Big drug data for big drug trials: development, validation, and implementation of routinely-collected data on medications within large trials in cardiovascular disease and COVID-19 in England and Scotland

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APPENDIX

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Table of contents

Supplement to Chapter 2 3
Supplementary tables 3
Supplementary table S2.1 - Calculation of agreement metrics for binary events 3
Supplementary table S2.2 - Comparative studies conducted within RCTs (n=18) 5
Supplementary table S2.3 - Comparative studies conducted within observational studies outside RCTs (n=174) 13
Supplementary references 75

Supplement to Chapter 2

Supplementary tables

Supplementary table S2.1 - Calculation of agreement metrics for binary events

		Reference source	
		Yes	No
Comparator source	Yes	A (true positives)	B (false positives)
	No	C (false negatives)	D (true negatives)

Percent agreement: (A+D)/(A+B+C+D)

Sensitivity: A/(A+C)

Specificity: D/(B+D)

Positive predictive value: A/(A+B)

Negative predictive value: D/(C+D)

Cohen's Kappa (K): $K = \frac{2*(A*D-C*B)}{(A+B)*(B+D)+(A+C)*(C+D)}$

Prevalence-and-bias-adjusted-Kappa (PABAK): $PABAK = 2 * \frac{(A+D)}{A+B+C+D} - 1$

Adapted from: Byrt, Bishop, and Carlin, J Clin Epidemiol 1993

Table legends (for supplementary tables S2.2 and S2.3):

† results presented as self-report vs RCD (with RCD used as reference for sensitivity/specificity/predictive values), unless specified otherwise;
‡ where multiple agreement results are shown for the same metric, these are presented in the order of the different outcomes or analysis methods used in that particular study (as listed in the "Outcomes" and "Analysis methods (RCD)" columns)

κ – Cohen's Kappa; PABAK – prevalence-and-bias-adjusted-Kappa; SE – sensitivity; SP – specificity; PPV – positive predictive value; NPV – negative predictive value; NSAID – non-steroidal anti-inflammatory drugs

Supplementary table S2.2 - Comparative studies conducted within RCTs (n=18)

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method (RCD)	Summary results‡	Conclusion	Other comments
Grymonpre[1] (1998, Canada)	Claims data (regional – manual and electronic review), pill-counts, self-report	Elderly, 65+ years (135)	Any drug	Number of drugs	Fixed window (1 year prior)	Manual claims data (n): 981 Electronic claims data (n): 532 Pill counts (n): 816 Self-report (n): 814	Good agreement	Pill-counts underestimate adherence compared with both self-report and claims data; self-report has additional value in identifying non-adherent patients
				Number of drugs by patient (mean)		Manual claims data (n): 9.3 Electronic claims data (n): 8.7 Pill counts (n): 6.2 Self-report (n): 6.2		
				Adherence by drug (median)	Legend-time	Manual claims data (%): 94 Electronic claims data (%): 92 Pill counts (%): 69 Self-report (%): 100		
				Adherence by patient (mean)		Manual claims data (%): 100 Electronic claims data (%): 91.2 Pill counts (%): 66.9 Self-report (%): 94.4		
Saunders[2] (1998, US)	Claims data (regional), self-report	Patients initiating antidepressant drugs (164)	Antidepressants	Current use (at 1 month)	Legend-time	K: 0.33; Percent agreement: 75%	Modest to good agreement	Data on dosage frequently missing from claims data
				Current use (at 4 months)		K: 0.72; Percent agreement: 86%		
				Dose (at 1 month)		K: 0.52; Percent agreement: 83%		
				Dose (at 4 months)		K: 0.65; Percent agreement: 90%		
				Acute phase treatment adequacy		K: 0.80; Percent agreement: 91%		
Kwon[3] (2003, US)	Claims data (regional), self-report (used as reference)	Depression (164)	Antidepressants	Current use	Fixed window (90 days prior)	Sn: 0.74; Sp: 0.94 PPV: 0.90; NPV: 0.82 K: 0.69 Percent agreement: 85%	Good agreement	Self-report considered the best source; self-report better for drugs used to treat a specific indication, and claims better for specific drugs; 88% of discrepancies due to use of antidepressants for other conditions, recent discontinuations, using samples, and use “as needed”
Caskie and Willis[4] (2004, US)	Claims data (regional), self-report	Elderly people, rural, low-income	Antihistamines	Current use	Fixed window (time window not defined)	K: 0.46; Percent agreement: 95%	Good agreement	Agreement higher for drugs used in more serious conditions,
			Anti-infectives			K: 0.34; Percent agreement: 94%		
			Autonomic drugs			K: 0.71; Percent agreement: 94%		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method (RCD)	Summary results‡	Conclusion	Other comments
		(294)	Blood formation and coagulation			K: 0.82; Percent agreement: 97%		more specific classes of drugs, and healthier individuals
			Cardiovascular drugs			K: 0.83; Percent agreement: 92%		
			Central nervous system agents			K: 0.60; Percent agreement: 83%		
			Electrolytic, caloric, and water balance			K: 0.69; Percent agreement: 87%		
			Ear, eye, nose and throat preparations			K: 0.54; Percent agreement: 92%		
			Gastrointestinal drugs			K: 0.67; Percent agreement: 89%		
			Hormones and synthetic substitutes			K: 0.80; Percent agreement: 91%		
			ACE inhibitors			K: 0.90; Percent agreement: 98%		
			Cardiac glycosides			K: 0.77; Percent agreement: 97%		
			Beta-blockers			K: 0.84; Percent agreement: 95%		
			Calcium channel blockers			K: 0.91; Percent agreement: 96%		
			Antilipemic drugs			K: 0.87; Percent agreement: 96%		
			Antihypertensives			K: 0.83; Percent agreement: 98%		
			Vasolidators			K: 0.73; Percent agreement: 95%		
			NSAIDs			K: 0.63; Percent agreement: 93%		
			Opiates			K: 0.15; Percent agreement: 94%		
			Benzodiazepines			K: 0.58; Percent agreement: 92%		
Mudd[5] (2008, US)	Claims data (national), pharmacy records (local)	Children with asthma (159)	Inhaled corticosteroids	Use within past 12 months	Fixed window (12 months)	Percent agreement: 57%	Significant overlap (people captured), but low concordance	Local records include data on more people; national claims data captures more distinct events
			Leukotriene modifiers			Percent agreement: 78%		
			Short-acting beta-agonists			Percent agreement: 44%		
			Oral corticosteroids			Percent agreement: 69%		
Pit[6] (2008, Australia)	Claims data (national), self-report	Elderly, dwelling adults (566)	Benzodiazepines	Current use	Fixed window (30, 60, 90, 180, or 365 days prior)	Percent agreement: 94%; 95%; 95%; 94%; 92% PABAK: 0.88; 0.90; 0.89; 0.88; 0.84 Sn: 0.88; 0.80; 0.74; 0.66; 0.57 Sp: 0.95; 0.96; 0.97; 0.98; 0.99 PPV: 0.53; 0.68; 0.71; 0.83; 0.90 NPV: 0.99; 0.98; 0.97; 0.95; 0.92	Good-to-excellent agreement	High specificity across different drug groups and time periods; a 90-day time period closely approximates self-report current use
			Any NSAID			Percent agreement: 88%; 88%; 86%; 80%; 73% PABAK: 0.75; 0.75; 0.71; 0.61; 0.45 Sn: 0.81; 0.71; 0.64; 0.54; 0.45 Sp: 0.89; 0.93; 0.95; 0.96; 0.98 PPV: 0.58; 0.78; 0.83; 0.89; 0.95		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method (RCD)	Summary results‡	Conclusion	Other comments
						NPV: 0.96; 0.91; 0.86; 0.78; 0.66		
			Ibuprofen/ diclofenac			Percent agreement: 99%; 99%; 98%; 97%; 96% PABAK: 0.98; 0.97; 0.96; 0.94; 0.91 Sn: 0.75; 0.67; 0.56; 0.41; 0.33 Sp: 0.99; 1.00; 1.00; 1.00; 1.00 PPV: 0.69; 0.77; 0.77; 0.85; 0.92 NPV: 1.00; 0.99; 0.99; 0.97; 0.96		
			Thiazide diuretic			Percent agreement: 89%; 91%; 94%; 95%; 92% PABAK: 0.77; 0.82; 0.87; 0.89; 0.84 Sn: 0.89; 0.82; 0.83; 0.81; 0.71 Sp: 0.88; 0.93; 0.96; 0.99; 1.00 PPV: 0.46; 0.68; 0.84; 0.95; 0.99 NPV: 0.99; 0.97; 0.96; 0.95; 0.90		
			Psychothropics		Fixed window (30, 60, or 90 days prior)	Percent agreement: 89%; 92%; 92% PABAK: 0.79; 0.83; 0.83 Sn: 0.88; 0.85; 0.81 Sp: 0.89; 0.94; 0.95 PPV: 0.61; 0.77; 0.82 NPV: 0.98; 0.96; 0.95		
			Any diuretic			Percent agreement: 81%; 87%; 91% PABAK: 0.62; 0.74; 0.81 Sn: 0.90; 0.88; 0.88 Sp: 079; 0.86; 0.92 PPV: 0.46; 0.67; 0.82 NPV: 0.98; 0.96; 0.95		
			Any antihypertensive			Percent agreement: 86%; 94%; 95% PABAK: 0.72; 0.87; 0.90 Sn: 0.99; 0.97; 0.97 Sp: 0.69; 0.86; 0.90 PPV: 0.81; 0.93; 0.95 NPV: 0.98; 0.94; 0.93		
			Proton pump inhibitor/H2 receptor antagonists			Percent agreement: 89%; 94%; 94% PABAK: 0.79; 0.88; 0.87 Sn: 0.95; 0.92; 0.88 Sp: 0.87; 0.95; 0.96		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method (RCD)	Summary results‡	Conclusion	Other comments
						PPV: 0.75; 0.90; 0.93 NPV: 0.98; 0.96; 0.94		
			Antihyperglycaemic			Percent agreement: 96%; 98%; 99% PABAK: 0.93; 0.97; 0.98 Sn: 0.98; 0.98; 0.98 Sp: 0.96; 0.98; 0.99 PPV: 0.68; 0.87; 0.91 NPV: 1.00; 1.00; 1.00		
			Digoxin			Percent agreement: 95%; 97%; 98% PABAK: 0.91; 0.93; 0.95 Sn: 1.00; 0.91; 0.91 Sp: 0.95; 0.97; 0.98 PPV: 0.33; 0.57; 0.74 NPV: 1.00; 1.00; 0.99		
			Allopurinol			Percent agreement: 94%; 96%; 97% PABAK: 0.87; 0.91; 0.95 Sn: 0.86; 0.86; 0.91 Sp: 0.93; 0.96; 0.98 PPV: 0.35; 0.60; 0.79 NPV: 0.99; 0.99; 0.99		
			Warfarin			Percent agreement: 98%; 100%; 100% PABAK: 0.98; 0.98; 1.00 Sn: 1.00; 1.00; 0.97 Sp: 0.98; 0.99; 1.00 PPV: 0.70; 0.91; 1.00 NPV: 1.00; 0.99; 1.00		
Hansen[7] (2009, US)	Claims data (local), electronic monitoring (used as reference), self-report	Hypertension (492) and heart failure (314)	Cardiovascular drugs (e.g. ACE inhibitors, digoxin, beta-blockers, calcium-channel blockers, diuretics)	Adherence (continuous)	Legend-time (over 12 months)	Median adherence: 86% electronic vs 84% self-report vs 91% refill Correlation coefficient: - Self-report vs electronic: 0.31 - Self-report vs claims: 0.35 - Claims vs electronic: 0.48	Good agreement	Agreement influenced by depression, age, and comorbid conditions; claims data better approximates electronic measures (standard)
				Adherence (dichotomised at 80%)		Self-report: Sn: 0.68; Sp: 0.50; PPV: 0.67; NPV: 0.51; Percent agreement: 61% Claims:		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method (RCD)	Summary results‡	Conclusion	Other comments
						Sn: 0.87; Sp: 0.53; PPV: 0.74; NPV: 0.71; Percent agreement: 73%		
Thorpe[8] (2009, US)	Claims data (regional), self-report	Hypertension, males (562)	Antihypertensive drugs	Adherence (dichotomised at 80%)	Legend-time (90 days prior)	K: 0.19 Percent agreement: 67%	Poor agreement	Both measures have a strong association with blood pressure control but not with each other, suggesting complementary information
Cohen[9] (2010, US)	Claims data (regional), self-report (2 scales), HbA1c levels	Diabetes (526)	Antidiabetic drugs	Adherence	Legend-time (1 year prior)	HbA1c vs MPR tertiles: 8.9, 8.5, 8.6 Morisky score <2 vs MPR tertiles: 47%; 38%; 26% Missed pills on one day/week vs MPR tertiles: 35%; 31%; 14%	Good agreement	MPR better predicts glycaemic control
Rikala[10] (2010, Finland)	Claims data (national), self-report (used as reference)	Population cohort, 75+ (570)	Antipsychotics	Current use	Fixed window (4, 6, or 12 months prior)	K: 0.80; 0.81; 0.84 Sn: 0.73; 0.77; 0.84 Sp: 0.99; 0.99; 0.99	Good agreement	Agreement varied per drug type (lower for benzodiazepines); sensitivity varied with different timeframes but specificity was consistently high
			Benzodiazepines			K: 0.61; 0.67; 0.70 Sn: 0.63; 0.72; 0.90 Sp: 0.94; 0.93; 0.91		
			Antidepressants			K: 0.86; 0.88; 0.85 Sn: 0.84; 0.90; 0.93 Sp: 0.96; 0.98; 0.96		
Gordon[11] (2012, Australia)	Claims data (national), self-report	Colorectal cancer, newly-diagnosed (76)	Gastrointestinal, cardiovascular, psychiatry, respiratory drugs	Current use	Not detailed	K: 0.13 Percent agreement: 44%	Poor agreement	Under-reporting associated with receiving chemotherapy or living alone; over-reporting not associated with any sociodemographic or treatment factors
Ding[12] (2013, US)	Claims data (national), self-report	Patients discharged from ED departments with at least one prescription (1,026)	Overall	Prescription refill	Fixed window (between discharge and interview)	Sn: 0.96; Sp: 0.30	Good agreement	Claims data better for prescription vs over-the-counter drugs
			Central nervous system			Sn: 0.97; Sp: 0.32		
			Anti-infective			Sn: 0.97; Sp: 0.20		
			Respiratory			Sn: 0.87; Sp: 0.34		
			Gastrointestinal			Sn: 0.96; Sp: 0.33		
			Cardiovascular			Sn: 1.00; Sp: 0.00		
			As-needed	Yes		Sn: 0.96; Sp: 0.35		
				No		Sn: 0.96; Sp: 0.27		
			Over-the-counter	Yes		Sn: 0.94; Sp: 0.35		
				No		Sn: 0.97; Sp: 0.27		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method (RCD)	Summary results‡	Conclusion	Other comments
Tommelein[13] (2014, Belgium)	Claims data (local); self-report	COPD (613)	COPD inhalers (maintenance therapy)	Adherence (continuous)	Legend-time	Correlation coefficient: 0.10	Poor agreement	
Taipale[14] (2016, Finland)	Claims data (national), self-report	Community-dwelling adults (569)	Proton-pump inhibitors	Any recent use, or current use (last 2 weeks)	Legend-time	K: 0.78, 0.74 Sn: 0.80, 0.85; PPV: 0.80; 0.68	Very high agreement	Agreement poor for over-the-counter and as needed use (NSAIDs, paracetamol, benzodiazepines)
			Antidiabetics			K: 0.98; 0.98 Sn: 0.97; 0.97; PPV: 1.00; 1.00		
			Insulins			K: 1.00; 1.00 Sn: 1.00; 1.00; PPV: 1.00; 1.00		
			Oral antidiabetics			K: 0.97; 0.97 Sn: 0.95; 0.95; PPV: 1.00; 1.00		
			Antithrombotic drugs			K: 0.92; 0.92 Sn: 0.93; 0.93; PPV: 0.96; 0.96		
			Digitalis			K: 0.93; 0.93 Sn: 0.95; 0.95; PPV: 0.92; 0.92		
			Organic nitrates			K: 0.82; 0.89 Sn: 0.81; 0.99; PPV: 0.98; 0.87		
			Diuretics			K: 0.89; 0.90 Sn: 0.93; 0.93; PPV: 0.93; 0.93		
			Beta-blocking agents			K: 0.93; 0.93 Sn: 0.97; 0.97; PPV: 0.98; 0.97		
			Calcium-channel blockers			K: 0.89; 0.89 Sn: 0.93; 0.94; PPV: 0.91; 0.91		
			Agents acting on the renin-angiotensin system			K: 0.92; 0.93 Sn: 0.98; 0.98; PPV: 0.93; 0.93		
			Lipid-modifying agents			K: 0.95; 0.95 Sn: 0.95; 0.95; PPV: 0.98; 0.98		
			Drugs for urinary incontinence			K: 0.81; 0.83 Sn: 0.75; 0.79; PPV: 0.88; 0.88		
			Drugs for benign prostatic hypertrophy			K: 0.94; 0.94 Sn: 0.98; 0.98; PPV: 0.92; 0.92		
			Levothyroxine			K: 0.96; 0.96 Sn: 0.93; 0.93; PPV: 1.00; 1.00		
			NSAIDs			K: 0.43; 0.37 Sn: 0.42; 0.81; PPV: 0.63; 0.27		
			Allopurinol			K: 0.90; 0.95 Sn: 0.88; 0.97; PPV: 0.94; 0.94		
			Drugs for treatment of bone			K: 0.90; 0.90 Sn: 0.92; 0.92; PPV: 0.91; 0.91		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method (RCD)	Summary results‡	Conclusion	Other comments
			diseases/bisphosphonates					
			Opioids			K: 0.69; 0.57 Sn: 0.56; 1.00; PPV: 0.90; 0.40		
			Paracetamol			K: 0.15; 0.25 Sn: 0.14; 0.25; PPV: 0.83; 0.36		
			Antipsychotics			K: 0.90; 0.92 Sn: 0.88; 0.91; PPV: 0.94; 0.94		
			Benzodiazepines and related			K: 0.70; 0.66 Sn: 0.71; 0.89; PPV: 0.89; 0.63		
			Antidepressants			K: 0.81; 0.83 Sn: 0.76; 0.78; PPV: 0.93; 0.93		
			Anti-dementia drugs			K: 0.95; 0.95 Sn: 0.91; 0.91; PPV: 1.00; 1.00		
			Drugs for obstructive airway disease			K: 0.83; 0.84 Sn: 0.81; 0.91; PPV: 0.90; 0.80		
			Adrenergics, inhalations			K: 0.71; 0.70 Sn: 0.64; 0.86; PPV: 0.85; 0.61		
			Other drugs for obstructive airway diseases, inhalations			K: 0.86; 0.85 Sn: 0.85; 0.89; PPV: 0.89; 0.84		
			Anti-glaucoma preparations			K: 0.91; 0.91 Sn: 0.98; 0.98; PPV: 0.86; 0.86		
Mehta[15] (2019, US)	Claims data (national), electronic monitoring	Post acute myocardial infarction (682)	Statins	Adherence (continuous); split by 3 definitions of drug adherence (strict, intermediate, relaxed)	Legend-time (over 12 months)	Correlation coefficient: - Strict: 0.21 - Intermediate: 0.14 - Relaxed: 0.17	Modest agreement	Improved adherence using either measure is associated with improved outcomes, which is stronger for electronic monitoring
			Multi-drug regimen (statins + beta-blockers + antiplatelet agent)			Correlation coefficient: - Strict: 0.32 - Intermediate: 0.09 - Relaxed: 0.13		
Fanaroff[16] (2020, US)	Claims data (regional), self-report, serum drug levels (in a subset)	Post myocardial infarction (8,373)	P2Y12 inhibitors	Non-adherence (30+ day gap)	Legend-time	Claims vs self-report: Sn: 0.25; Sp: 0.96 PPV: 0.75; NPV: 0.73	Poor agreement	Claims data underestimates and self-report overestimates adherence compared with an objective measurement; non-adherence measured by either claims or self-report associated with poor outcomes; switch to non-persistent status by claims
						Claims/self-report vs drug levels: K: 0.00-0.19 (claims data vs serum levels); 0.11-0.23 (self-report vs serum levels)		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method (RCD)	Summary results‡	Conclusion	Other comments
								data associated with reporting switching pharmacies
Lauffenburger[17] (2020, US)	Claims data, self-report	Uncontrolled diabetes, cholesterol, or blood pressure (459)	Antihypertensives, antidiabetics, antidyslipidemics	Non-adherence (<80%) in last 30 days (assessed 1 year after randomisation)	Legend-time (calculated based on 1 or 12 months prior)	Sn: 0.25, 0.24, Sp: 0.83, 0.87, PPV: 0.59, 0.80, NPV: 0.52, 0.34	Poor agreement	Agreement poor regardless of timeframe used for analysis
Hammill[18] (2022, US)	Claims data (national), study case-report form (used as reference)	Diabetes (139)	ACE inhibitors	Current use (at randomisation)	Legend-time method (using 1 year prior)	Percent agreement: 77% Sn: 0.73; Sp: 0.74 PPV: 0.73; NPV: 0.74	Good agreement, but incomplete substitute	Low sensitivity but high specificity; claims data may be a better standard than trial data for medications; claims data substantially better in comparison with electronic health records; claims data only available for a fraction of participants and would require contracting with 12 different providers (included Medicare only)
			Angiotensin receptor blockers			Percent agreement: 87% Sn: 0.82; Sp: 0.89 PPV: 0.77; NPV: 0.91		
			P2Y12 inhibitor			Percent agreement: 85% Sn: 0.94; Sp: 0.80 PPV: 0.71; NPV: 0.97		
			Anti-hyperglycemic medication			Percent agreement: 93% Sn: 0.93; Sp: N/A PPV: 1.00; NPV: 0.00		
			DDP4 inhibitors			Percent agreement: 74% Sn: 0.83; Sp: 0.72 PPV: 0.28; NPV: 0.97		

