (31.1%) Antibiotics (6.6%) Anticoagulants (4.3%)
Gurwitz et al./ 2003 [87]	RCS	Ambulatory clinic patients/ USA	≥ 65 yrs/ (n=27,617)	ADE	Clinician reports, computer	CV (24.5%) Diuretics (22.1%) Nonopioid analgesics (15.4%)

					generated prompts, MRR	Hypoglycaemics (10.9%) Anticoagulants (10.2%)
Passarelli et al./2005 [37]	POS	Teaching hospital/ Brazil	≥60yrs admitted to internal medicine/ (n=186)	ADRad and ADRin	Drug surveillance	<u>ADRad:</u> Digoxin (% not specified) NSAIDs Insulin or oral antidiabetic agents <u>ADRin:</u> Diuretics Antibacterials Captopril
Hanlon et al./2006 [84]	PCS	Eleven veteran affairs hospitals – medical or surgical wards/ USA	Frail ≥65yrs/ (n=808)	ADRs	MRR	Anticoagulants (8.6% of ADRs) Diuretics (8.5%) ACE-I (6.2%) Antidiabetics/anticholinergics (6.2%) Anti-infectives/NSAIDs (5.4%) Nontricyclic antidepressants (4.8%) Digoxin (4.4%) BB (4.2%) CCB (3.8%)
Ocampo et al./2008 [53]	CSS	Hospital emergency department/ Columbia	Patients ≥60 years/ (n=400)	ADE and ADR	MRR	Antiplatelets (19.7%) Hypoglycaemics (15.9%) Diuretic (13%) NSAIDs (12%) CV (10.2%)
Cecile et al./2009 [69]	RCS	University hospital/ France	≥65yrs/ (n=823)	ADEs	MRR	AntiHTN and antiarrhythmics (23.2% of ADEs) Psychotropics (17.9%) Anti-infectives (17%)

						Diuretics (15.2%) AT (8.9%)
Trivalle et al./2010 [79]	Randomised prospective trial	Geriatric centres/ France	≥65 years/ (n=576)	ADE	MRR using checklist	CV (19.8%) Analgesics (12.8%) Antipsychotics (12%) Anticoagulants (6.4%) Antidepressants (3.8%)
Budnitz et al./2011 [6]	RCS	58 non-paediatric hospitals/ USA	≥65years presenting to emergency/ (n=estimated 99,628 cases)	ADE	National surveillance data	Haematological (42.3%) Endocrine (22.8%) CV (9.8%) CNS (9.7%) Anti-infective (3.8%)
Conforti et al./2012 [55]	PCS	University hospital/ Italy	≥65yrs admitted to hospital/ (n=1023)	ADRin and ADRad	Clinician reporting	<u>ADRad:</u> Diuretics (% not specified) AT ACE-I <u>ADRin:</u> Furosemide (71 cases) Enoxaparin (31 cases) Warfarin (17 cases) Ampicillin plus sulbactam (16 cases)
Marcum et al./2012 [56]	RCS	Veterans affairs medical centre/ USA	≥65yrs veterans/ (n=6778)	ADR	MRR and panel consensus	CV (% not specified) CNS AT Endocrine
O'Connor et al./2012 [68]	PCS	University teaching hospital/ Ireland	≥65yrs/ (n=513)	ADRs	Predictive risk score	Diuretics (25% of ADRs) BZD (18%) Opioids (18%) Anti-hypertensives (17%)
Kanaan et al./2013 [85]	RCS	Large multispecialty	≥65yrs within 45 days of discharge/	ADEs and pADEs	MRR and panel consensus	<u>ADEs:</u> CV (35.5%)

		group practice/ USA	(n=1000)			Diuretics (20.2%) Opioids (9.5%) Anti-infectives (7.9%) AT (7.4%) <u>pADEs:</u> CV (40.5%) Diuretics (23.8%) Opioids (16.7%) NSAIDs (8.3%) Anticoagulants (6.0%) Aspirin (6.0%)
Gustafsson et al./ 2016 [34]	ROS	University hospital/ Sweden	≥65 years with cognitive impairment/ (n=458)	DRP	MRR and panel consensus	CV (29.5%) Psychotropic (27.3%) Analgesic (7.6%) Respiratory (7.2%) AT (6.8%)
Carnovale et al./ 2016 [97]	OS	Nursing homes/ Italy	≥65years/ (n=1073 cases)	ADR	Physician reporting	Vaccines (37.5%) Antibacterials (21.6%) Antineoplastic (9.5%) Psycholeptics (6.7%) Anti-inflammatory (5%)
Ognibene et al./ 2018 [62]	ROS	Internal medicine unit/ Italy	≥65 years / (n=1750)	ADR	MRR	Diuretics (17.9%) AT (14.7%) CNS (9.4%)
Parekh et al./ 2018 [90]	PCS	Five teaching hospitals/ England	≥ 65yrs/ (n=1280)	MRH	Telephone interview with questionnaire, MRR	AntiHTN (22.4%) Opioids (17.2%) Diuretics (12.2%) Antibiotics (10.5%) Anticoagulants (6.6%) Laxatives (6.6%)

ACE-I is angiotensin converting enzyme inhibitors, *ADR* is adverse drug reaction, *ADRad* is adverse drug reactions causing admission, *ADRin* is inpatient adverse drug reactions, *ADE* is adverse drug event, *AntiHTN* is antihypertensives, *AT* is antithrombotics, *BB* is beta-blockers, *BZD* is benzodiazepines, *CCB* is calcium channel blockers, *CNS* is central nervous system, *CV* is cardiovascular, *DRP* is drug related problems, *ICD* is International classification

of diseases, *MM* is medication misadventure, *MRH* is medication-related harm, *MRR* is medical record review, *NSAIDs* is non-steroidal anti-inflammatory drugs, *NSW* is New South Wales, *pADEs* is preventable adverse drug events, *PCS* is prospective cohort study, *POS* is prospective observational study, *OS* is observational study, *RCS* is retrospective cohort study, *ROS* is retrospective observational study, *TT* is trigger tool, *USA* is United States of America, *WA* is Western Australia