Supplementary table S2.3 - Comparative studies conducted within observational studies outside RCTs (n=174)

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed		Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
Johnson[19] (1991, US)	Claims data (local), home-visit	Frail, >65 years (83)	Prescription drugs	Cardiac agents	Current use	Fixed window (3 months prior)	Sn: 0.81; Sp: 0.98; PPV: 0.97	Automated prescription system considered adequate	Agreement lower for non-prescription drugs
				Diuretics			Sn: 0.77; Sp: 0.92; PPV: 0.87		
				Analgesics			Sn: 0.80; Sp: 0.98; PPV: 0.87		
				Psychotropics			Sn: 0.92; Sp: 0.88; PPV: 0.76		
				Cardiovascular			Sn: 0.78; Sp: 0.98; PPV: 0.95		
				Potassium replacements			Sn: 0.81; Sp: 0.96; PPV: 0.81		
				Anti-inflammatories			Sn: 0.83; Sp: 0.94; PPV: 0.71		
				Antiasthmatics			Sn: 0.92; Sp: 0.96; PPV: 0.79		
				Sedative/hypnotics			Sn: 0.83; Sp: 0.96; PPV: 0.77		
				Anti-infectives			Sn: 0.73; Sp: 0.88; PPV: 0.47		
				GI (other than anti-ulcer specifics)			Sn: 0.70; Sp: 0.93; PPV: 0.58		
				Anti-Parkinson's			Sn: 1.00; Sp: 1.00; PPV: 1.00		
				Anti-ulcer specifics			Sn: 1.00; Sp: 1.00; PPV: 1.00		
				Ear-Nose-Throat preparations			Sn: 0.71; Sp: 0.93; PPV: 0.50		
				Thyroid agents			Sn: 0.71; Sp: 1.00; PPV: 1.00		
				Hormones			Sn: 0.67; Sp: 1.00; PPV: 1.00		
				Anticonvulsants			Sn: 1.00; Sp: 0.99; PPV: 0.83		
				Skin preparations			Sn: 0.50; Sp: 0.91; PPV: 0.22		
			Non-prescription drugs	Analgesics			Sn: 0.25; Sp: 0.98; PPV: 0.90		
				Laxatives			Sn: 0.64; Sp: 0.83; PPV: 0.62		
				Vitamins			Sn: 0.40; Sp: 0.92; PPV: 0.62		
				Electrolyte/minerals			Sn: 0.57; Sp: 0.96; PPV: 0.73		
				Insulins			Sn: 0.50; Sp: 1.00; PPV: 1.00		
				GI (other than laxatives)			Sn: 0.33; Sp: 0.96; PPV: 0.33		
				Antihistamines			Sn: N/A; Sp: 1.00; PPV: N/A		
				Skin preparations			Sn: N/A; Sp: 0.95; PPV: N/A		
Van den Brandt [20] (1991, Netherlands)	Claims data (national; used as reference), self-report	Population cohort, 55-69 years (207)	Any drug		Current use	Fixed window (2.5 years prior)	Sn: 0.61	Self-report underestimates drug exposure	Sensitivity decreased with age and total number of drugs used, and increased with duration of use
			Alimentary tract/central nervous system				Sn: 0.52		
			Cardiovascular system				Sn: 0.66		
			Other				Sn: 0.61		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
								and at higher drug group levels; cardiovascular drugs better reported than central nervous system/psychiatry and gastroenterology
Heerdink[21] (1995, Netherlands)	Claims data (local), prescription data (local); home-visit (used as reference)	Adults 65+ (100)	Any drug	Current use	Fixed window (2 years prior for claims data; 6 months for prescription data)	Sn: 0.79 (self-report vs claims); 0.39 (self-report vs GP data)	Reasonable agreement for claims vs self-reported	Older prescription (>3 months ago) more likely to represent discrepancies; GP data misses many self-reported drugs (potentially those prescribed in hospital), and seems less complete than claims data
			Cardiovascular drugs			Sn: 0.83 (self-report vs claims); 0.53 (self-report vs GP data)		
			Analgesics			Sn: 0.70 (self-report vs claims); 0.23 (self-report vs GP data)		
			Psychotropics			Sn: 0.81 (self-report vs claims); 0.30 (self-report vs GP data)		
			Respiratory drugs			Sn: 0.68 (self-report vs claims); 0.52 (self-report vs GP data)		
West [22] (1995, US)	Claims data (regional; used as reference), self-report	Random sample from healthcare group, 50-80 years (520)	NSAIDs	Current use – any NSAID	Fixed window (12 years prior)	Sn: 0.57; Sp: 0.95	Self-report underestimates drug exposure, with no evidence of over reporting	Sensitivity increased if use stopped more recently
				Current use - specific NSAID name		Sn: 0.30		
				Current use - specific NSAID name and dose		Sn: 0.15		
			Non-contraceptive estrogens	Current use - specific estrogen		Sn: 0.78		
				Current use - specific estrogen drug and dose		Sn: 0.26		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
Norell[23] (1998, Sweden)	Claims data (local), self-report	Healthy women, 20-34 years (427)	Oral contraceptives	Current use	Fixed window	Sn: 0.97; Sp: 0.88 PPV: 0.76; NPV: 0.99 K: 0.78	Good agreement	Self-report may be more accurate for current use (if collecting pills from pharmacies not covered by the data collection); claims data preferred to assess duration over longer time periods, but no evidence of underreporting use
				Duration of use	Fixed window (any time point)	Correlation coefficient: 0.78 (higher for more recent time periods)		
				Time since first use		Correlation coefficient: 0.93		
				Time since last use		Correlation coefficient: 0.84		
Sjahid[24] (1998, Netherlands)	Claims data (local), self-report	Cohort study, 55+ years (1682)	Atenolol	Current use	Fixed window (6 months prior) or legend-time	K: 0.96, 0.97	Good agreement	Agreement varied greatly per individual drug
			Hydrochlorothiazide + potassium-sparing diuretic			K: 0.91, 0.91		
			Digoxin			K: 0.96, 0.95		
			Frusemide			K: 0.90, 0.86		
			Metoprolol			K: 0.97, 0.97		
			Enalapril			K: 0.93, 0.93		
			Nitroglycerin			K: 0.53, 0.31		
			Nifedipine			K: 0.93, 0.93		
			Isosorbide mononitrate			K: 0.87, 0.82		
			Isosorbide dinitrate			K: 0.87, 0.82		
			Epitizide + potassium-sparing diuretic			K: 0.84, 0.87		
			Organo-heparinoid			K: 0.26, 0.27		
			Cardiac drugs			Percent agreement: 92%		
			Antihypertensives			Percent agreement: 91%		
			Diuretics			Percent agreement: 93%		
			Peripheral vasodilators			Percent agreement: 95%		
			Vasoprotective drugs			Percent agreement: 35%		
			Beta-blockers			Percent agreement: 98%		
			Calcium channel blockers			Percent agreement: 94%		
			ACE inhibitors			Percent agreement: 94%		
Choo[25] (1999, US)	Pharmacy database (local),	Hypertensio n	Antihypertensives	Adherence (continuous); calculated in	Legend-time (1 year previous)	Pharmacy data (PDC) vs electronic monitoring: r = 0.32 Pill counts vs electronic monitoring:	Modest correlation for pharmacy data	Self-reported adherence is poorly reported,

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
	manual pill counts, electronic monitoring	monotherapy (286)		pharmacy data using proportion of days covered (PDC); self-reported questionnaire pertaining to past week		r = 0.52 Pharmacy data (PDC) vs self-report: - Days forgotten in past week: 0: 0.99; 1: 0.90; 2+: 061 - Days missed on purpose: 0: 0.98; 1+: 0.75 - Days added an extra pill: 0: 0.98; 1+: 0.95 - "take less medicine as not needed": Yes: 0.74; No: 0.98 - how regularly forgetting to take medication: Never: 1.01; almost never: 0.99; more than almost never: 0.85	vs objective measures of adherence	but non-adherence not so much; adherence is better if measured in terms of quantity vs timing
Langendam[26] (1999, Netherlands)	Disease registry, self-report	Drug users (505)	Methadone	Current dosage (categorical)	Most up-to-date record at the time of the interview	K: 0.94 Correlation: 0.97	Accurate reporting	Low methadone dosage, lower education, and depressive/euphoric mood during the interview associated with incorrect reporting
Klungel[27] (1999, Netherlands)	Claims data (local), self-report	Hypertensive, 20-59 years (372)	Any antihypertensive	Current use (specific drug)	Legend-time or fixed window (any time point)	K: 0.67; 0.84	Good agreement	Self-report can be used reliably, but claims preferred for older individuals; legend-time has lower agreement (as it relies on assumptions about adherence)
			Diuretics			K: 0.79; 0.91		
			Beta-blockers			K: 0.70; 0.83		
				Current use (any drug)		K: 0.82; 0.95		
			Other antihypertensives			K: 0.80; 0.93		
Bronstein[28] (2000, US)	Claims data (regional), electronic medical records (used as reference)	Asthmatic children (98)	Nebulizer treatment	Current use	Exact link (patient, provider, date)	PPV: 0.88; NPV: 0.97	Good agreement	Claims may miss events that are not billed, but may be a better depiction of actual medication availability/consumption than

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
								medical records as some prescriptions may not be filled
Klungel[29] (2000, Netherlands)	Claims data (local), self-report	Hypertensive, 20-59 years, (372)	Antithrombotics, antihypertensives, lipid lowering drugs, antidiabetics, oral contraceptives	Current use (specific drug)	Legend-time	Sn: 0.71; PPV: 0.67	Good agreement	Sensitivity is improved with direct versus open questions
McKenzie[30] (2000, US)	Claims data (national), medical records (used as reference)	Nursing home residents (692)	Antipsychotics	Current use	Fixed window (3 months)	Percent agreement: 96%; K: 0.89 PPV: 0.90; NPV: 0.98	Acceptable agreement	
			Antidepressants			Percent agreement: 98%; K: 0.95 PPV: 0.94; NPV: 0.99		
			Benzodiazepines			Percent agreement: 95%; K: 0.79 PPV: 0.86; NPV: 0.97		
Erickson[31] (2001, US)	Claims data (regional), self-report	Asthma, adults (100)	Metered-dose inhalers	Adherence (continuous)	Legend-time	Percent agreement: 75.5% Correlation coefficient: 0.35	Moderate agreement	Concordance highest for non-adherence - self-report can be used as a screening tool
King[32] (2001. Australia)	Claims data (national), nursing home records (used as reference)	Nursing home residents (898)	Alimentary tract and metabolism	Current use (last 7 days)	Fixed window (12 weeks prior)	Sn: 0.27; PPV: 0.57	Variable agreement	3 month period maximises agreement;
			H2 receptor antagonists			Sn: 0.65; PPV: 0.82		
			Laxatives			Sn: 0.10; PPV: 0.30		
			Bisacodyl			Sn: 0.26; PPV: 0.23		
			Senna glycosides, combinations			Sn: 0.02; PPV: 1.00		
			Blood and blood forming organs			Sn: 0.34; PPV: 0.74		
			Aspirin			Sn: 0.24; PPV: 0.90		
			Cardiovascular system			Sn: 0.51; PPV: 0.83		
			Digoxin			Sn: 0.43; PPV: 0.89		
			Furosemide			Sn: 0.47; PPV: 0.91		
			Dermatologicals			Sn: 0.44; PPV: 0.10		
			Genito urinary system and sex hormones			Sn: 0.66; PPV: 0.69		
			General anti-infectives for systemic use			Sn: 0.62; PPV: 0.18		
			Musculo-skeletal system			Sn: 0.65; PPV: 0.70		
			Nervous system			Sn: 0.60; PPV: 0.72		
			Paracetamol			Sn: 0.51; PPV: 0.50		
			Antipsychotics			Sn: 0.59; PPV: 0.77		
			Temazepam			Sn: 0.77; PPV: 0.78		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
			Respiratory system			Sn: 0.53; PPV: 0.53		
			Sensory organs			Sn: 0.65; PPV: 0.55		
			Total (administered medications)			Sn: 0.48; PPV: 0.56		
Maselli[33] (2001, US)	Claims data (regional), medical records (used as reference)	Children with pharyngitis (422) or acute bronchitis (497)	Total (medication orders)	Current use	Fixed window (2 days for pharyngitis; 10 for bronchitis)	Sn: 0.41; PPV: 0.66	Accurate source	
			Antibacterials (bronchitis)			Sn: 0.79; Sp: 0.84; NPV: 0.98 Percent agreement: 79%		
Reijneveld[34] (2001, Netherlands)	Claims data (local), self-report	Convenience sample of men (899)	Prescription drugs	Current use	Fixed window (3 months prior)	K: 0.60	Self-report provides valid estimates	Agreement better for people with higher educational and occupational status, but not income
Monster[35] (2002, Netherlands)	Claims data (local), self-report	Adults, 28-75 years (8,592)	Antihypertensives	Current use	Fixed window (1 year prior)	K: 0.69; Sn: 0.89; PPV: 0.62	Good agreement	Agreement better for chronically used drugs, poorer for those used for short periods, as needed, or over-the-counter
			Lipid-lowering drugs			K: 0.81; Sn: 0.85; PPV: 0.79		
			Oral antidiabetics			K: 0.75; Sn: 0.71; PPV: 0.82		
			Nitrates			K: 0.37; Sn: 0.35; PPV: 0.44		
			Oral contraceptives			K: 0.62; Sn: 0.80; PPV: 0.64		
			Hormone replacement therapy			K: 0.49; Sn: 0.60; PPV: 0.46		
			NSAIDs, aspirin and paracetamol			K: 0.21; Sn: 0.37; PPV: 0.64		
Metlay (2003, US)[36]	Claims data (national), self-report (used as reference)	Adults (103)	Antimicrobials	Current-use	Fixed window (6 months prior)	Percent agreement: 83% Sn: 0.53; Sp: 0.88	Agreement good and comparable across drug classes	Agreement/detection for self-reported drugs varies with interview method
			Cardiovascular drugs			Percent agreement: 70% Sn: 0.20; Sp: 0.88		
			NSAIDs			Percent agreement: 78% Sn: 0.77; Sp: 0.78		
Boudreau[37] (2004, US)	Claims data (regional), self-report	Breast cancer (case-control study) (403)	Antihypertensives	Past use (in the last 6 months, 2 years, or 8 years) , split between cases and controls	Fixed window, 2 or more records (6 months, 2 years, or 8 years prior)	Sn: 0.92 (6 months); 0.87-0.90 (2 years); 0.79-0.80 (8 years) Sp: 0.91-0.93; 0.95-0.97; 1.00	Good agreement	Agreement better for cardiovascular versus antidepressant drugs and not altered by breast cancer status
			Statins			Sn: 0.83-0.93; 0.75-0.86; 0.67-0.75 Sp: 0.98; 0.99; 0.99-1.00		
			Antidepressants			Sn: 0.64-0.66; 0.56-0.58; 0.44-0.49 Sp: 0.98; 0.97-0.99; 1.00		
			Antihypertensives	Duration of use (within		Intraclass correlation coefficient: 0.85-0.86; 0.89-0.90		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
			Statins	last 6 months or 2 years), split between cases and controls	Fixed window (6 months or 2 years prior)	Intraclass correlation coefficient: 0.85-0.86; 0.85-0.89		
			Antidepressants			Intraclass correlation coefficient: 0.67-0.77; 0.74-0.81		
Løkkegaard [38] (2004, Denmark)	Claims data (national), self-report	Population cohort, nurses (2,694)	Hormone replacement therapy	1993 Current use	Fixed window (up until 1993)	Sn: 0.78; Sp: 0.98	Good agreement	No differences based on demography or lifestyle
				1999 Current use	Fixed window (up until 1999)	Sn: 0.74; Sp: 0.98		
				1999 Past use		Sn: 0.60; Sp: 0.93		
Wang[39] (2004, US)	Claims data (regional), self-report	Hypertensive (200)	Antihypertensives (monotherapy)	Adherence (continuous) in the last 12 months	Legend-time	Correlation coefficient: 0.15	Poor agreement	Fewer visits associated with overstated compliance
				Adherence (dichotomised at 80%) in last 12 months	Legend-time	K: 0.12 Percent agreement: 19% (positive), 22% (negative)		
Boudreau[40] (2005, US)	Claims data (regional), self-report	One chronic condition, 67+ years (3,610)	Antidepressants	Current use (patients with vs without drug benefits)	Fixed window, 2 or more records (within 12 months prior), combined with legend-time method (for current availability)	K: 0.74-0.78; PABAK: 0.91-0.90	Good agreement	Patients on no drug benefits show lower agreement between sources
			Antihypertensives			K: 0.43-0.63; PABAK: 0.51-0.69		
			Acid suppressants			K: 0.64-0.83; PABAK: 0.86-0.90		
			Cardiac			K: 0.82-0.88; PABAK: 0.92-0.95		
			Diabetic			K: 0.83-0.84; PABAK: 0.89-0.85		
			Hormone therapy			K: 0.75-0.83; PABAK: 0.88-0.92		
			Lipid lowering			K: 0.74-0.84; PABAK: 0.83-0.87		
Fairley[41] (2005, Australia)	Claims data (local), self-report	HIV (448)	Antiretroviral therapy	Adherence (continuous) in last 28 days	Legend-time	Self-report: 98.6%; Claims: 96.2%	Self-report correlates well with claims data; both predict viral load suppression	Claims data more closely approximates viral load for adherences of up to 99%; self-report more close if 99-100% adherence
Guenette[42] (2005, Canada)	Claims data (local), self-report	65+ (189)	Any drug	Adherence (dichotomised at 80%)	Legend-time (during 4 fills)	K: 0.16; Percent agreement: 29% (positive), 57% (negative) Negative percent agreement: 57%	Poor agreement	Claims data can overestimate adherence similarly to self-report;
			Statins			K: 0.04		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
						Percent agreement: 11% (positive), 84% (negative)		disagreement mostly due to incorrect classification of non-adherents; agreement poorer for non-tablet forms, more than once-daily dosing, and older individuals
			Antiplatelets			K: 0.43 Percent agreement: 50% (positive), 93% (negative)		
			Beta-blockers			K: 0.38 Percent agreement: 47% (positive), 89% (negative)		
			Thyroid hormones			K: -0.1 Percent agreement: 22% (positive), 92% (negative)		
			ACE inhibitors			K: -0.12 Percent agreement: 0% (positive), 88% (negative)		
			Dihydropyridines			K: 0.14 Percent agreement: 22% (positive), 91% (negative)		
			Proton pump inhibitors			K: 0.34 Percent agreement: 44% (positive), 88% (negative)		
			Estrogens			K: 0.20 Percent agreement: 31% (positive), 77% (negative)		
			Angiotensin-receptor blockers			K: -0.05 Percent agreement: 0% (positive), 95% (negative)		
			Vitamin D and analogs			K: 0.50 Percent agreement: 22% (positive), 80% (negative)		
			Calcium			K: -0.01 Percent agreement: 29% (positive), 67% (negative)		
Schootman[43] (2005, US)	Cancer registry (national), self-report	Women 65+ years with breast cancer (307)	Hormonal therapy	Current use	Not specified	Percent agreement: 79% K: 0.54; PABAK: 0.57 Sn: 0.87; Sp: 0.66; PPV: 0.79; NPV: 0.78	Almost perfect agreement	
				Ever use		Percent agreement: 82% K: 0.61; PABAK: 0.64 Sn: 0.97; Sp: 0.61; PPV: 0.78; NPV: 0.92		
			Chemotherapy	Ever use		Percent agreement: 98% K: 0.93; PABAK: 0.96		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
						Sn: 0.96; Sp: 0.94; PPV: 0.91; NPV: 0.96		
Seaton[44] (2005, US)	Claims data (national), medical records	Heart failure (87)	All drugs assessed	Current use	Legend-time method	Percent agreement: 83%	Significant disagreement	
			Nitrate/hydralazine			Percent agreement: 97%		
			ARB			Percent agreement: 86%		
			Digoxin			Percent agreement: 85%		
			Spironolactone			Percent agreement: 85%		
			Diuretics			Percent agreement: 82%		
			Beta-blocker			Percent agreement: 77%		
			ACE inhibitor			Percent agreement: 72%		
Shenson[45] (2005, US)	Claims data (national)+ medical record review, self-report	Community-dwelling, 65+ (135)	Pneumococcal vaccination	Ever use (up to 1997)	Fixed window	Percent agreement: 80%; Sn: 0.75; Sp: 0.83	Good agreement	
Wogelius[46] (2005, Netherlands)	Claims data (national), parental self-report	Children with asthma (1273)	Inhaled beta2 agonists, inhaled corticosteroids, or both combined	Past use	Fixed window (12 months prior)	Sn: 0.92; Sp: 0.96; PPV: 0.64; NPV: 0.99	High agreement	
Caskie[47] (2005, US)	Claims data (regional), self-report	Adults (430)	ACE inhibitors	Current use	Legend-time (medication available until up to one week before assessment)	Sn: 0.95; PPV: 0.79	Good agreement	Self-report has better sensitivity when compared with claims (versus opposite comparison) – possibly due to non-compliance and use of medication samples; sensitivity is similar in both directions; younger and healthier individuals show better agreement
			Antidepressants			Sn: 0.86; PPV: 0.77		
			Anti-infectives			Sn: 0.63; PPV: 0.60		
			Antilipemics			Sn: 0.96; PPV: 0.79		
			Beta-blockers			Sn: 0.89; PPV: 0.83		
			Calcium-channel blockers			Sn: 0.94; PPV: 0.79		
			Cardiac agents			Sn: 0.86; PPV: 0.64		
			Diuretic agents			Sn: 0.97; PPV: 0.80		
			Diabetic agents			Sn: 0.94; PPV: 0.82		
			Diuretics			Sn: 0.82; PPV: 0.58		
			Estrogens			Sn: 0.71; PPV: 0.73		
			Gastrointestinal agents			Sn: 0.73; PPV: 0.59		
			Glucocorticoids			Sn: 0.67; PPV: 0.53		
			NSAIDs			Sn: 0.53; PPV: 0.65		
			Salicylates			Sn: 0.40; PPV: 0.38		
			Thyroid replacement			Sn: 0.94; PPV: 0.79		
			All medications			Percent agreement: 58%		
Curtis[48] (2006, US)	Claims data (regional),	Steroid-induced	Alendronate	Current use	Fixed window (6 months prior)	Sn: 0.74; Sp: 0.99; PPV: 0.93; NPV: 0.96 K: 0.80	High agreement	Agreement lower with lower income and
			Risendronate			Sn: 0.70; Sp: 1.00; PPV: 0.91; NPV: 0.98		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
	self-report (used as reference)	osteroporosis (2,363)				K: 0.78		education level; optimal interval for assessment using claims data is 120-180 days
			Calcitonin			Sn: 0.56; Sp: 1.00; PPV: 0.78; NPV: 0.99 K: 0.64		
			Raloxifene			Sn: 0.65; Sp: 1.00; PPV: 0.77; NPV: 1.00 K: 0.70		
Du[49] (2006, US)	Claims data (national), medical records (used as reference)	Women aged 65+ with breast cancer (1228)	Chemotherapy	Past use (within 6 months of diagnosis)	Fixed window (6 months)	Percent agreement: 94% K: 0.69	Good agreement	Medical records could miss chemotherapy events if received outside the local area (which would be captured in the national claims data)
Fiscella[50] (US, 2006)	Claims data (national), self-report	65+ adults (18,315)	Influenza vaccination	Use in the previous year	Fixed window (1 year)	White ethnicity: 47.1% claims vs 72.8% self-report	Large variation	Unclear which source is more accurate
						Minority ethnicity: 27.2% claims vs 60.6% self-report		
Guerriere[51] (2006, Canada)	Claims data (regional), self-report	Cystic fibrosis (110)	Insulin	Current use	Not specified	K: 0.64 Percent agreement: 95%	Moderate-substantial agreement	
			Antibiotics/antifungals (amoxicillin, apo-sulfatrim, cefuroxime, cephalexin, ciprofloxacin, cloxacillin, tobramycin, and nystatin)			K: 0.62 Percent agreement: 81%		
			Gastrointestinal therapy (domperidone, digestive enzymes, ranitidine, omeprazole, and multivitamins)			K: 0.57 Percent agreement: 78%		
			Pulmonary therapy (beclomethasone, budesonide, fenoterol, sodium cromoglycate, ipratropium, prednisone, salbutamol)			K: 0.55 Percent agreement: 78%		
Grymonpre[52] (2006, Canada)	Claims data (regional), pill counts	Convenience sample, 65+ years (151)	Any medication	Adherence (continuous or categorical)	Legend-time, 2 different methods: cumulative medication acquisition (CMA) and cumulative	1. Analysis by patient: - Continuous adherence: Spearman's r: 0.34 (CMA), -0.51 (CMG) - Categorical adherence: Spearman's r: 0.23 (CMA), 0.26 (CMG) Percent agreement: 43% (CMA), 52% (CMG)	Good agreement despite using metrics that capture different behaviours	Potential issues with using "days-supply" field to estimate adherence for "as-needed" medications or

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
					medication gap (CMG)	2. Analysis by drug: - Continuous adherence: Pill-count: 100% CMA: 99.1% Spearman's r: 0.32 (CMA), -0.40 (CMG) - Categorical adherence: Spearman's r: 0.15 (CMA), 0.26 (CMG) Percent agreement: 79% (CMA), 85% (CMG)		non-discrete dose forms (liquids, topical formulations)
			ACE inhibitors			- Continuous adherence: Pill-count: 100% CMA: 100% Spearman's r: 0.29 (CMA), -0.40 (CMG) - Categorical adherence: Spearman's r: 0.14 (CMA), 0.49 (CMG) Percent agreement: 88% (CMA), 95% (CMG)		
			High-ceiling diuretics			- Continuous adherence: Pill-count: 100% CMA: 97.1%		
			Cholesterol-lowering drugs			- Continuous adherence: Pill-count: 96.9% CMA: 99.4%		
			Calcium-channel blockers			- Continuous adherence: Pill-count: 101.2% CMA: 101%		
			Beta-blockers			- Continuous adherence: Pill-count: 100.7% CMA: 99.8%		
			Low-ceiling diuretics			- Continuous adherence: Pill-count: 101.2% CMA: 102.9%		
			Cardiac glycosides			- Continuous adherence: Pill-count: 101% CMA: 98.8%		
			Thyroid			- Continuous adherence: Pill-count: 100% CMA: 97%		
			Non-opioids			- Continuous adherence: Pill-count: 100.8%		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
						CMA: 99.6%		
			Vasolidators			- Continuous adherence: Pill-count: 98.4% CMA: 96.5%		
			NSAIDs			- Continuous adherence: Pill-count: 100% CMA: 90.4%		
			Top 10 most common drugs			- Continuous adherence: Pill-count: 100% CMA: 99.1%		
Kavanagh[53] (2006, Ireland)	Misuse drug registry (national), medical records (used as reference)	Methadone user (452)	Methadone	Past use	Fixed window (1 year)	Sn: 0.61	Registry is incomplete	Several inaccurate variables
Kolasa[54] (2006, US)	Immunisation registry (regional), medical records (used as reference)	Children 19-35 months (620)	4:3:1:3 immunization (4 doses of diphtheria, tetanus toxoids, and pertussis vaccine, 3 doses of poliovirus vaccine, 1 dose of measles-mumps-rubella vaccine, and 3 doses Haemophilus influenza type b vaccine)	Any previous use	Fixed window	Coverage (individuals): 92% K: 0.58	Good agreement	Agreement better for hospital based immunisations (K: 0.81); worse for paediatric practice (K: 0.37) and family practice (K: 0.63) Agreement better for direct (K: 1.00) and electronic entry (K: 0.72) vs manual logs (K: 0.42) or manual billing (K: 0.65)
Uiters[55] (2006, Netherlands)	Primary care data survey (national), self-report	General population (7,012)	All prescribed medications (excluding contraceptives and over-the-counter)	Current use (last 14 days); by ethnicity	Fixed window (14 days prior)	Dutch: K: 0.23; Percent agreement: 63% Moroccan: K: 0.16; Percent agreement: 66% Turkish: K: 0.22; Percent agreement: 67% Antilles: K: 0.21; Percent agreement: 65%	Slight agreement	No ethnic differences in agreement

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
						Surinamese: K: 0.22; Percent agreement: 59%		
Brown[56] (2007, US)	Claims data (regional), self-report	Adults 45+ years (7,918)	Lipid-lowering	Current use	Fixed window (60 days before or after)	Sn: 0.94; Sp: 0.96; PPV: 0.54; NPV: 1.00 K: 0.67	Good agreement	Sensitivity decreases and specificity increases with larger time periods
					Fixed window (15 days before or after)	Sn: 0.98; Sp: 0.93; PPV: 0.21; NPV: 1.00		
					Fixed window (30 days before or after)	Sn: 0.96; Sp: 0.95; PPV: 0.35; NPV: 1.00		
					Fixed window (90 days before or after)	Sn: 0.91; Sp: 0.96; PPV: 0.59; NPV: 1.00		
Friedman[57] (2007, US)	Claims data (national) vs medical records + self-report + clinician interview	Glaucoma (13,956)	Prostaglandins	Initiation	Not specified	Sn: 0.69 (31% false-negative past-users - other sources but not claims data)	Good agreement overall	Provision of medication samples may affect measures of adherence
				Switch		Sp: 0.10 (90% add-ons misclassified as switches - false-positives)		
Jackevicius[58] (2007, Canada)	Claims data (regional), medical records	Post myocardial infarction (345)	Combination of drugs (anticoagulants, antiplatelets, antiarrhythmics, beta-blockers, calcium antagonists, ACE inhibitors, statins, nitrates, other cardiovascular drugs, diuretics, pain relievers, psychotropics, gastrointestinal, respiratory, antidiabetes, antimicrobials, miscellaneous)	Days' supplied	Extracted directly	Perfect agreement: 71%	Good concordance	Most prescriptions dispensed within 7 days of discharge
				Quantity		Perfect agreement: 66%		
				Daily dose		Perfect agreement: 76%		
Glintborg[59] (2007, Denmark)	Claims data (national), hospital records, self-report, blood levels (used as reference)	Hospitalised patients (500)	Digoxin	Current use	Fixed window (2 years prior)	Sn: 0.98 (claims data), 0.93 (hospital records), 0.98 (self-report)	Good agreement between sources	Claims data more closely approximates objective measurement of drug consumption (blood levels) than self-report
			Bendroflumethiazide			Sn: 0.90 (claims data), 0.87 (hospital records), 0.89 (self-report)		
			Amlodipine			Sn: 0.92 (claims data), 0.79 (hospital records); 0.87 (self-report)		
			Simvastatin			Sn: 0.97 (claims data), 0.89 (hospital records),0.83 (self-report)		
			Glimepiride			Sn: 0.88 (claims data), 0.88 (hospital records), 0.88 (self-report)		
George and Shalanksy[60] (2007, Canada)	Combined prescription + claims	Heart failure (350)	Any heart failure drug	Non-adherence (defined as <90%	Legend-time	Non-adherence: 22.3% (claims data), 38.3% (self-report)	Moderate agreement	

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
	data (regional), self-report			adherence in claims data)				
Haukka[61] (2007, Finland)	Claims data (national), self-report	Schizophrenia or other psychotic disorders (905)	Typical antipsychotics	Current use	Legend-time or fixed window (6 months period)	K: 0.69; 0.87	High agreement	Fixed time window improves agreement (versus legend-time method) but not substantially; agreement for some drugs may be influenced by reimbursement patterns (benzodiazepines)
			Atypical antipsychotics			K: 0.86; 0.88		
			Antidepressants			K: 0.73; 0.77		
			Lithium			K: 0.96; 0.96		
			Benzodiazepines			K: 0.37; 0.42		
			Mood stabilizers			K: 0.70; 0.74		
			Biperiden			K: 0.59; 0.73		
			Others			K: 0.13; 0.23		
			Antipsychotics	Daily dose (chlorpromazine equivalents)	Extracted directly	Correlation coefficient: 0.79		
Krigsman[62] (2007, Sweden)	Claims data (local), manually collected prescriptions	Asthma, COPD (285)	Adrenergics and steroids in combination for inhalation, or glucocorticosteroids and anticholinergics for inhalation	Adequate refill adherence (supply for 80-120% of days within 1 year)	Legend-time	Adequate adherence: 28% claims data vs 35% prescriptions Oversupply: 29% claims data vs 23% prescriptions Undersupply: 43% claims data vs 42% prescriptions	Good overlap between sources	
Nau[63] (2007, US)	Claims data (regional), self-report	Diabetes (1,985)	Antidiabetics	Adherence (dichotomised at 80% or continuous)	Legend-time	K: 0.18; Correlation coefficient: 0.22	Moderate agreement	Most subjects correctly classified, but disagreement in 25-33%
			Antidyslipidemics			K: 0.19; Correlation coefficient: 0.26		
Shalanksy[64] (2007, Canada)	Combined prescription + claims data (regional), self-report	Heart failure (194)	Any prescription drug (excluding as-needed, warfarin)	Number of medications currently used	Legend-time	Percent agreement: 29% participants, 76% individual drugs Mean difference: -1.0 (claims data minus self-report)	Moderate agreement	Use of RCD difficult without confirming data with patient
				Dose of medications currently used	Extracted directly	Percent agreement: 66% participants, 94% medications		
Dahri[65] (2008, Canada)	Claims data (regional), electronic dispenser	Heart failure (43)	Beta-blockers	Adherence (continuous)	Legend-time	Mean adherence: 98% claims data vs 97% electronic dispenser; limits-of-agreement: 6.8% +/- 18.5%	Reasonable agreement for most patients	Claims data tends to overestimate adherence for patients with high adherence rates

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
Glintborg[66] (2008, Denmark)	Claims data (national), self-report combined with inpatient medication list	Inpatients in acute medical department (500)	Prescription-only medications	Current use	Extracted directly (active drugs)	Sn: 68%	Reasonable agreement	Some patients still using drugs filled >1 year before admission
Nielsen[67] (2008, Denmark)	Claims data (national), self-report	Population cohort (16,688)	Proton pump inhibitors	Current use	Legend-time or fixed window (90 days prior)	K: 0.61; 0.59	Good to very good agreement	Agreement better for chronic medications versus as needed; agreement for as needed medications improves with fixed 90 day window (versus legend-time); assessments based on expected daily dose are sensitive to dose assumption
			Insulin and analogues			K: 0.78; 0.82		
			Oral blood glucose lowering drugs			K: 0.75; 0.82		
			Antithrombotic agents			K: 0.70; 0.75		
			Cardiovascular system			K: 0.84; 0.80		
			Hormone replacement therapy			K: 0.51; 0.51		
			Musculoskeletal system			K: 0.54; 0.50		
			Analgesics			K: 0.46; 0.57		
			Opioids			K: 0.49; 0.62		
			Antimigraine preparations			K: 0.39; 0.42		
			Psycholeptics			K: 0.53; 0.51		
			Antipsychotics			K: 0.54 (0.69 if assuming lower doses); 0.73		
			Anxiolytics			K: 0.47; 0.45		
			Hypnotics and sedatives			K: 0.46; 0.39		
			Antidepressants			K: 0.63; 0.66		
			Drugs for obstructive airway diseases			K: 0.65; 0.66		
Sandini[68] (2008, Finland)	Claims data (national), self-report	Population cohort, women, 47-56 years (11,377)	Hormone replacement therapy	Past use (last 5 years)	Fixed window (5 years prior)	Sn: 0.53; PPV: 0.98; K: 0.63	Good agreement	Agreement poorer if short-term use; specifying brand names improves agreement; self-report may underestimate use duration
Irving[69] (2009, US)	Vaccination registry (regional), self-report	Cohort study (2907)	Influenza vaccine	Past use (previous year)	Fixed window (1 year prior)	Sn: 0.95; Sp: 0.90; PPV: 0.89; NPV: 0.96 Percent agreement: 95%	Good agreement	Agreement poorer for parents of younger children

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
Krousel-Wood[70] (2009, US)	Claims data (local), self-report	Hypertension, 65+ (87)	Hypertensive medications	Adherence (categorical: low vs medium vs high for self-report)	Legend-time (1 year)	Continuous, single-interval measures of medication availability (CSA): Median - 0.66 low, 0.88 medium, 0.94 high self-reported adherence Medication possession-ratio (MPR): Median - 0.65 low, 0.89 medium, 0.98 high self-reported adherence Continuous, multiple-interval measures of medication gaps (CMG): Median - 0.43 low, 0.13 medium, 0.09 high self-reported adherence	Good agreement	Self-reported tool better for providing reasons for non-adherence and easier for use in clinical practice
McHorney[71] (2009, US)	Claims data (regional), self-report using a 3-group adherence risk estimator	Convenience sample with 1+ of: cardiovascular disease, dyslipidaemia, diabetes, osteoporosis, or asthma (1,676)	Cardiovascular disease drugs	Adherence (continuous, calculated using proportion of days covered [PDC] or medication possession ratio [MPR]) Persistence (PDC>80% and no gaps >30 days), or obtained second fill within 30 days	Legend-time (9 month period)	PDC: 0.81 (low-risk adherence group); 0.73 (medium-risk adherence group); 0.60 (high-risk adherence group) MPR: 0.96 (low-risk adherence group); 0.94 (medium-risk adherence group); 0.93 (high-risk adherence group) Persistence (no gaps): - index medication: 44% (low-risk adherence group); 32% (medium-risk adherence group); 30% (high-risk adherence group) - any medication: 51% (low-risk adherence group); 38% (medium-risk adherence group); 33% (high-risk adherence group) Persistence (obtained second-fill): - index medication: 71% (low-risk adherence group); 66% (medium-risk adherence group); 62% (high-risk adherence group) - any medication: 74% (low-risk adherence group); 69% (medium-risk adherence group); 65% (high-risk adherence group)	Good agreement	Statistically-robust associations between self-reported adherence and claims data (for both adherence and persistence)

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
			Lipid-lowering			PDC: 0.66 (low-risk adherence group); 0.59 (medium-risk adherence group); 0.44 (high-risk adherence group) MPR: 0.92 (low-risk adherence group); 0.91 (medium-risk adherence group); 0.85 (high-risk adherence group) Persistence (no gaps): - index medication: 42% (low-risk adherence group); 31% (medium-risk adherence group); 25% (high-risk adherence group) - any medication: 44% (low-risk adherence group); 33% (medium-risk adherence group); 29% (high-risk adherence group) Persistence (obtained second-fill): - index medication: 76% (low-risk adherence group); 68% (medium-risk adherence group); 59% (high-risk adherence group) - any medication: 78% (low-risk adherence group); 70% (medium-risk adherence group); 62% (high-risk adherence group)		
			Antidiabetics			PDC: 0.63 (low-risk adherence group); 0.54 (medium-risk adherence group); 0.51 (high-risk adherence group) MPR: 0.89 (low-risk adherence group); 0.92 (medium-risk adherence group); 0.88 (high-risk adherence group)		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
						Persistence (no gaps): - index medication: 30% (low-risk adherence group); 28% (medium-risk adherence group); 18% (high-risk adherence group) - any medication: 34% (low-risk adherence group); 33% (medium-risk adherence group); 25% (high-risk adherence group) Persistence (obtained second-fill): - index medication: 67% (low-risk adherence group); 67% (medium-risk adherence group); 49% (high-risk adherence group) - any medication: 70% (low-risk adherence group); 72% (medium-risk adherence group); 56% (high-risk adherence group)		
			Biphosphonates			PDC: 0.85 (low-risk adherence group); 0.65 (medium-risk adherence group); 0.65 (high-risk adherence group) MPR: 0.89 (low-risk adherence group); 0.92 (medium-risk adherence group); 0.87 (high-risk adherence group) Persistence (no gaps): - index medication: 46% (low-risk adherence group); 38% (medium-risk adherence group); 36% (high-risk adherence group) - any medication: 49% (low-risk adherence group); 40% (medium-risk adherence group); 39% (high-risk adherence group)		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
			Asthma-controllers			Persistence (obtained second-fill): - index medication: 75% (low-risk adherence group); 63% (medium-risk adherence group); 61% (high-risk adherence group) - any medication: 76% (low-risk adherence group); 67% (medium-risk adherence group); 63% (high-risk adherence group) PDC: 0.31 (low-risk adherence group); 0.33 (medium-risk adherence group); 0.22 (high-risk adherence group) MPR: 0.68 (low-risk adherence group); 0.62 (medium-risk adherence group); 0.42 (high-risk adherence group) Persistence (no gaps): - index medication: 14% (low-risk adherence group); 11% (medium-risk adherence group); 11% (high-risk adherence group) - any medication: 17% (low-risk adherence group); 12% (medium-risk adherence group); 11% (high-risk adherence group) Persistence (obtained second-fill): - index medication: 40% (low-risk adherence group); 46% (medium-risk adherence group); 28% (high-risk adherence group) - any medication: 41% (low-risk adherence group); 49% (medium-risk adherence group);		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
						30% (high-risk adherence group)		
			All studied drugs			PDC: 0.65 (low-risk adherence group); 0.60 (medium-risk adherence group); 0.48 (high-risk adherence group) MPR: 0.91 (low-risk adherence group); 0.91 (medium-risk adherence group); 0.87 (high-risk adherence group) Persistence (no gaps): - index medication: 37% (low-risk adherence group); 29% (medium-risk adherence group); 25% (high-risk adherence group) - any medication: 41% (low-risk adherence group); 32% (medium-risk adherence group); 29% (high-risk adherence group) Persistence (obtained second-fill): - index medication: 69% (low-risk adherence group); 64% (medium-risk adherence group); 55% (high-risk adherence group) - any medication: 70% (low-risk adherence group); 67% (medium-risk adherence group); 58% (high-risk adherence group)		
Noize[72] (2009, France)	Claims data (national), self-report (used as reference)	Population cohort (4,112)	Drugs used in diabetes	Current use (more than once a week in the last month)	Fixed window (60 days prior)	K: 0.93 Sn: 0.91; Sp: 1.00; PPV: 0.96; NPV: 0.99	Good agreement overall (but variable)	Agreement best for a 60 versus 30 days prior time window; Agreement also best for cardiovascular and other chronic conditions; worse
			Antiarrhythmics			K: 0.90 Sn: 0.88; Sp: 1.00; PPV: 0.94; NPV: 0.99		
			Anti-gout			K: 0.89 Sn: 0.87; Sp: 1.00; PPV: 0.92; NPV: 0.99		
			Cardiac glycosides			K: 0.88 Sn: 0.85; Sp: 1.00; PPV: 0.92; NPV: 1.00		
			Antihypertensives			K: 0.86		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
						Sn: 0.90; Sp: 0.96; PPV: 0.97; NPV: 0.89		for as-needed, acute medications, and over the counter
			Vasodilators used in cardiac conditions			K: 0.85 Sn: 0.84; Sp: 0.99; PPV: 0.88; NPV: 0.99		
			Lipid lowering agents			K: 0.85 Sn: 0.87; Sp: 0.98; PPV: 0.95; NPV: 0.93		
			Antineoplastic/ immunology drugs			K: 0.85 Sn: 0.81; Sp: 1.00; PPV: 0.89; NPV: 1.00		
			Neurology/dementia drugs			K: 0.85 Sn: 0.83; Sp: 1.00; PPV: 0.88; NPV: 0.99		
			Antidepressants			K: 0.81 Sn: 0.83; Sp: 0.98; PPV: 0.82; NPV: 0.98		
			Antirheumatic products			K: 0.78 Sn: 0.73; Sp: 1.00; PPV: 0.87; NPV: 0.99		
			Antipsychotics			K: 0.76 Sn: 0.70; Sp: 1.00; PPV: 0.84; NPV: 0.99		
			Blood/blood forming organs drugs			K: 0.74 Sn: 0.74; Sp: 0.96; PPV: 0.88; NPV: 0.91		
			Drugs for treatment of bone diseases			K: 0.73 Sn: 0.70; Sp: 0.99; PPV: 0.79; NPV: 0.99		
			Systemic hormonal preparations			K: 0.73 Sn: 0.86; Sp: 0.96; PPV: 0.69; NPV: 0.98		
			Drugs for obstructive airway diseases			K: 0.72 Sn: 0.78; Sp: 0.98; PPV: 0.98; NPV: 0.83		
			Benzodiazepine derivatives			K: 0.70 Sn: 0.70; Sp: 0.96; PPV: 0.86; NPV: 0.90		
			Mineral supplements			K: 0.70 Sn: 0.67; Sp: 0.98; PPV: 0.84; NPV: 0.94		
			Drugs for acid related disorders			K: 0.69 Sn: 0.84; Sp: 0.93; PPV: 0.67; NPV: 0.97		
			Genito-urinary system drugs (women)			K: 0.67 Sn: 0.71; Sp: 0.95; PPV: 0.74; NPV: 0.94		
			Opioid analgaesics			K: 0.64 Sn: 0.77; Sp: 0.99; PPV: 0.57; NPV: 1.00		
			NSAIDs			K: 0.57 Sn: 0.79; Sp: 0.90; PPV: 0.54; NPV: 0.97		
			Anilide and opioid analgaesics in combination			K: 0.54 Sn: 0.76; Sp: 0.93; PPV: 0.48; NPV: 0.98		
			Antihistamines for systemic use			K: 0.52 Sn: 0.65; Sp: 0.97; PPV: 0.46; NPV: 0.99		
			Muscle relaxants			K: 0.48		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
						Sn: 0.71; Sp: 0.98; PPV: 0.38; NPV: 1.00		
			Peripheral vasodilators			K: 0.39 Sn: 0.33; Sp: 0.99; PPV: 0.95; NPV: 0.76		
			Sensory organ drugs			K: 0.39 Sn: 0.73; Sp: 0.86; PPV: 0.34; NPV: 0.97		
			Salicylates and anilide analgaesics			K: 0.38 Sn: 0.66; Sp: 0.81; PPV: 0.41; NPV: 0.92		
			Dermatologicals			K: 0.26 Sn: 0.50; Sp: 0.91; PPV: 0.22; NPV: 0.97		
			Anti-infective / antiparasitic drugs			K: 0.20 Sn: 0.67; Sp: 0.88; PPV: 0.14; NPV: 0.99		
			Laxatives			K: 0.16 Sn: 0.12; Sp: 0.99; PPV: 0.47; NPV: 0.93		
			Homeopathy/herbal medicines			K: 0.16 Sn: 0.11; Sp: 0.99; PPV: 0.49; NPV: 0.96		
			Drugs for functional gastrointestinal disorders			K: 0.11 Sn: 0.07; Sp: 1.00; PPV: 0.58; NPV: 0.93		
			Vitamins			K: 0.09 Sn: 0.06; Sp: 1.00; PPV: 0.57; NPV: 0.95		
			Genito-urinary system drugs (men)			K: 0.067 Sn: 0.04; Sp: 1.00; PPV: 0.67; NPV: 0.81		
			Psychostimulants			K: 0.050 Sn: 0.01; Sp: 1.00; PPV: 0.50; NPV: 0.98		
			Vasculoprotectives			K: 0.002 Sn: 0.00; Sp: 1.00; PPV: 1.00; NPV: 0.78		
Skurtveit[73] (2009, Finland)	Claims data (national), self-report	Adolescents 15-16 years (2,613)	Oral contraception	Any current or past use	Fixed window (100 days)	Sn: 0.99; Sp: 0.80	Good agreement	Agreement higher for contraceptive versus other classes among adolescents
			Antiasthmatics			Sn: 0.79; Sp: 0.90		
			Painkillers			Sn: 0.49; Sp: 0.83		
			Psychotropics			Sn: 0.75; Sp: 0.92		
Tulloc[74] (2009, Canada)	Claims data (regional), self-report	General medicine inpatients (50)	Prescription only drugs	Current use (at admission)	Extracted directly	Number of discrepancies: 26% (101/378)	Good complement but cannot substitute patient interview	Most common discrepancies: wrongly inactive (49%), wrongly active (9%), lower incorrect dose (13%), higher incorrect dose (15%)

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
Warholak[75] (2009, US)	Claims data (regional), self-report	Hospitalised patients (78)	Any medication	Current use (number of medications missed)	Legend-time	30% (claims) vs 53.2% (self-report)	Claims data more complete but may miss over-the-counter or non-reimbursed drugs	Combination of both methods is potentially superior
Haapea[76] (2010, Finland)	Claims data (national), self-report	Population cohort (7,625)	Antipsychotics	Current use	Fixed window (6 months prior)	K: 0.77; PABAK: 0.99; Sn: 77%	Good agreement	Agreement varied with drug class
			Antidepressants			K: 0.68; PABAK: 0.98; Sn: 69%		
			Antiepileptics			K: 0.84; PABAK: 1.00; Sn: 84%		
			Antidiabetics			K: 0.92; PABAK: 1.00; Sn: 92%		
			Beta-blockers			K: 0.55; PABAK: 0.98; Sn: 56%		
Karkov[77] (2010, Denmark)	Prescription registry (national), GP records, in-home care provider records, self-report	Patients hospitalised with hip fractures (9)	All medications	Current use	Fixed window (6 months prior)	Sn: 0.75 Number of omissions: - Registry: 17 - GP: 21 - Home-care: 1 - Self-report: 32	Poor agreement	Registry better source if at-home care report not available and provides additional information vs other sources
Nwaru[78] (2010, Finland)	Claims data (national), self-report	Children with asthma (2,236)	Any asthma medication	Past use (12 months)	Fixed window (12 months prior)	Sn: 0.98; Sp: 0.97; PPV: 0.60; NPV: 1.00	High agreement	
Cadarette[79] (2011, Canada)	Claims data (regional), self-report	Community-dwelling women, 65+ (858)	Any bisphosphonate	Current use; past-use; never-use	Legend-time (using records within prior year)	K: 0.83; 0.80; 0.81	Very good agreement	Agreement for HRT and steroids increased if using a 5 year lookback period for analysis
			Etidronate			K: 0.86; 0.73; 0.78		
			Alendronate			K: 0.81; 0.70; 0.75		
			Risedronate			K: 0.79; 0.79; 0.79		
			Nasal calcitonin			K: 0.40; 0.28; 0.33		
			Raloxifene			K: 0.66; 0.58; 0.62		
			HRT			K: 0.75; 0.33; 0.44		
			Oral steroids			K: 0.59; 0.35; 0.41		
			Thyroid medications			K: 0.92; 0.86; 0.88		
Dersch-Mills[80] (2011, Canada)	Prescription registry (regional), local pharmacy records,	Paediatric inpatients (99)	All medications	Current use (at admission)	Not detailed	Completeness score (correct medication, dose, and frequency): - 75% medical records - 50% prescription registry - 69% community pharmacy - 100% self-report	Good agreement for prescription drugs	Over-the-counter and herbal products frequently missed by all sources except interview;

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
	medical records, self-report, conjunction of all methods (best-possible medication history) – used as reference		Prescription-only medications			Completeness score (correct medication, dose, and frequency): - 100% medical records - 100% prescription registry - 100% community pharmacy - 100% self-report		self-report is required for best possible medication history
Garg[81] (2011, US)	Pharmacy data (local), medical records (used as reference)	Atrial fibrillation (1,953)	Aspirin	Current use	Fixed window (3 or 6 months after diagnosis)	Sn: 0.31, 0.37; Sp: 0.97, 0.95; PPV: 0.90. 0.88; K: 0.28, 0.31	Good agreement for warfarin, not for aspirin	Claims data not appropriate for over-the-counter drugs
			Warfarin			Sn: 0.94, 0.95; Sp: 0.99, 0.99; PPV: 0.99, 0.99; K: 0.92, 0.93		
Ekedahl[82] (2011, Sweden)	Claims data (national), self-report , medical record s	Heart failure, diabetes, or osteoarthritis (66)	All medications	Current-use	Not detailed	Agreement (drug level): 78% Agreement (patient-level): 14%	Discrepancies are common and agreement is low	Issues with missingness in the claims data (22%) are more common than noncurrent drugs (13%)
Goldsbury[83] (2011, Australia)	Claims data (regional), physician survey (used as reference)	Prostate cancer (571)	Androgen deprivation therapy	Past use	Extracted directly	Sn: 0.76; Sp: 0.95	Reasonable agreement	Data more accurate for people living in urban areas (further away from state borders)
Liang[84] (2011, US)	Claims data (local), medical records (used as reference)	Women with breast cancer (775)	Transtuzumab (n=775)	Past use	Fixed window (6 months after diagnosis)	Percent agreement: 95% (total), 81% (positive), 97% (negative) K: 0.78 Sn: 0.98; Sp: 0.98; PPV: 0.86; NPV: 0.96	Good agreement	Agreement higher for drugs with unique billing codes or higher cost
			Adjuvant chemotherapy (n=393)			Percent agreement: 90% (total), 87% (positive), 91% (negative) K: 0.79 Sn: 0.88; Sp: 0.88; PPV: 0.83; NPV: 0.95		
			Any chemotherapy	Past use		K: 0.89; Sn: 0.92; Sp: 0.97; PPV: 0.89		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed		Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
Fleming[85] (2012, US)	Claims data (national), medical records (used as reference)	Women with breast cancer (1,762)	Single agent chemotherapy			Fixed window (1 year after diagnosis)	K: 0.41; Sn: 0.37; Sp: 0.99; PPV: 0.48	Good agreement	
			Multiple agents	Any			K: 0.85; Sn: 0.92; Sp: 0.96; PPV: 0.83		
				Doxorubicin, cyclophosphamide			K: 0.69; Sn: 0.68; Sp: 0.99; PPV: 0.72		
				Doxorubicin, cyclophosphamide, docetaxel/paclitaxel			K: 0.63; Sn: 0.66; Sp: 0.98; PPV: 0.64		
				Cyclophosphamide, epirubicin, fluorouracil			K: 0.73; Sn: 0.69; Sp: 1.00; PPV: 0.79		
				Cyclophosphamide, methotrexate, fluorouracil			K: 0.69; Sn: 0.68; Sp: 0.99; PPV: 0.70		
				Other			K: 0.36; Sn: 0.55; Sp: 0.99; PPV: 0.29		
			Other chemotherapy				K: 0.00; Sn: 0.00; Sp: 0.99; PPV: 0.00		
Font[86] (2012, Spain)	Claims data (regional), self-report, clinician assessment	Women with breast cancer (692)	Oral endocrine therapy		Adherence (dichotomised at 80%)	Legend-time (5 year period)	K: 0.10 (claims vs self-report), 0.19 (claims vs physician), 0.04 (self-report vs clinician)	Poor agreement	
Jespersen[87] (2012, Denmark)	Inpatient registry (national), medical records (used as reference)	Prostate cancer (300)	Gonadotropin-releasing hormone agonist		Past use (5 years prior)	Fixed window (5 years prior)	PPV: 0.93; NPV: 0.94	Good agreement	
					Date of treatment		0 months difference: 71% <3 months difference: 23%		
Nielsson[88] (2012, Denmark)	Inpatient registry (national), medical records (used as reference)	Breast, prostate, lung, or kidney cancer plus multiple myeloma (60)	Biphosphonates (any type)		Past use	Fixed window (4 years)	PPV: 1.00	Perfect agreement	
			Biphosphonates (intravenous)				PPV: 0.98		
Nissen[89] (2012, US)	Disease registry, self-report	Breast and colon cancer patients (455)	Any chemotherapy		Ever use	Not detailed	Percent agreement: 98%	Important gaps on self-reported treatment	Accuracy decreased with increasing age
			Any hormone therapy				Percent agreement: 52%		
			Doxorubicin				Percent agreement: 44%		
			Tamoxifen				Percent agreement: 94%		
			Aromatase inhibitor				Percent agreement: 92%		
			Trastuzumab				Percent agreement: 89%		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
			Oxaliplatin			Percent agreement: 53%		
Noize[90] (2012, France)	Claims data (national), self-report	Cohort study, community-dwelling (2,985)	Antihypertensives	Current use	Legend-time (80% coverage or 80% coverage + maximum 60 days between claims)	Sn: 0.94; Sp: 0.85; PPV: 0.87; NPV: 0.93 Sn: 0.95; Sp: 0.67; PPV: 0.62; NPV: 0.96	Good agreement	Agreement better for drugs used chronically than for those used intermittently
			Cardiac therapy			Sn: 0.90; Sp: 0.98; PPV: 0.83; NPV: 0.99 Sn: 0.92; Sp: 0.94; PPV: 0.53; NPV: 0.99		
			Lipid-lowering agents			Sn: 0.87; Sp: 0.89; PPV: 0.72; NPV: 0.95 Sn: 0.88; Sp: 0.79; PPV: 0.40; NPV: 0.98		
			Drugs for acid-related disorders			Sn: 0.84; Sp: 0.98; PPV: 0.79; NPV: 0.98 Sn: 0.91; Sp: 0.94; PPV: 0.44; NPV: 1.00		
			Antidepressants			Sn: 0.79; Sp: 0.98; PPV: 0.73; NPV: 0.99 Sn: 0.78; Sp: 0.95; PPV: 0.29; NPV: 1.00		
			Antithrombotic agents			Sn: 0.85; Sp: 0.91; PPV: 0.66; NPV: 0.97 Sn: 0.87; Sp: 0.84; PPV: 0.33; NPV: 0.99		
			Systemic hormonal preparations			Sn: 0.91; Sp: 0.96; PPV: 0.67; NPV: 0.99 Sn: 0.93; Sp: 0.93; PPV: 0.43; NPV: 1.00		
			NSAIDs			Sn: 0.73; Sp: 0.96; PPV: 0.51; NPV: 0.98 Sn: 0.67; Sp: 0.93; PPV: 0.16; NPV: 0.98		
			Benzodiazepine derivatives			Sn: 0.86; Sp: 0.88; PPV: 0.48; NPV: 0.98 Sn: 0.34; Sp: 0.98; PPV: 0.63; NPV: 0.95		
			Sensory system drugs			Sn: 0.34; Sp: 0.98; PPV: 0.63; NPV: 0.95 Sn: 0.36; Sp: 0.97; PPV: 0.96; NPV: 0.97		
			Anilide / opioid analgesics (combination)			Sn: 0.59; Sp: 0.98; PPV: 0.45; NPV: 0.99 Sn: 0.64; Sp: 0.97; PPV: 0.19; NPV: 1.00		
			Mineral supplements			Sn: 0.80; Sp: 0.94; PPV: 0.43; NPV: 0.99 Sn: 0.82; Sp: 0.92; PPV: 0.16; NPV: 1.00		
			Genitourinary system drugs (women)			Sn: 0.72; Sp: 0.94; PPV: 0.44; NPV: 0.98 Sn: 0.66; Sp: 0.92; PPV: 0.21; NPV: 0.99		
			Salicylates and anilide analgesics			Sn: 0.41; Sp: 0.94; PPV: 0.39; NPV: 0.95 Sn: 0.50; Sp: 0.93; PPV: 0.19; NPV: 0.98		
Oberguggenberger[91] (2012, Austria)	Claims data (national), self-report, clinician ratings, drug levels	Women with breast cancer (242)	Anastrozole	Adherence (continuous)	Legend-time (6 months prior)	Correlation (rho): - Drug levels vs self-report: 0.22 - Drug levels vs clinician: 0.27 - Drug levels vs claims: 0.25 - Claims vs self-report: 0.19 - Claims vs clinician: 0.24 - Self-report vs clinician: 0.37	Modest agreement	6 month lookback period maximises correlation between claims and all other sources
Price[92] (2012, Canada)	Claims data (regional), reconciled medications	Inpatient episodes – emergency department,	Any drug	Current use (at the time of admission)	Not detailed	Agreement (by patient): 16% Agreement (by patient) – excluding non-serious disagreements: 52%	Claims data not sufficient for reconciliation	Claims data can be used as a starting point for drug
			Ramipril			Percent agreement: 93%		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed		Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
	list (including self-report)	wards, pre-admission clinics (1,125)	5 drugs with best agreement	Hydrochlorothiazide			Percent agreement: 90%		reconciliation but needs to be confirmed with patients
				Atorvastatin			Percent agreement: 89%		
				Levothyroxine sodium			Percent agreement: 89%		
				Citalopram			Percent agreement: 89%		
			5 drugs with worst agreement	Artificial tears and other indifferent preparations			Percent agreement: 2%		
				Insulin			Percent agreement: 11%		
				Ibuprofen, acetaminophen and aspirin, and combinations			Percent agreement: 14%		
				Warfarin			Percent agreement: 17%		
				Codeine and combinations			Percent agreement: 21%		
Grimes[93(p20)] (2013, Ireland)	Claims data (national), clinician reports, pharmacy reports, previous hospital records, self-report	Hospitalised adults using at least 3 medications (97)	All medications		Current use (at the point of admission) – per episode	Fixed window (3 months prior)	Percent agreement (episodes with data available): 17% Percent agreement (entire population): 16%	Claims data are accurate	Claims data provides best agreement with reconciled medications list vs all other sources Less reliable for males vs females, those using many drugs, or drugs not reimbursed
					Current use (at the point of admission) – per drug		Percent agreement (episodes with data available): 74% Percent agreement (entire population): 68%		
Allin[94] (2013, Canada)	Claims data (regional), self-report	Community-dwelling adults, 65+ (32,848)	Antihypertensives		Current use (assessed at two time points: 2001 – open question; 2005 – targeted question)	Fixed window (30, 100, or 130 days prior)	2001: K: 0.24; 0.46; 0.47 Sn: 0.32; 0.70; 0.73 Sp: 0.91; 0.78; 0.77 2005: K: 0.24; 0.55; 0.57 Sn: 0.35; 0.75; 0.79 Sp: 0.91; 0.80; 0.79	Good agreement	Agreement improved with targeted questions and longer analysis time windows; agreement poorer for 75+ and in poor health
			Oral antidiabetics				2001: K: 0.52; 0.79; 0.79 Sn: 0.47; 0.86; 0.88 Sp: 0.99; 0.98; 0.98		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed		Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
							2005: K: 0.55; 0.57; 0.89 Sn: 0.38; 0.82; 0.86 Sp: 0.99; 0.99; 0.99		
Daouphars[95] (2013, France)	Claims data (local), self-report	Chronic myeloid leukaemia (46)	Imatininb		Adherence (continuous)	Legend-time (in 6 months prior)	Correlation coefficient: 0.68	Good agreement	
					Adherence (dichotomised at 90%)		Sn: 0.50; Sp: 0.97; PPV: 0.83; NPV: 0.85		
Lund[96] (2013, US)	Claims data (national), medical records (used as reference)	Cancer (1,187)	Breast (2000 and 2005)	Cyclophosphamide	Past use (within 6 months after diagnosis)	Fixed window (6 months after diagnosis)	K: 0.83 Sn: 0.75; Sp: 0.98; PPV: 0.91; NPV: 0.95	Good agreement	
				Doxorubicin			K: 0.78 Sn: 0.73; Sp: 0.99; PPV: 0.90; NPV: 0.96		
			Colorectal (2000)	5-fluorouracil			K: 0.76 Sn: 0.85; Sp: 0.93; PPV: 0.95; NPV: 0.81		
			Colorectal (2005)	5-fluorouracil			K: 0.83 Sn: 0.89; Sp: 0.95; PPV: 0.91; NPV: 0.93		
				Capecitabine			K: 0.55 Sn: 0.47; Sp: 0.98; PPV: 0.81; NPV: 0.92		
				Oxaliplatin			K: 0.73 Sn: 0.75; Sp: 0.97; PPV: 0.85; NPV: 0.94		
			Non-small cell lung (2005)	Carboplatin			K: 0.95 Sn: 0.95; Sp: 0.99; PPV: 0.99; NPV: 0.97		
				Paclitaxel			K: 0.90 Sn: 0.90; Sp: 0.98; PPV: 0.97; NPV: 0.95		
			Ovary (2005)	Carboplatin			K: 0.68 Sn: 0.91; Sp: 0.78; PPV: 0.92; NPV: 0.76		
				Paclitaxel			K: 0.62 Sn: 0.88; Sp: 0.74; PPV: 0.88; NPV: 0.75		
Lund[97] (2013, Denmark)	Inpatient registry (national), pharmacy records, medical records	Colorectal cancer (50)	Any chemotherapy		Past use (within 6 months after diagnosis)	Fixed window (6 months after diagnosis)	Hospital 1: K: 0.90 Sn: 0.94; Sp: 1.00; PPV: 1.00; NPV: 0.87 Hospital 2: K: 0.90 Sn: 1.00; Sp: 0.88; PPV: 0.94; NPV: 1.00	Good agreement	Accuracy depends on local hospital coding practices
			Fluorouracil or capecitabine				Hospital 1: K: N/A Sn: 0.00; Sp: 1.00; PPV: N/A; NPV: 0.92 Hospital 2: K: 0.91		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
						Sn: 1.00; Sp: 0.94; PPV: 0.89; NPV: 1.00		
			Oxaliplatin + fluorouracil/capecitabine			Hospital 1: K: 0.26 Sn: 0.25; Sp: 1.00; PPV: 1.00; NPV: 0.59 Hospital 2: K: 1.00 Sn: 1.00; Sp: 1.00; PPV: 1.00; NPV: 1.00		
			Bevacizumab			Hospital 1: K: 0.83 Sn: 0.75; Sp: 1.00; PPV: 1.00; NPV: 0.95 Hospital 2: K: 1.00 Sn: 1.00; Sp: 1.00; PPV: 1.00; NPV: 1.00		
Poehling[98] (2013, US)	Immunisation registry (regional), medical records (used as reference)	Children <18 years (226)	Seasonal flu vaccine	Number of doses	Fixed window (any time previously)	Percent agreement: 80%; K: 0.63	Substantial agreement	
				Immunised		Sn: 0.68; Sp: 0.93; PPV: 0.89; NPV: 0.77		
			H1N1 vaccine	Number of doses		Percent agreement: 89%; K: 0.71		
				Immunised		Sn: 0.92; Sp: 0.95; PPV: 0.85; NPV: 0.98		
			Pneumococcal conjugate vaccine	Number of doses		Percent agreement: 96%; K: 0.90		
				Immunised		Sn: 1.00; Sp: 1.00; PPV: 1.00; NPV: 1.00		
			23-valent pneumococcal polysaccharide vaccine	Number of doses		Percent agreement: 97%; K: 0.84		
				Immunised		Sn: 1.00; Sp: 0.97; PPV: 0.75; NPV: 1.00		
Rauma[99] (2013, Finland)	Claims data (national), self-report	Post-menopausal women (11,031)	Any psychoactive drug	Current use	Fixed window (120 days prior)	Sn: 0.44; Sp: 0.98; K: 0.53	Good agreement	Agreement better for diuretics vs psychoactive drugs; claims data can overestimate adherence for infrequent users; self-report may be better in people with more severe psychiatric disease / higher drug use
			Antidepressants			Sn: 0.55; Sp: 0.99; K: 0.65		
			Other psychoactive drugs (not antidepressants)			Sn: 0.29; Sp: 0.97; K: 0.30		
			Diuretics			Sn: 0.83; Sp: 0.98; K: 0.82		
Richardson[100]			Drugs for acid-related disorders	Current use		K: 0.67		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
(2013, Ireland)	Claims data (national), self-report	Community-dwelling adults, 50+ years (2,621)	Drugs used in diabetes		Fixed window (3 or more records in the 6 months prior and at least one record in the last month)	K: 0.86	Good agreement	Agreement poorer for topicals or as needed medications
			Mineral supplements			K: 0.66		
			Antithrombotic agents			K: 0.72		
			Cardiac therapy			K: 0.72		
			Diuretics			K: 0.77		
			Beta-blocking agents			K: 0.80		
			Calcium-channel blockers			K: 0.77		
			Agents acting on the renin-angiotensin system			K: 0.78		
			Lipid-modifying agents			K: 0.73		
			Urologicals			K: 0.70		
			Thyroid therapy			K: 0.81		
			Anti-inflammatory and antirheumatic products			K: 0.54		
			Drugs for treatment of bone diseases			K: 0.67		
			Analgesics			K: 0.50		
			Psycholeptics			K: 0.59		
			Psychoanaleptics			K: 0.69		
			Drugs for obstructive airway disease			K: 0.64		
			Opthalmologicals			K: 0.37		
Wójcik[101] (2013, Denmark)	Immunisation registry (national), parent reports	Children aged <5 years (386)	Tetanus, diphtheria, pertussis, and polio booster	Ever use	Extracted directly	Prevalence: 82% registry; 85.6% after adjustment (most conservative estimate) 94.8% after adjustment (least conservative estimate)	Underreporting is frequent	
Bobo[102] (2014, US)	Pharmacy data (local), medical records	Random sample of medication initiators (398)	Antidepressants	Initiation	Fixed window (first drug prescription on medical records and excluding records on the previous 6 months, 1 year, 1.5 years, or 2 years)	PPV: 0.81 (all records); 0.91 (only records with dose less than recommended starting dose) 0.82 (1 year window) 0.83 (1.5 years window) 0.83 (2 years window)	Good agreement	
Dahlen[103] (2014, Sweden)	Prescription registry (national), parent report (used as	Adolescents with asthma (3,316)	Any asthma medication	Past use (one year)	Fixed window (3, 6, 12, 18, or 24 months)	Prevalence (at any time point within last year): 10.7% (parent), 10.3% (adolescent), 8.1% (registry) Sn: 0.36, 0.49, 0.65, 0.76, 0.83 Sp: 1.00, 0.99, 0.99, 0.98, 0.97 PPV: 0.90, 0.90, 0.86, 0.83, 0.76	Good agreement	18 month window provides best agreement; 30% of adolescents with reported drug use

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
	reference), self-report		Short-acting beta2 agonists			Prevalence (at any time point within last year): 9.1% (parent), 8.4% (adolescent), 6.3% (registry) Sn: 0.25, 0.38, 0.56, 0.69, 0.77 Sp: 1.00, 0.99, 0.99, 0.98, 0.97 PPV: 0.83, 0.85, 0.81, 0.79, 0.73		had not purchased any medication; agreement better for adolescents with severe asthma
			Inhaled corticosteroids			Prevalence (at any time point within last year): 5.1% (parent), 4.3% (adolescent), 3.1% (registry) Sn: 0.23, 0.35, 0.52, 0.61, 0.67 Sp: 0.35, 1.00, 0.99, 0.98, 0.98 PPV: 0.89, 0.89, 0.84, 0.73, 0.66		
			Fixed combinations			Prevalence (at any time point within last year): 3.2% (parent), 3.1% (adolescent), 2.7% (registry) Sn: 0.37, 0.56, 0.74, 0.84, 0.88 Sp: 1.00, 1.00, 1.00, 1.00, 0.99 PPV: 0.87, 0.86, 0.86, 0.84, 0.70		
			Leukotriene receptor antagonists			Prevalence (at any time point within last year): 1.3% (parent), 1.3% (adolescent), 1.2% (registry) Sn: 0.48, 0.55, 0.76, 0.79, 0.81 Sp: 1.00, 1.00, 1.00, 1.00, 1.00 PPV: 0.91, 0.82, 0.80, 0.79, 0.72		
			Long-acting beta2 agonists			Prevalence (at any time point within last year): 0.8% (parent), 0.9% (adolescent), 0.5% (registry) Sn: 0.39, 0.43, 0.50, 0.52, 0.68 Sp: 1.00, 1.00, 1.00, 1.00, 1.00 PPV: 1.00, 0.92, 0.88, 0.74, 0.61		
Fleming[104] (2014, US)	Claims data (national), medical records (used as reference)	Prostate cancer (2,756)	Luteinizing hormone–releasing hormone agonists	Past use	Fixed window (1 year after diagnosis)	K: 0.71; Sn: 0.95	Good agreement	Claims may provide better coverage vs hospital medical records if medications delivered in the outpatient setting
Heintzman[105] (2014, US)	Claims data (national),	Random sample (13,101)	Flu vaccine	Past use	Fixed window (1 year)	K: 0.77	Medical records underestimate exposure	Agreement better for events that are commonly

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
	medical records							provided/recorded in the setting where medical records are extracted
Jimenez-Garcia[106] (2014, Spain)	Immunisation registry (regional), self-report	Cohort study (1,449)	Flu vaccine	Ever use	Extracted directly	Prevalence: 19.7% (self-reported), 15% (registry)	Reasonable agreement	Self-report affected by socio-demographic variables such as immigrant status, age, and gender
MacDonald[107] (2014, Canada)	Immunisation registry, parent report, medical records (used as reference)	Children (461)	Up-to-date immunisations	Ever use	Extracted directly	Number of discrepancies: 44 parent report (mostly wrong report), 16 registry (omission only)	Good agreement	Parents more accurate at identifying non-adherence; registry more accurate at identifying adherence
Reynolds[108] (2014, US)	Claims data (local), self-report	Women with osteoporosis (400)	Biphosphonates	Adherence (dichotomised)	Legend-time (6 months prior)	Agreement for low-adherence: 70% Sn: 0.82; Sp: 0.46; PPV: 0.76	Moderate agreement	
Roane[109] (2014, US)	Claims data (regional), self-report (used as reference)	Convenience sample (147)	Any drug	Current use	Legend-time	Sn: 0.72; PPV: 0.75 Discrepancies: 42%	Poor agreement	Self-reported considered the standard; disagreements represented new-potential drug-drug interactions, gaps in therapy, and duplications
Wu[110] (2014, Taiwan)	Claims data (national), self-report	Population cohort (15,574)	Anti-hypertensives	Current use	Not detailed	K: 0.72 Percent agreement: 95% (total), 75% (positive), 97% (negative)	Substantial agreement	Agreement poorer for asthma medications, possibly due to episodic nature
			Anti-diabetes			K: 0.85 Percent agreement: 99% (total), 85% (positive), 99% (negative)		
			Lipid lowering agents			K: 0.44 Percent agreement: 96% (total), 46% (positive), 98% (negative)		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
			Anti-asthmatics			K: 0.38 Percent agreement: 98% (total), 39% (positive), 99% (negative)		
			Anti-gout drugs			K: 0.44 Percent agreement: 97% (total), 45% (positive), 98% (negative)		
			Overall			K: 0.64 Percent agreement: 97% (total), 66% (positive), 98% (negative)		
Engqvist[111] (2015, Sweden)	Prescription registry (national),primary care records, inpatient prescriptions	Emergency department admissions (168)	All medications	Current use	Fixed window (6 months prior)	Number of participants with registry /primary care record but no inpatient record: 54% (registry vs inpatient) 40% (primary care vs inpatient) Number of participants with inpatient record but no registry/primary care record: 18% (registry vs inpatient) 50% (primary care vs inpatient)	Significant discrepancies	Prescription registry may include drugs no longer active, and miss over-the-counter, sporadic, or drugs not complied with
Haerskjold (2015, Denmark)[112]	Prescription registry (national), clinician reimbursement registry (national), medical records (used as reference)	Children (182)	Pavilizumab	Ever use	Fixed window (any previous record)	Prescription registry vs medical records: Sn: 0.26; Sp: 0.97 Reimbursement registry vs medical records: Sn: 0.29; Sp: 0.97 Prescription registry vs reimbursement registry: Sn: 0.80; Sp: 0.99	Poor agreement	Prescription registry may miss drugs used in the inpatient setting
Hendrickson (2015, US)[113]	Immunisation registry (regional), medical records, personal vaccine card	Convenience sample (100)	Any vaccination, including BCG (bacille Calmette-Guerin for tuberculosis), DTaP (diphtheria and tetanus toxoids and acellular pertussis), Hep A (hepatitis A), Hep B (hepatitis B), Hib (Haemophilus influenzae type B), HPV (human papilloma virus), H1N1 (specific influenza type), influenza (any other type), IPV or OPV (inactivated or oral polio), MCV (meningococcal),	Ever use	Fixed window (any previous record)	Completeness (vs total identified): 85% registry; 82% medical records; 88% personal card	No source is complete	Triangulation of data sources provides the most accurate depiction of vaccination status

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed		Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
			(measles, mumps, rubella), PCV (pneumococcal conjugated vaccine), PPSV (pneumococcal polysaccharide vaccine), Rotavirus (rotavirus), Tdap (tetanus, diphtheria and acellular pertussis with reduced diphtheria and pertussis doses), Td (tetanus and diphtheria booster), and varicella (chicken pox)						
Koepke[114] (2015, US)	Immunisation registry (regional), immunisation registry (national), medical records	Convenience sample (1,833)	4:3:1:3:3:1:4 vaccination series	Combined	Immunisation up-to-date (%)	Fixed window (any previous record)	49% medical records,77% regional registry, 75% national registry	Complete and accurate	Registry more complete than medical records
				Diphteria-tetanus-acellular pertussis			61% medical records, 86% regional registry, 88% national registry		
				Polio			66% medical records, 92% regional registry, 89% national registry		
				Measles, mumps, rubella			72% medical records, 91% regional registry, 89% national registry		
				Haemophilus influenza type b			67% medical records, 92% regional registry, 90% national registry		
				Hepatitis B			60% medical records, 90% regional registry, 88% national registry		
				Varicella			70% medical records, 89% regional registry, 89% national registry		
				Pneumococcal conjugate			60% medical records, 84% regional registry, 85% national registry		
			Hepatitis B birth dose				56% medical records, 72% regional registry, 72% national registry		
			Hepatitis A (first dose)				60% medical records, 74% regional registry, 79% national registry		
			Hepatitis A (second dose)				46% medical records, 58% regional registry, 56% national registry		
			Rotavirus				55% medical records, 72% regional registry, 67% national registry		
			All vaccines		Immunisation date	Extracted directly	Percent agreement: 99%		
			Diphteria-tetanus-acellular pertussis				Percent agreement: 99%		
			Hepatitis A				Percent agreement: 99%		
			Hepatitis B				Percent agreement: 98%		
			Hepatitis B birth dose				Percent agreement: 91%		
			Haemophilus influenza type b				Percent agreement: 99%		
			Measles, mumps, rubella				Percent agreement: 99%		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
			Pneumococcal conjugate			Percent agreement: 99%		
			Polio			Percent agreement: 99%		
			Rotavirus			Percent agreement: 99%		
			Varicella			Percent agreement: 99%		
Spangler[115] (2015, US)	Claims data (local), self-report	Peri/post-menopausal women (1,399)	Oral contraception	Use within previous 0-5 years	Fixed window (1+ record, or 2+ records <12 months apart during observation period)	PABAK: 0.88, 0.90; K: 0.62, 0.64	Substantial agreement within last 5 years, moderate up to 20 years	Using 2 events improves agreement
				Use within previous 5-10 years		PABAK: 0.75, 0.81; K: 0.56, 0.62		
				Use within previous 10-15 years		PABAK: 0.69, 0.76; K: 0.51, 0.56		
				Use within previous 15-20 years		PABAK: 0.65, 0.49; K: 0.46, 0.69		
				Use from age 30		PABAK: 0.40, 0.87; K: 0.42, 0.46		
				Use from age 35		PABAK: 0.54, 0.66; K: 0.51, 0.61		
				Use from age 40		PABAK: 0.63, 0.58; K: 0.50, 0.71		
Fujita[116(p20)] (2015, Japan)	Claims data (regional), self-report	Adults, 40-74 years (54,712)	Antihypertensives	Current use	Fixed window (30 days or 90 days prior)	K: 0.61, 0.71; Sn: 0.94, 0.92; Sp: 0.82, 0.86	Good agreement	Agreement improved when using a 90 day period
			Antidiabetics			K: 0.67, 0.77 Sn: 0.82, 0.83; Sp: 0.65; 0.99		
			Antidyslipidemics			K: 0.60, 0.70 Sn: 0.87, 0.86; Sp: 0.88, 0.91		
Kubica[117] (2015, Poland)	Claims data (national), self-report	Post-percutaneous coronary intervention (184)	Clopidogrel	Adherence (dichotomised)	Legend-time (over 9 months)	Adherent: 54% claims vs 94% self-report	Poor agreement	Both methods associated with measures of platelet activation
Lochner[118] (2015, US)	Claims data (national), self-report (used as reference)	Cohort study (9,378)	Flu vaccine	Past use (1 year)	Fixed window (1 year)	Sn: 0.68; Sp: 0.96; PPV: 0.98; NPV: 0.57	Reasonable agreement	Claims less complete for <65 years, non-White ethnicity, and less than college education

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
Pisa[119] (2015, Italy)	Claims data (regional), self-report	Pregnant women (767)	Medications for acid related disorders	Current use	Not detailed	K: 0.17; PABAK: 0.81	High agreement	PABAK provides a more reliable measure of agreement for medications with low prevalence of use Self-report and claims data are complementary
			Antacids			K: 0.18; PABAK: 0.90		
			Medications for peptic ulcer and gastro-oesophageal reflux			K: 0.15; PABAK: 0.89		
			Medications for functional gastrointestinal disorders			K: 0.00; PABAK: 0.97		
			Bile and liver therapy			K: 0.40; PABAK: 0.99		
			Laxatives and antidiarrheals			K: 0.00; PABAK: 0.99		
			Insulin			K: 0.50; PABAK: 0.99		
			Vitamins and mineral supplements			K: 0.00; PABAK: 0.94		
			Antithrombotic agents			K: 0.70; PABAK: 0.96		
			Heparins			K: 0.64; PABAK: 0.97		
			Platelet aggregation inhibitors			K: 0.76; PABAK: 0.98		
			Antihemorrhagics			K: 0.00; PABAK: 0.99		
			Iron			K: 0.49; PABAK: 0.59		
			Folic acid			K: 0.11; PABAK: 0.22		
			Solutions			K: 0.00; PABAK: 0.99		
			Antihypertensive medications			K: 0.86; PABAK: 0.99		
			Methyldopa			K: 0.00; PABAK: 0.99		
			Beta-blocking agents			K: 1.00; PABAK: 1.00		
			Calcium channel blockers			K: 0.83; PABAK: 0.99		
			ACE inhibitors			K: 0.00; PABAK: 0.99		
			Lipid modifying agents			K: 0.00; PABAK: 0.99		
			Diuretics			K: 0.00; PABAK: 0.99		
			Vasoprotectives			K: 0.00; PABAK: 0.99		
			Gynaecological anti-infective - antiseptics			K: 0.00; PABAK: 0.98		
			Sympathomimetics, labour repressants			K: 0.18; PABAK: 0.98		
			Prolactin inhibitors			K: 0.00; PABAK: 0.99		
			Hormonal contraceptives			K: 0.00; PABAK: 0.99		
			Estrogens			K: 0.00; PABAK: 0.99		
			Progestogens			K: 0.28; PABAK: 0.79		
			Gonadotrophins			K: 0.00; PABAK: 0.99		
			Glucocorticoids, systemic			K: 0.28; PABAK: 0.97		
			Thyroid preparations			K: 0.86; PABAK: 0.97		
			Thyroid hormones			K: 0.88; PABAK: 0.98		
			Antithyroid preparations			K: 0.00; PABAK: 0.99		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
			Antibiotics, systemic			K: 0.12; PABAK: 0.63		
			Antimycotics, systemic			K: 0.40; PABAK: 0.99		
			Antivirals, systemic			K: 0.33; PABAK: 0.99		
			Immune sera and immunoglobulins			K: 0.00; PABAK: 0.98		
			Non-steroidal anti-inflammatory drugs			K: 0.00; PABAK: 0.97		
			Bisphosphonates			K: 0.00; PABAK: 0.99		
			Non-opioid analgesics			K: 0.00; PABAK: 0.87		
			Selective serotonin agonists			K: 0.00; PABAK: 0.99		
			Antiepileptic medications			K: 1.00; PABAK: 1.00		
			Antidepressants			K: 0.00; PABAK: 0.99		
			Methadone			K: 0.00; PABAK: 0.99		
			Antiprotozoals and antinematodals			K: 0.00; PABAK: 0.99		
			Medications for obstructive airway disease			K: 0.27; PABAK: 0.93		
			Adrenergic inhalants			K: 0.49; PABAK: 0.98		
			Other inhalants			K: 0.08; PABAK: 0.94		
			Adrenergics, systemic			K: 0.00; PABAK: 0.99		
			Nasal decongestants and other topicals			K: 0.00; PABAK: 0.99		
			Cough and cold preparations			K: 0.00; PABAK: 0.99		
			Antihistamines for systemic use			K: 0.50; PABAK: 0.99		
Zhou[120] (2015, US)	Claims data (national), self-report (used as reference)	Cohort study (2,906)	Lisinopril	Current use	Legend-time (up to interview or occurring any time during next 30 days)	Percent agreement: 77%	Good to very good agreement	Poorer agreement for male veterans (vs any females); better agreement for discounted drugs vs total
			Atenolol			Percent agreement: 79%		
			Metformin			Percent agreement: 75%		
			Atorvastatin			Percent agreement: 73%		
			Amlodipine			Percent agreement: 72%		
			Valsartan			Percent agreement: 74%		
Bailey[121] (2016, US)	Claims data (national), medical records (manual and electronic; manual record review used as reference)	Random sample (150)	Flu vaccine	Past use	Fixed window (1 year)	Percent agreement: 88%; K: 0.74 Sn: 0.75; Sp: 0.97; PPV: 0.94; NPV: 0.85	Good agreement	

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
Carroll[122] (2016, Australia)	Claims data (national), self-report	Adults recently released from prison (864)	Any medication	Current use (1, 3, and 6 months after release)	Fixed window (1, 3, or 6 months)	K: 0.62, 0.66, 0.55 PPV: 0.68, 0.71, 0.68 NPV: 0.92, 0.94, 0.98	Reasonably good agreement	
			Antidepressant			K: 0.79, 0.68, 0.72 PPV: 0.77, 0.61, 0.69 NPV: 0.98, 0.99, 0.98		
			Antipsychotic			K: 0.72, 0.59, 0.84 PPV: 0.65, 0.54, 0.82 NPV: 0.99, 0.98, 0.99		
			Lipid-modifier			1 month: K: 0.62, 0.57, 0.63 PPV: 0.65, 0.56, 0.63 NPV: 0.99, 0.99, 0.99		
Colantonio[123] (2016, US)	Claims data (national), self-report, home inventory	Stroke, 45+ years (899)	Antidyslipidemics	Current use (in 2 weeks prior)	Fixed window (90 days prior)	K: 0.69 (home inventory vs claims), 0.65 (self-report vs claims)	Good agreement	Agreement between claims and home inventory (an objective measure of medication availability) is better than for claims with self-report Agreement improved with longer lookback periods Agreement worse with legend-time method
					Fixed window (120 days prior)	K: 0.72 (home inventory vs claims), 0.68 (self-report vs claims), 0.67 (self-report + home inventory vs claims)		
					Fixed window (180 days prior)	K: 0.74 (home inventory vs claims), 0.71 (self-report vs claims)		
					Legend-time	K: 0.62 (home inventory vs claims), 0.63 (self-report vs claims), 0.60 (self-report + home inventory vs claims)		
Daupin[124] (2016, Canada)	Prescription registry (regional), admission medication list	Gynaecological inpatients (344)	All medications	Current use	Extracted directly	Percent agreement: 48%	Reasonable agreement	
Drieling[125] (2016, US)	Claims data (regional), self-report	Women, population cohort	Statins	Current use	Legend-time	K: 0.96; Sn: 0.95; Sp: 0.99; PPV: 0.99	Good agreement	
			Calcium-channel blockers			K: 0.89; Sn: 1.00; Sp: 1.00; PPV: 1.00		
			Beta-blockers			K: 0.87; Sn: 0.97; Sp: 0.99; PPV: 0.98		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
		(223)	Biphosphonates			K: 0.95; Sn: 0.80; Sp: 0.99; PPV: 0.80		
Eichler[126(p201)] (2016, US)	Claims data (national), self-report	Multiple sclerosis or Parkinson's disease (565)	Alemtuzumab	Past use (last 5 years)	Fixed window (5 years prior)	Percent agreement: 100% (total), N/A (positive), 100% (negative)	Reasonable agreement	Agreement for medications worse than for diagnoses
			Dimethyl fumarate			Percent agreement: 83% (total), 90% (positive), 82% (negative)		
			Fingolimod			Percent agreement: 92% (total), 83% (positive), 93% (negative)		
			Glatarimer acetate			Percent agreement: 74% (total), 62% (positive), 77% (negative)		
			Interferon beta 1a			Percent agreement: 74% (total),67% (positive), 75% (negative)		
			Interferon beta 1b			Percent agreement: 87% (total), 48% (positive), 90% (negative)		
			Metoxantrone			Percent agreement: 96% (total), N/A (positive), 96% (negative)		
			Natalizumab			Percent agreement: 84% (total), 58% (positive), 86% (negative)		
			Peginterferon Beta 1			Percent agreement: 98% (total), 0% (positive), 100% (negative)		
			Teriflunomide			Percent agreement: 95% (total), 30% (positive), 97% (negative)		
			Any disease-modifying therapy			Percent agreement: 57% (total), 55% (positive), 60% (negative)		
Guerard[127] (2016, US)	Claims data (national), self-report	Random sample (4,325)	Prescription drugs	Current use	Fixed window (1 year prior)	Percent agreement: 56.6%; K: 0.34	Reasonable agreement	
Hamood[128] (2016, Israel)	Cancer registry, local claims records (used as reference)	Breast cancer (119)	Chemotherapy	Past use (before 2003 or 2003-2010)	Fixed window (within respective time period)	PPV: 44%, 92%	Good agreement	
			Hormone therapy			PPV: 0%, 100%		
Lacasse[129] (2016, Canada)	Claims data (regional), self-report	Chronic pain (272)	Nonspecific NSAIDs	Current use, or use in past 12 months	Fixed window (12 months prior)	K: 0.11; 0.15	Good agreement	Past year agreement lower for some classes of drugs
			COX-2-selective NSAIDs			K: 0.78; 0.63		
			Anticonvulsants			K: 0.66; 0.59		
			Antidepressants			K: 0.76; 0.70		
			Skeletal muscle relaxants			K: 0.66; 0.62		
			Synthetic cannabinoids			K: 0.66; 0.83		
			Opioid agonists			K: 0.67; 0.57		
			Antimigraine agents			K: 0.66; 0.36		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
Lopez-Simarro[130] (2016, Spain)	Claims data (local), self-report	Diabetes (320)	Antidiabetics	Adherence (dichotomised at 80%)	Legend-time	K: 0.01	Poor agreement	Claims data is more closely associated with disease control parameters
			Antihypertensives			K: 0.11		
			Lipid-lowering drugs			K: 0.01		
			Any drug			K: 0.08		
Young[131] (2016, US)	Claims data (national), self-report	Statin initiators, according to claims (766)	Statins	Initiation	Fixed window (1 year)	Sp: 0.80	Poor agreement	
Chan[132] (2017, Mongolia)	Immunisation registry (national), medical records (used as reference)	Children 2-23 months (1,273)	Pneumococcal conjugate vaccine	Ever use	Fixed window (any time)	Sn: 0.91	High agreement	
				Immunisation date		Percent agreement: 93%		
Demore[133] (2017, France)	Claims data (national), self-report	Convenience sample (653)	Any antibiotic	Past use (4 months), before and after prompt question	Fixed window (4 months prior)	Percent agreement: 81%; 82% K: 0.60; 0.63	Good agreement	Recent purchase associated with better recall; self-report reliable for generic but not specific exposure
			Specific antibiotic used			Percent agreement: 24%		
Gnjidic[134] (2017, Australia)	Claims data (national), self-report	Cohort study (500)	Agents acting on the renin-angiotensin system	Current use (last 4 weeks)	Fixed window (90 days prior)	Sn: 0.93; PPV: 0.98	Good agreement	Agreement better for chronic medications
			Lipid-modifying agents			Sn: 0.94; PPV: 0.97		
			Drugs for acid-related disorders			Sn: 0.86; PPV: 0.94		
			Antibacterial agents for systemic use			Sn: 0.05; PPV: 0.78		
			Calcium-channel blockers			Sn: 0.88; PPV: 0.97		
			Beta-blocking agents			Sn: 0.89; PPV: 0.93		
			Psychoanaleptic agents			Sn: 0.79; PPV: 0.93		
			Antithrombotic agents			Sn: 0.77; PPV: 0.98		
			Psycholeptics			Sn: 0.26; PPV: 0.66		
			Obstructive airway disease agents			Sn: 0.30; PPV: 0.81		
			Diuretics			Sn: 0.90; PPV: 0.80		
			Anti-inflammatory and antirheumatic agents			Sn: 0.48; PPV: 0.85		
			Diabetes agents			Sn: 0.90; PPV: 0.98		
			Ophthalmologic agents			Sn: 0.38; PPV: 1.00		
			Bone disease agents			Sn: 0.54; PPV: 0.86		
			Sex hormones and modulators			Sn: 0.42; PPV: 0.63		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed		Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
			Corticosteroids, dermatological agents				Sn: 0.00; PPV: N/A		
			Cardiac therapy agents				Sn: 0.79; PPV: 0.67		
			Anti-gout agents				Sn: 0.85; PPV: 0.88		
			Analgaesics				Sn: 0.42; PPV: 0.70		
			Corticosteroids for systemic use				Sn: 0.54; PPV: 0.86		
			Thyroid agents				Sn: 0.79; PPV: 0.59		
			Otologicals, anti-infectives				Sn: 0.00; PPV: N/A		
			Antiepileptics				Sn: 0.75; PPV: 0.75		
			Antihypertensives				Sn: 0.71; PPV: 0.80		
			Antidiarrheals, intestinal anti-inflammatory/antiinfective agents				Sn: 0.33; PPV: 0.80		
Harris[135] (2017, Australia)	Claims data (national), medical records (EHR) (used as reference)	Breast cancer female patients (110)	Chemotherapy protocols	ACTH - doxorubicin, cyclophosphamide, taxane and trastuzumab	Ever use Number of treatments Treatment duration (for chemotherapy protocols)	Extracted directly	N: 35 (claims) vs 64 (EHR); Percent agreement: 55% Median number of treatments: 30 (claims) vs 34 (EHR) Median treatment duration: 443 (claims) vs 422 (EHR)	Good agreement	Agreement for claims data influenced by reimbursement patterns
				TCH - docetaxel, carboplatin and trastuzumab			N: 32 (claims) vs 35 (EHR); Percent agreement: 91% Median number of treatments: 27 (claims) vs 29 (EHR) Median treatment duration: 368 (claims) vs 367 (EHR)		
				TH - paclitaxel and trastuzumab			N: 5 (claims) vs 5 (EHR); Percent agreement: 100% Median number of treatments: 19 (claims) vs 28 (EHR) Median treatment duration: 385 (claims) vs 371 (EHR)		
				Docetaxel, cyclophosphamide and trastuzumab			N: 3 (claims) vs 3 (EHR); Percent agreement: 100% Median number of treatments: 21 (claims) vs 25 (EHR) Median treatment duration: 377 (claims) vs 289 (EHR)		
				FEC-DH - 5-fluorouracil, epirubicin, docetaxel and trastuzumab			N: 1 (claims) vs 2 (EHR); Percent agreement: 50% Median number of treatments: 16 (claims) vs 16 (EHR)		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed		Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
							Median treatment duration: 68 (claims) vs 180 (EHR)		
				Docetaxel, doxorubicin, cyclophosphamide, followed by docetaxel and trastuzumab			N: 1 (claims) vs 0 (EHR); Percent agreement: 0%		
			Hormone therapy	Tamoxifen 20 mg			N: 31 (claims) vs 22 (EHR); Percent agreement: 71%		
				Anastrazole 1 mg			N: 24 (claims) vs 20 (EHR); Percent agreement: 83%		
				Letrozole 2.5 mg			N: 18 (claims) vs 15 (EHR); Percent agreement: 83%		
				Exemestane 25 mg			N: 1 (claims) vs 0 (EHR); Percent agreement: 0%		
				Toremifene 60 mg			N: 1 (claims) vs 0 (EHR); Percent agreement: 0%		
				Goseraline 3.6 mg			N: 2 (claims) vs 0 (EHR); Percent agreement: 0%		
Holdø[136] (2017, Norway)	Prescription registry (national), parental report	Children 0-18 months (47,413)	Alimemazine		Ever use	Fixed window (any time)	K: 0.46	Moderate agreement	No differences for agreement based on demographics
			Promethazine				K: 0.00		
			Dexchlorpheniramine				K: 0.44		
			Hypnotics and sedatives (nitrazepam, midazolam, melatonin)				K: 0.41		
			Anxiolytics (diazepam, clobazam, hydroxyzine)				K: 0.19		
			Recommended childhood antiepileptics (carbamazepine, oxcarbazepine, lamotrigine, topiramat, valproate)				K: 0.93		
Madewell[137] (2017, US)	Immunisation registry (regional), self-report	Random sample (533)	Diphtheria, tetanus, and acellular pertussis		Ever use	Fixed window (any time)	K: 0.49	Moderate agreement	Voluntary registry underestimates actual coverage
			Pneumococcal conjugate				K: 0.49		
			Haemophilus influenza type b				K: 0.46		
			Varicella				K: 0.39		
			Polio				K: 0.39		
			Measles, mumps, and rubella				K: 0.35		
			Hepatitis B				K: 0.17		
Zhao[138]	Claims data (regional),	Pregnant women (93)	Antidepressants	Selective serotonin reuptake inhibitor	Use at any time during	Legend-time	Entire pregnancy: PPV: 1.00; NPV: 0.96	Good agreement	

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed		Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
(2017, Canada)	self-report (used as reference)				specified period		1st trimester – PPV: 1.00; NPV: 0.90		
				Noradrenergic and specific serotonergic antidepressants			Entire pregnancy – PPV: 1.00; NPV: 0.99 1st trimester – PPV: 1.00; NPV: 0.93		
				Serotonin antagonist and reuptake inhibitor			Entire pregnancy – PPV: 1.00; NPV: 0.99 1st trimester – PPV: 1.00; NPV: 0.99		
				Norepinephrine-dopamine reuptake inhibitor			Entire pregnancy – PPV: 1.00; NPV: 1.00 1st trimester – PPV: 1.00; NPV: 1.00		
				Serotonin-norepinephrine reuptake inhibitor			Entire pregnancy – PPV: 1.00; NPV: 0.99 1st trimester – PPV: 1.00; NPV: 1.00		
				Tricyclic			Entire pregnancy – PPV: 0.50; NPV: 1.00 1st trimester – PPV: 1.00; NPV: 1.00		
			Chronic medications	Thyroid hormones			Entire pregnancy – PPV: 1.00; NPV: 0.98 1st trimester – PPV: 1.00; NPV: 1. 00		
				Asthma medications (fluticasone, budesonide)			Entire pregnancy – PPV: 0.80; NPV: 0.93 1st trimester – PPV: 1.00; NPV: 0.97		
			Acute medications	Antibiotics			Entire pregnancy – PPV: 0.87; NPV: 0.92 1st trimester – PPV: 0.38; NPV: 0.95		
			As needed medications	Antiemetics			Entire pregnancy – PPV: 0.78; NPV: 0.96 1st trimester – PPV: 0.77; NPV: 0.96		
				Asthma medications (salbutamol)			Entire pregnancy – PPV: 0.33; NPV: 0.99		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
						1st trimester – PPV: 0.20; NPV: 0.97		
De Castro[139(p201)] (2017, Spain)	Claims data (local), self-report	Inflammatory bowel disease (203)	Oral mesalazine	Adherence (continuous)	Legend-time	Correlation index (r^2): 0.08	Poor agreement	Medication adherence questionnaire is not accurate enough to screen for non-adherence (based on claims data)
			Thiopurines			Correlation index (r^2): 0.07		
Cheung[140] (2017, Netherlands)	Claims data (local), self-report	Pregnant women (2,637)	Selective serotonin receptor inhibitors	Current use (last 6 months if in first trimester, last 3 months afterwards)	Not detailed	Yule's Y: 0.88; Sn: 0.67; Sp: 0.99	Good agreement	Non-Western ethnicities showed lower agreement; good concordance for chronic conditions but lower for acute medications
			Benzodiazepines			Yule's Y: 0.79; Sn: 0.61; Sp: 0.98		
			Folic acid			Yule's Y: 0.45; Sn: 0.36; Sp: 0.94		
			Antibiotics			Yule's Y: 0.51; Sn: 0.65; Sp: 0.84		
			Antiasthmatics			Yule's Y: 0.68; Sn: 0.74; Sp: 0.91		
			Antihistamines			Yule's Y: 0.61; Sn: 0.41; Sp: 0.96		
Savitz[141] (2017, US)	Claims data (national). self-report	Population cohort (2,099)	Atenolol, lisinopril, metformin, amlodipine, atorvastatin, valsartan	Current use	Legend-time (medication available until up to 30 days before assessment)	K: 0.8	Good agreement	Agreement lower for participants with low adherence
Bryan[142] (2018, US)	Immunisation registry (regional), medical records	Children with acute respiratory illness at hospital admission (450)	Vaccinations (up-to-date schedule)	Ever use	Fixed window (any previous)	Sn: 0.99; Sp: 0.12; PPV: 0.45; NPV: 0.91	Poor agreement	Medical records less reliable as may rely on parent reporting
Durand[143(p201)] (2018, Ireland)	Claims data (national), self-report, drug levels (used as reference)	Resistant hypertension (204)	Anti-hypertensive drugs	Adherence (dichotomised) – defined in claims as filling 3/4 quarterly scripts or 9/12 monthly scripts	Fixed window (1 year)	Correlation: - Refill vs self-report: 0.30, 0.17 - Refill vs drug levels: 0.00 - Drug levels vs self-report: 0.01, 0.04	Reasonable agreement	No association between drug levels and any other measure

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed		Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
Frank[144] (2018, Norway)	Prescription registry (national), self-report	Pregnant women (56,148)	Thyroid hormone replacement		Past use	Fixed window (during pregnancy)	K: 0.86 (6 months pre-pregnancy), 0.83 (first trimester), 0.89 (second trimester), 0.57 (third trimester)	High agreement	
Hafferty[145] (2018, UK)	Claims data (national),self-report	Population cohort, adults (10,244)	Antidepressant		Current use	Fixed window (3 or 6 months prior)	K: 0.84, 0.85; Sn: 0.90, 0.85 Sp: 0.99, 0.99; PPV: 0.90, 0.89	Good agreement	
			Mood stabilizer				K: 0.40, 0.42; Sn: 0.41, 0.40 Sp: 0.99, 0.99; PPV: 0.41, 0.45		
			Cholesterol-lowering medication				K: 0.92, 0.95; Sn: 0.97, 0.97 Sp: 0.98, 0.99; PPV: 0.90, 0.95		
			Antihypertensive				K: 0.90, 0.90; Sn: 0.89, 0.86 Sp: 0.99, 1.00; PPV: 0.95, 0.98		
			Aspirin				K: 0.81, 0.84; Sn: 0.97, 0.95 Sp: 0.97, 0.98; PPV: 0.72, 0.78		
			Insulin				K: 0.87, 0.93; Sn: 1.00, 1.00 Sp: 1.00, 1.00; PPV: 0.78, 0.88		
			HRT (females only)				K: 0.62, 0.78; Sn: 0.92, 0.91 Sp: 0.97, 0.98; PPV: 0.49, 0.70		
			Oral contraceptives (females only)				K: 0.55, 0.73; Sn: 0.82, 0.82 Sp: 0.92, 0.95; PPV: 0.47, 0.72		
Cohen[146] (2018, Norway)	Prescription registry (national), self-report (used as reference)	Parents of ongoing pregnancies (42,848)	Medications used chronically	Antiepileptics	Past use (6 months pre-pregnancy)	Legend-time (using 1 or 2 distinct events); K presented only for analyses using 1 event	K: 0.87; Sn: 0.93, 0.76; Sp: 0.99, 1.00; PPV: 0.81, 0.91; NPV: 1.00, 1.00	Good agreement	Agreement worse for episodic or over-the-counter medications; requiring 2 events has a great impact on sensitivity, especially for episodic medications, and does not improve specificity to a great degree; self-report may be only option for over-the-counter medications
				Antipsychotics			K: 0.63; Sn: 0.87, 0.67; Sp: 1.00, 1.00; PPV: 0.50, 0.80; NPV: 1.00, 1.00		
				Antidepressants			K: 0.74; Sn: 0.93, 0.78,; Sp: 1.00, 0.98; PPV: 0.62, 0.76; NPV: 1.00, 1.00		
			Medications used episodically	Anti-infectives for systemic use			K: 0.19; Sn: 0.67, 0.26; Sp: 0.89, 0.98; PPV: 0.13, 0.23; NPV: 0.99, 0.98		
				Opioids			K: 0.32; Sn: 0.56, 0.26; Sp: 0.97, 1.00; PPV: 0.24, 0.50; NPV: 0.99, 0.99		
				Anxiolytics			K: 0.40; Sn: 0.60, 0.36; Sp: 1.00, 1.00; PPV: 0.30, 0.41; NPV: 1.00, 1.00		
				Hypnotics and sedatives			K: 0.32; Sn: 0.70, 0.39; Sp: 0.99, 1.00; PPV: 0.21, 0.41; NPV: 1.00, 1.00		
			Over-the-counter medications	NSAIDs			K: 0.20; Sn: 0.31, 0.13; Sp: 0.92, 0.99; PPV: 0.24, 0.48; NPV: 0.94, 0.93		
				Paracetamol			K: 0.02; Sn: 0.02, 0.37; Sp: 1.00, 1.00; PPV: 0.36, 0.48; NPV: 0.85, 0.85		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
King[147] (2018, US)	Immunisation registry (regional), self-report	Acute respiratory illness (1,814)	Flu vaccine	Past use (current or previous year)	Fixed window (current and previous year)	K: 0.95, 0.85; Sn: 0.98, 0.97; Sp: 0.97, 0.88; PPV: 0.98, 0.93; NPV: 0.98, 0.94	High agreement	Validity of self-reported data poorer for exposure occurring further back in time
Marquez-Contreras[148] (2018, Spain)	Claims data (regional), electronic monitor (used as reference)	Hypertension (102)	Anti-hypertensives	Adherence (dichotomised)	Legend-time (6 month intervals)	Visit 1 (6 months): K: 0.29; Sn: 0.29; Sp: 0.95; PPV: 0.60; NPV: 0.84 Visit 2 (12 months): K: 0.41 Sn: 0.50; Sp: 0.92; PPV: 0.90; NPV: 0.94 Visit 3 (18 months): K: 0.62 Sn: 0.73; Sp: 0.90; PPV: 0.70; NPV: 0.91 Visit 4 (24 months): K: 0.78 Sn: 0.87; Sp: 0.93; PPV: 0.80; NPV: 0.96 Area-under-the-curve: 0.903	Good agreement	
Sediq[149] (2018, Netherlands)	Prescription registry (national), self-report	Cohort study (16,367)	Drugs for acid-related disorders	Current use	Fixed window (90 days)	K: 0.64	Good agreement	Agreement varies greatly per drug group; self-report less adequate to capture as-needed, sporadic, or topical medications; best accuracy achieved by triangulating both sources; longer time windows preferable for chronic medications with 3-monthly refills, but no major impact on acute medications
			Drugs for gastrointestinal disorders			K: 0.50		
			Drugs for constipation			K: 0.51		
			Antidiarrheals			K: 0.51		
			Antidiabetics			K: 0.83		
			Antithrombotics			K: 0.78		
			Antianemics			K: 0.52		
			Cardiac therapy			K: 0.60		
			Diuretics			K: 0.79		
			Vasoprotectives			K: 0.21		
			Beta blocking agents			K: 0.79		
			Ca2+ channel blockers			K: 0.79		
			Drugs acting on the RAAS			K: 0.81		
			Lipid modifying agents			K: 0.82		
			Antifungals			K: 0.26		
			Emollients			K: 0.19		
			Antipsoriatics			K: 0.37		
			Antibiotics			K: 0.13		
			Corticosteroids			K: 0.23		
			Anti-acne drugs			K: 0.39		
			Gynecological anti-infectives			K: 0.09		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
			Sex hormones			K: 0.43		
			Urologicals			K: 0.70		
			Corticosteroids			K: 0.28		
			Thyroid therapy			K: 0.83		
			Antibacterials			K: 0.13		
			Antimycotics			K: 0.22		
			Antivirals			K: 0.43		
			Antineoplastics			K: 0.53		
			Endocrine therapy			K: 0.72		
			Immunosuppressants			K: 0.54		
			Anti-inflammatory agents			K: 0.33		
			Anti-gout agents			K: 0.67		
			Bisphosphonates			K: 0.80		
			Analgesics			K: 0.43		
			Antiepileptics			K: 0.70		
			Psycholeptics			K: 0.52		
			Psychoanaleptics			K: 0.75		
			Antiprotozoals			K: 0.19		
			Nasal preparations			K: 0.51		
			Drugs for obstructive airway diseases			K: 0.61		
			Cough and cold medications			K: 0.17		
			Antihistamines			K: 0.50		
			Ophthalmologicals			K: 0.40		
			Otologicals			K: 0.13		
Stephenson[150] (2018, US)	Claims data (national sample), self-report	Atrial fibrillation (675)	Oral anticoagulation	Adherence (dichotomised at 80%)	Legend-time (in 12 months prior)	K: 0.065 Sn: 0.41; Sp: 0.66 PPV: 0.52; NPV: 0.55	Poor agreement	Non-adherence assessed by claims better approximates total healthcare utilisation costs
Weerasinghe[151] (2018, Canada)	Cancer registry (regional), medical records (used as reference)	Women with breast cancer (2,401)	Any chemotherapy	Past use	Fixed window (within 18 months after diagnosis and 3 months after medical record abstraction)	K: 0.80 Sn: 0.78; Sp: 0.99; PPV: 0.98; NPV: 0.89	Moderate to almost perfect agreement	Agreement may be affected by some hospitals not reporting data to the registry
			Fluorouracil, Epirubicin, Cyclophosphamide, Docetaxel			K: 0.68 Sn: 0.72; Sp: 0.95; PPV: 0.92; NPV: 0.81		
			Adriamycin, Cyclophosphamide			K: 0.71 Sn: 0.61; Sp: 1.00; PPV: 0.99; NPV: 0.93		
			Adriamycin, Cyclophosphamide, Paclitaxel/Taxol			K: 0.73 Sn: 0.65; Sp: 0.99; PPV: 0.93; NPV: 0.94		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
			Taxotere, Cyclophosphamide or Carboplatin			K: 0.56 Sn: 0.51; Sp: 0.98; PPV: 0.72; NPV: 0.95		
			Fluorouracil, Epirubicin, Cyclophosphamide			K: 0.73 Sn: 0.63; Sp: 1.00; PPV: 0.94; NPV: 0.97		
Anderson[152] (2019, US)	Claims data (national), medical records (used as reference)	Adults with hypertension or diabetes (207)	ACE inhibitors, beta-blockers, calcium-channel blockers, diuretics, biguanides, insulins, sulphonylureas	Current use	Fixed window (1 record in prior 30, 90, 180, or 365 days, or 2 records in prior 180 or 365 days)	Sn: 0.36, 0.81, 0.93, 0.95, 0.74, 0.89; Sp: 0.99, 0.98, 0.97, 0.93, 0.98, 0.98; PPV: 0.96, 0.92, 0.89, 0.80, 0.91, 0.85; NPV: 0.85, 0.98, 0.98, 0.98, 0.93, 0.97	High agreement	Algorithms with longer lookback windows or which allow for imperfect adherence (through grace periods) perform better; fixed-window generally better than legend-time
					Legend-time	Index date within most recent medication availability period (fill date + days supply): Sn: 0.77; Sp: 0.98; PPV: 0.93; NPV: 0.94		
						Index date within most recent medication availability period + 30 days: Sn: 0.87; Sp: 0.98; PPV: 0.92; NPV: 0.96		
						Index date within most recent medication availability period + 60 days: Sn: 0.91; Sp: 0.97; PPV: 0.91; NPV: 0.97		
						Index date within most recent medication availability period + 90 days: Sn: 0.92; Sp: 0.97; PPV: 0.89; NPV: 0.98		
						Index date within most recent medication availability period + 110% of days supplied: Sn: 0.80; Sp: 0.98; PPV: 0.93; NPV: 0.95		
						Index date within most recent medication availability period + 125% of days supplied: Sn: 0.85; Sp: 0.98; PPV: 0.93; NPV: 0.96		
Bercovich[153] (2019, Israel)	Immunisation registry (national), parent report	Children aged 2-59 months (1,272)	Rotavirus vaccination	Ever use	Fixed window (any previous record)	K: 0.69; Sn: 0.97; Sp: 0.75	Good agreement	High sensitivity but lower specificity
Evandt[154] (2019, Norway)	Claims data (national), self-report	Cohort study (13,019)	Hypnotics/sleep medication	Current use or ever use	Fixed window (last 100 days, last 200 days with one or two	Last 100 days –K: 0.58 Self-report reference – Sn: 0.52; Sp: 0.98	Good agreement	Neither source can be considered a gold-standard

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
	- both used as reference				or more events, or since 2004 – database inception)	RCD reference – Sn: 0.76; Sp: 0.94 Last 200 days (1 event)– K: 0.64 Self-report reference – Sn: 0.66; Sp: 0.96 RCD reference – Sn: 0.70; Sp: 0.96 Last 200 days (2+ events)– K: 0.53 Self-report reference – Sn: 0.42; Sp: 0.99 RCD reference – Sn: 0.86; Sp: 0.93 Since 2004 – K: 0.60 Self-report reference – Sn: 0.76; Sp: 0.89 RCD reference – Sn: 0.63; Sp: 0.94		for hypnotics and anxiolytics; agreement best for 1 event in the last 200 days (~6 months) – possibly due to "as-needed" medications than may be filled in irregular intervals; agreement better for current vs any previous use, but specificity high in all conditions assessed; agreement worse if requiring 2 events vs 1 only; higher prevalence of current use of psychotropics in RCD could represent either recall or social desirability bias; higher prevalence of ever-use in RCD (which only dates back to 2004) suggests recall bias or not thinking that sporadic use in the past was relevant
			Anxiolytics/tranquilizers			Last 100 days – K: 0.41 Self-report reference – Sn: 0.36; Sp: 0.98 RCD reference – Sn: 0.58; Sp: 0.99 Last 200 days (1 event)– K: 0.45 Self-report reference – Sn: 0.46; Sp: 0.97 RCD reference – Sn: 0.50; Sp: 0.90 Last 200 days (2+ events)– K: 0.39 Self-report reference – Sn: 0.33; Sp: 0.99 RCD reference – Sn: 0.69; Sp: 0.95 Since 2004 – K: 0.42 Self-report reference – Sn: 0.56; Sp: 0.90		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
			Blood-pressure medication			RCD reference – Sn: 0.47; Sp: 0.93 Last 100 days – K: 0.84 Self-report reference – Sn: 0.88; Sp: 0.97 RCD reference – Sn: 0.88; Sp: 0.97 Last 200 days (1 event)– K: 0.88 Self-report reference – Sn: 0.86; Sp: 0.99 RCD reference – Sn: 0.96; Sp: 0.96 Last 200 days (2+ events)– K: 0.66 Self-report reference – Sn: 0.93; Sp: 0.99 RCD reference – Sn: 0.96; Sp: 0.90 Since 2004 – K: 0.61 Self-report reference – Sn: 0.95; Sp: 0.92 RCD reference – Sn: 0.79; Sp: 0.98		
Joseph[155] (2019, UK)	Primary care records (national), self-report (used as reference)	Rheumatoid arthritis with oral corticosteroids prescribed in past 2 years (78)	Oral corticosteroids	Current use	Legend-time	Sn: 0.84; Sp: 0.88; PPV: 0.87; NPV: 0.85	Mixed agreement (high for oral but not for injectable exposure)	Need to consider if intended exposure is well captured in the dataset (e.g. secondary care administration)
				Dose	Extracted directly	Correlation coefficient: 0.46 Mean difference: 2.4 mg		
			Injectable corticosteroids	Ever use	Fixed window (any record)	K: 0.14		
				Date of injections	Extracted directly	Median difference: 2 years		
Glassberg[156] (2019, US)	Claims data (national), self-report (used as reference)	One chronic condition (diabetes, hypertension, hyperlipidemia, mental health	Cardiovascular, diabetes, mental health, anti-parskinsonism, and oral respiratory drugs	Adherence (Proportion of Days Covered [PDC] >80%)	Legend-time	Sn: 0.33	Mixed agreement	Claims underestimates adherence; main reason for misclassification is appropriate medication discontinuation
				Adherence (<30 days gap without assumed		Sn: 0.84		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed		Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
		disorders, and asthma) (1,425)			medication possession)				
Hashibe[157] (2019, US)	Claims data (regional), cancer registry (regional), medical records (used as reference)	Breast or colorectal cancer (10,759)	Chemotherapy	Breast	Past use	Fixed-window (2013-2014)	Cancer registry: Sn: 0.66; Sp: 0.97 Claims data: Sn: 0.57; Sp: 0.89 Both: Sn: 0.70; Sp: 0.86	Good agreement	Claims data improves sensitivity of cancer registries but reduces specificity; triangulation of evidence should be performed
				Colorectal			Cancer registry: Sn: 0.88; Sp: 0.99 Claims data: Sn: 0.77; Sp: 0.90 Both: Sn: 0.95; Sp: 0.89		
			Hormonal treatment	Breast			Cancer registry: Sn: 0.79; Sp: 0.84 Claims data: Sn: 0.75; Sp: 0.69 Both: Sn: 0.95; Sp: 0.58		
Hollenbach[158] (2019, US)	Claims data (regional), parent report	Asthma (206)	Systemic corticosteroid use		Past use (12 months prior)	Fixed window (12 months prior)	K: 0.02 Percent agreement: 16%	Poor agreement	
Lam[159] (2019, US)	Claims data (regional), pharmacy records (local, used as reference)	Participants in a pharmacy vaccination program (243)	Tetanus-diphtheria-acellular pertussis/diphtheria-tetanus-acellular pertussis		Ever use	Fixed window (any previous use)	K: -0.008	Poor agreement	Claims data more complete than local pharmacy data; triangulation of evidence improves discrimination
			Zoster vaccine live				K: -0.028		
			13-valent pneumococcal conjugate vaccine				K: -0.016		
			23-valent pneumococcal polysaccharide vaccine				K: 0.005		
			Hepatitis B vaccine series				K: 0.000		
			Human papillomavirus vaccine				K: 0.000		
Oksuzyan[160] (2019, Denmark)	Prescription registry (national), self-report, parental report	Cohort study (4,590)	Acid-related disorders		Current use	Fixed window (4 months prior)	K: 0.55 (self), 0.36 (parental)	Good agreement	
			Antithrombotic agents				K: 0.52 (self), 0.41 (parental)		
			Cardiac therapy				K: 0.85 (self), 0.60 (parental)		
			Diuretics				K: 0.78 (self), 0.43 (parental)		
			Analgesics				K: 0.53 (self), 0.45 (parental)		
			Psycholeptics				K: 0.58 (self), 0.42 (parental)		
			Medicines for obstructive airway disease				K: 0.81 (self), 0.83 (parental)		
Riis[161] (2019, Denmark)	Prescription registry (national), drug levels	Cancer (147)	Statins		Current use	Legend-time	PPV: 0.93; NPV: 0.93	Good agreement	

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
	(used as reference)							
Rodriguez-Blanco[162] (2019, Spain)	Vaccination registry (national), self-report	Pregnant women (1,017)	Influenza vaccination	Ever use	Extracted directly	K: 0.97	Good agreement	
			Pertussis vaccination			K: 0.92		
Uitvlugt[163] (2019, Netherlands)	Prescription registry (national), medication reconciliation (used as reference)	Hospitalised patients (66)	All medications	Current use	Direct extraction	17% of participants with no discrepancies 66% of medication records with no discrepancy	Poor agreement	Most common error was omission
Fukai[164] (2020, Japan)	Claims data (local), self-report	Employees at large companies (61,676)	Antihypertensives	Current use	Fixed window (1, 2, 3, or 12 months prior)	Percent agreement: 95%, 97%, 98%, 96% K: 0.69, 0.85, 0.87, 0.83 Sn: 0.90, 0.90, 0.90, 0.77 Sp: 0.95, 0.98, 0.98, 0.99 PPV: 0.59, 0.82, 0.87, 0.94 NPV: 0.99, 0.99, 0.97, 0.97	Near-perfect agreement	Agreement improved when using 3-month period vs 1, 2, or 12 months
			Oral antidiabetics or insulin			Percent agreement: 99%, 99%, 99%, 99% K: 0.74, 0.87, 0.89, 0.86 Sn: 0.90, 0.90, 0.90, 0.79 Sp: 0.99; 1.00, 0.98, 1.00 PPV: 0.64, 0.86, 0.87, 0.96 NPV: 1.00, 1.00, 0.97, 0.99		
			Antidyslipidemics			Percent agreement: 96%, 97%, 98%, 97% K: 0.65, 0.81, 0.83, 0.80 Sn: 0.86, 0.86, 0.90, 0.73 Sp: 0.96, 0.98, 0.98, 0.99 PPV: 0.55, 0.78, 0.87, 0.91 NPV: 0.99, 0.99, 0.97, 0.97		
Jensen[165] (2020, Denmark)	Hospital medication administration database (local), manual	In-hospital drug administrations (227)	Any medication	Generic name	Direct extraction	Percent agreement: 98%	Good agreement	
				Brand name		Percent agreement: 93%		
				Dose		Percent agreement: 94%		
				Time		Percent agreement: 97%		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed		Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
	administration verifications (used as reference)								
Laursen[166] (2020, Sweden)	Prescription registry (national), self-report	Pregnant women (220)	Medicines for chronic conditions/ regular use	All medications	Past use (during pregnancy)	Fixed window (any record during pregnancy)	Positive percent agreement: 65%	Good agreement	Agreement improved if included records in the 6 months before pregnancy
				Antidepressants			Positive percent agreement: 66%		
				Thyroid therapy			Positive percent agreement: 95%		
				Cardiovascular drugs			Positive percent agreement: 33%		
				Antiepileptics			Positive percent agreement: 82%		
				Intestinal antiinflammatory agents			Positive percent agreement: 88%		
				Antipsychotics			Positive percent agreement: 50%		
				Platelet aggregation inhibitors ex heparin			Positive percent agreement: 57%		
				Insulin			Positive percent agreement: 100%		
				Oral antidiabetics			Positive percent agreement: 62%		
				ADHD treatment			Positive percent agreement: 67%		
				Immunosuppressant			Positive percent agreement: 0%		
				Other chronic conditions/ regular use			Positive percent agreement: 22%		
			Medicines for chronic conditions/ nonregular use	All medications			Positive percent agreement: 41%		
				Antiasthmatics			Positive percent agreement: 49%		
				Paracetamol/antiinflammatory drugs			Positive percent agreement: 30%		
				Antimigraines			Positive percent agreement: 36%		
				Antihistamines			Positive percent agreement: 63%		
				Nucleosides, nucleotides			Positive percent agreement: 10%		
				Other medicines for chronic conditions/nonregular use			Positive percent agreement: 17%		
			Medicines for occasional or	All medications			Positive percent agreement: 46%		
				Antibiotics (systemic)			Positive percent agreement: 61%		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed		Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
			short term use	Topical dermatological, incl. antiacne			Positive percent agreement: 21%		
				Ear, eye, nose and throat preparations			Positive percent agreement: 37%		
				Topical dermatological, corticosteroids			Positive percent agreement: 19%		
				Opioids			Positive percent agreement: 47%		
				Antifungal (systemic)			Positive percent agreement: 50%		
				Anxiolytics, hypnotics and sedatives			Positive percent agreement: 0%		
				Other medication for occasional or short term use			Positive percent agreement: 13%		
			Pregnancy related medication	All medications			Positive percent agreement: 56%		
				Gynaecological antiinfectives			Positive percent agreement: 57%		
				Progesterone			Positive percent agreement: 63%		
				Antiemetics			Positive percent agreement: 56%		
				Haemorrhoids treatment			Positive percent agreement: 41%		
				Acid related disorders			Positive percent agreement: 55%		
				Heparin			Positive percent agreement: 100%		
				Constipation			Positive percent agreement: 67%		
			All medications				Positive percent agreement: 50%		
Sharma[167] (2020, US)	Claims data (national), medical records (used as reference)	Cancer (170)	Oral anticancer agents		Ever use	Extracted directly	K: 0.47; Percent agreement: 73%	Moderate agreement	
Voss[168] (2020, Denmark)	Vaccination registry (national), parent reports	Children aged 5 (340)	Tetanus, diphtheria, pertussis and polio booster vaccination		Ever use	Extracted directly	Sn: 0.62	Poor agreement	Registry underestimates coverage

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
	(used as reference)							
Wilson[169] (2020, Canada)	Vaccination registry (regional), medical records (used as reference)	Children aged 7 (2,657)	4 (or 5) doses of DTaP	Ever use	Fixed window (any previous records)	Sn: 0.96; PPV: 0.89	High completeness	
			3 (or 4) doses of Polio			Sn: 0.96; PPV: 0.89		
			2 doses of MMR			Sn: 0.99; PPV: 0.89		
			1 dose of Men-C			Sn: 0.96; PPV: 0.89		
			Overall			Sn: 0.96; PPV: 0.89		
Bülow[170] (2021, Denmark)	Prescription registry (national), medication reconciliation (used as reference)	Patients aged 50+ and admitted to hospital with 5+ medications (260)	All medications	Current use	Extracted directly	88% had discrepancies	Poor agreement	RCD is inaccurate; most discrepancies due to issues with healthcare system records (rather than patients)
Brüne[171] (2021, Germany)	Claims data (national), self-report	Diabetes (494)	All diabetes drugs	Initiation	Fixed window (3 or 6 months prior, and no records within 6 months before)	K: 0.52, 0.62 Sn: 0.48, 0.60; PPV: 0.57, 0.65	Moderate agreement	6 month observation window improves agreement
			Insulins and analogs			K: 0.46, 0.60 Sn: 0.38, 0.57; PPV: 0.63, 0.65		
			Blood glucose lowering drugs, excluding insulins			K: 0.62, 0.62 Sn: 0.72, 0.63; PPV: 0.62, 0.64		
Celind[172] (2021, Sweden)	Prescription registry (national), parent reports	Children aged 11-13 with asthma (3,634)	Any asthma medication	Current use	Fixed window (any record between ages 11-13)	K: 0.71	Good agreement	
Dalli[173] (2021, Australia)	Claims data (national), self-report (used as reference)	Stroke (630)	Antihypertensive	Current use	Fixed window (4 months)	Sn: 0.85; Sp: 0.73; PPV: 0.93	High agreement	
			Lipid-lowering			Sn: 0.87; Sp: 0.78; PPV: 0.94		
			Antithrombotic			Sn: 0.61; Sp: 0.85; PPV: 0.97		
Howe[174] (2021, New Zealand)	Vaccination registry (national), parent report (used as reference)	Children aged 1-4 (N/A)	Vaccinations	Ever use	Extracted directly	Sn: 0.90-0.93; Sp: 0.78-0.85; PPV: 0.91-0.94; NPV: 0.7-0.84	Good agreement	

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
Jensen[175] (2021, Denmark)	Claims data (national), self-report	Asthma (178)	Inhaled corticosteroids	Adherence (continuous)	Fixed window (12 months prior)	Regression coefficient: 0.36 R^2: 0.082	Poor agreement	Majority of patients report 100% adherence but have claims data adherence between 0-100%
Matsumoto[176] (2021, Japan)	Claims data (local), self-report	Cohort study (2,472)	Antihypertensives	Current use	Fixed window (3 or 6 months)	K: 0.92. 0.92 Sn: 0.95, 0.94; Sp: 0.97, 0.97	Good agreement	Agreement influenced by education
			Antidiabetics			K: 0.89, 0.88 Sn: 0.94, 0.92; Sp: 0.98, 0.99		
			Antidyslipidemics			K: 0.85, 0.86 Sn: 0.94, 0.92; Sp: 0.98, 0.99		
Moura[177] (2021, Canada)	Claims data (regional), self-report	Cohort study, 40-69 years (7,276)	Systemic hormonal preparations	Current use	Fixed window (30 or 90 days prior)	K: 0.84; 0.91 (all reported) K: 0.86; 0.92 (label-confirmed)	Good agreement	Agreement slightly improved by confirming labels and by using 90 day periods (especially for chronically used drugs); agreement influenced by gender (and different per drug group), improved with higher education, and worse with heavy healthcare use, and polypharmacy; evidence of recall bias since number of drugs was higher in patients who brought the packages
			Antineoplastic and immunomodulating agents			K: 0.83; 0.90 (all reported) K: 0.83; 0.84 (label-confirmed)		
			Cardiovascular system			K: 0.83; 0.90 (all reported) K: 0.90; 0.89 (label-confirmed)		
			Musculo-skeletal system			K: 0.75; 0.78 (all reported) K: 0.76; 0.80 (label-confirmed)		
			Blood and blood-forming organs			K: 0.74; 0.82 (all reported) K: 0.74; 0.81 (label-confirmed)		
			Genito-urinary system and sex hormones			K: 0.72; 0.81 (all reported) K: 0.75; 0.83 (label-confirmed)		
			Antiparasitic, insecticides and repellents			K: 0.71; 0.69 (all reported) K: 0.69; 0.70 (label-confirmed)		
			Nervous system			K: 0.67; 0.70 (all reported) K: 0.66; 0.71 (label-confirmed)		
			Various			K: 0.67; 0.61 (all reported) K: 0.67; 0.57 (label-confirmed)		
			Sensory organs			K: 0.59; 0.70 (all reported) K: 0.62; 0.66 (label-confirmed)		
			Anti-inflammatory agents			K: 0.55; 0.59 (all reported) K: 0.53; 0.57 (label-confirmed)		
			Alimentary tract and metabolism			K: 0.50; 0.57 (all reported) K: 0.44; 0.54 (label-confirmed)		
			Respiratory system			K: 0.46; 0.54 (all reported) K: 0.46; 0.56 (label-confirmed)		
			Anti-infectives			K: 0.37; 0.26 (all reported) K: 0.39; 0.33 (label-confirmed)		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
Nowalk[178] (2021, US)	Vaccination registry (regional), medical records (used as reference), self-report (used as reference)	Participants in flu vaccination programs (9,930)	Flu vaccination	Past use (1 year)	Extracted directly	Registry vs self-report: K: 0.54; percent agreement: 77% Sn: 0.69; Sp: 0.88; PPV: 0.90; NPV: 0.65 Registry vs medical records: K: 0.52; percent agreement: 77% Sn: 0.56; Sp: 0.95; PPV: 0.90; NPV: 0.72	Good agreement	Triangulation of evidence is the best method to ascertain definitive exposure
Payen[179] (2021, France)	Claims data (national), medication reconciliation (used as reference)	Patients admitted to hospital (328)	All medications	Current use	Fixed window (3 months prior)	Sn: 0.90; PPV: 0.50	Moderate agreement	
Pedersen[180] (2021, Norway)	Claims data (national), self-report	Coronary artery disease, (1,483)	Antihypertensives	Current use	Fixed window (6 months) or legend-time (using units or daily-defined doses)	K: 0.81, 0.78, 0.62 Sn: 0.94, 0.95, 0.97 Sp: 0.88, 0.95, 0.97 PPV: 0.96, 0.92, 0.78 NPV: 0.84, 0.88, 0.93	High agreement	Legend-time methods generate worse agreement - sensitivity improved slightly (older prescriptions with large amounts/small doses enough to last until moment of assessment and which are still being taken) but greatly reduce specificity (older prescriptions with large amounts/small doses enough to last until moment of assessment, but which are no
			Lipid-lowering			K: 0.78, 0.67, 0.63 Sn: 0.97, 0.98, 0.98 Sp: 0.78, 0.64, 0.60 PPV: 0.92, 0.83, 0.80 NPV: 0.84, 0.88, 0.93		
			Aspirin			K: 0.69, 0.60, 0.60 Sn: 0.86, 0.86, 0.86 Sp: 0.90, 0.74, 0.7 PPV: 0.96, 0.87, 0.87 NPV: 0.69, 0.72, 0.72		
			ACE inhibitor			K: 0.85, 0.80, 0.83 Sn: 0.80, 0.82, 0.81 Sp: 1.00, 0.98, 0.98 PPV: 0.97, 0.90, 0.85 NPV: 0.96, 0.97, 0.97		
			Angiotensin-receptor blocker			K: 0.83, 0.80, 0.79 Sn: 0.79, 0.80, 0.79 Sp: 0.99, 0.97, 0.97 PPV: 0.98, 0.90, 0.90 NPV: 0.93, 0.94, 0.93		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
			Beta-blocker			K: 0.77, 0.72, 0.40 Sn: 0.81, 0.82, 0.83 Sp: 0.96, 0.90, 0.68 PPV: 0.96, 0.89, 0.46 NPV: 0.82, 0.84, 0.92		longer being taken) Sn, Sp, and PPV high across all drugs; NPV high for most drugs except statins and aspirin – suggest non-adherence to prescribed medications
			Calcium-channel blocker			K: 0.83, 0.80, 0.83 Sn: 0.77, 0.78, 0.80 Sp: 1.00, 0.98, 0.99 PPV: 0.98, 0.98, 0.99 NPV: 0.95, 0.95, 0.96		
			Thiazide diuretic			K: 0.76, 0.71, 0.71 Sn: 0.67, 0.66, 0.66 Sp: 0.99, 0.98, 0.98 PPV: 0.96, 0.87, 0.86 NPV: 0.94, 0.94, 0.94		
			Statin			K: 0.61, 0.57, 0.55 Sn: 0.80, 0.81, 0.81 Sp: 0.88, 0.76, 0.74 PPV: 0.94, 0.86, 0.83 NPV: 0.64, 0.70, 0.71		
Petrie[181] (2021, US)	Vaccination registry (regional), medical records, self-report	Participants in flu vaccination program (11,503)	Flu vaccine	Past use (within that season)	Extracted directly	2011-2012: K: 0.73 Percent agreement: 87% Sn: 0.73; Sp: 0.99; PPV: 0.99; NPV: 0.80 2012-2013: K: 0.71 Percent agreement: 85% Sn: 0.73; Sp: 0.98; PPV: 1.00; NPV: 0.76 2013-2014: K: 0.63 Percent agreement: 81% Sn: 0.67; Sp: 0.98; PPV: 1.00; NPV: 0.69 2014-2015: K: 0.73 Percent agreement: 86% Sn: 0.78; Sp: 1.00; PPV: 1.00; NPV: 0.73 2015-2016: K: 0.83 Percent agreement: 92% Sn: 0.86; Sp: 1.00; PPV: 1.00; NPV: 0.82	Good agreement	Performance improved over time

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡		Conclusion	Other comments
						2016-2017	K: 0.86 Percent agreement: 93% Sn: 0.88; Sp: 1.00; PPV: 1.00; NPV: 0.86		
						2017-2018	K: 0.85 Percent agreement: 93% Sn: 0.88; Sp: 1.00; PPV: 1.00; NPV: 0.84		
						2018-2019	K: 0.84 Percent agreement: 93% Sn: 0.79; Sp: 0.99; PPV: 1.00; NPV: 0.82		
Selcuk[182] (2021, Denmark)	Prescription registry (national), self-report	Osteoarthritis (38,745)	Paracetamol	Current use	Fixed window (3 months prior)	Percent agreement: 65%; K: 0.33		Fair agreement	
			Morphine or other opioids			Percent agreement: 97%; K: 0.38			
			NSAIDs			Percent agreement: 75%; K: 0.40			
			Topical NSAIDs			Percent agreement: 95%; K: 0.01			
			Glucosamine			Percent agreement: 87%; K: 0.02			
			Hyaluronic acid injection			Percent agreement: 100%; K: 0.21			
			Corticosteroid injection			Percent agreement: 96%; K: 0.23			
			Tramadol			Percent agreement: 94%; K: 0.41			
			Codeine			Percent agreement: 98%; K: 0.20			
			Tricyclic antidepressants			Percent agreement: 93%; K: 0.08			
			Anticonvulsants			Percent agreement: 97%; K: 0.22			
			Methotrexate			Percent agreement: 99%; K: 0.35			
Smith[183] (2021, US)	Vaccination registry (regional), self-report	Inflammatory bowel disease (200)	Flu vaccination	Past use (current season)	Extracted directly	Sn: 0.99; Sp: 0.90; PPV: 0.97; NPV: 0.96		Good agreement	
			Pneumococcal vaccination			Sn: 0.84; Sp: 0.86; PPV: 0.96; NPV: 0.54			
Van der Heyden[184] (2021, Belgium)	Claims data (national), self-report	Aged 65+ (1,950)	Polypharmacy (5+ medications)	Current use	Legend-time	K: 0.52 Sn: 0.74; Sp: 0.83; PPV: 0.58; NPV: 0.91		Reasonable agreement	
			Excessive polypharmacy (10+ medications)			K: 0.28 Sn: 0.26; Sp: 0.99; PPV: 0.35; NPV: 0.98			
			Statins			K: 0.63 (men), 0.63 (women)			
			Antiplatelets			K: 0.61 (men), 0.64 (women)			
			Beta-blockers, selective			K: 0.63 (men), 0.56 (women)			
			Proton pump inhibitors			K: 0.69 (men), 0.60 (women)			
			ACE inhibitors			K: 0.72 (men), 0.65 (women)			
			Calcium channel blockers			K: 0.77 (men), 0.67 (women)			
			Biguanides			K: 0.63 (men), 0.65 (women)			

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
			Preparations inhibiting uric acid production			K: 0.64 (men)		
			Sulfonamides			K: 0.66 (men), 0.55 (women)		
			Angiotensin II receptor blockers			K: 0.74 (men), 0.74 (women)		
			Angiotensin II receptor blockers and diuretics			K: 0.78 (men), 0.76 (women)		
			Sulfonylureas			K: 0.78 (men)		
			Vitamin K antagonists			K: 0.69 (men)		
			Adrenergics in combination with corticosteroids or other drugs			K: 0.55 (men), 0.82 (women)		
			Antidepressants			K: 0.52 (men), 0.71 (women)		
			Beta blocking agents, selective, and thiazides			K: 0.86 (men), 0.73 (women)		
			Vasodilators used in cardiac diseases			K: 0.72 (men), 0.81 (women)		
			Selective serotonin reuptake inhibitors			K: 0.79 (men), 0.73 (women)		
			Beta blocking agents, non-selective			K: 0.78 (men), 0.74 (women)		
			Thyroid hormones			K: 0.66 (men), 0.73 (women)		
			Anticholinergics			K: 0.61 (men)		
			Angiotensin-converting enzyme inhibitors and diuretics			K: 0.57 (men), 0.73 (women)		
			Mucolytics			K: 0.32 (men), 0.42 (women)		
			Glucocorticoids			K: 0.24 (men)		
			Selective beta-2-adrenoreceptor agonists			K: 0.38 (men)		
			Beta blocking agents (ophthalmological treatment)			K: 0.22 (men)		
			Antivertigo preparations			K: 0.73 (women)		
			Biphosphonates			K: 0.27 (women)		
			Piperazine derivatives			K: 0.39 (women)		
			Biphosphonates (combinations)			K: 0.31 (women)		
Vesteghem[185] (2021, Denmark)	Inpatient registry (national), pharmacy data (local)	Solid malignant tumours (12,014)	Chemotherapy	Past use	Fixed window (any record between 2009-2019)	Sn: 0.98; PPV: 0.99	High agreement	
Malenka[186] (2022, US)	Disease registry (national),	Post percutaneo us coronary	Aspirin	Current use (at discharge)	Extracted directly	PABAK: 0.94; Percent agreement: 95%	High agreement	
			Clopidogrel			PABAK: 0.94; Percent agreement: 95%		
			Prasugrel			PABAK: 0.98; Percent agreement: 98%		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
	medical records (used as reference)	intervention in 2019 (N/A)	Ticagrelor			PABAK: 0.95; Percent agreement: 96%		
			Ticlopidine			PABAK: 0.98; Percent agreement: 99%		
			Statin			PABAK: 0.93; Percent agreement: 95%		
			Statin (dose)			PABAK: 0.78; Percent agreement: 82%		
Murali[187] (2022, Australia)	Claims data (national), self-report	Chronic kidney disease (113)	Antihypertensives	Adherence (dichotomised at 60% from self-report and 80% from claims data)	Legend-time (medication possession ratio [MPR] or proportion of days covered [PDC])	Percent agreement: 70% (MPR), 72% (PDC) K: 0.26 (MPR), 0.35 (PDC)	Modest agreement	
			Cardiometabolic			Percent agreement: 75% (MPR), 75% (PDC) K: 0.25 (MPR), 0.35 (PDC)		
Norberg[188] (2022, Sweden)	Prescription registry (national), self-report	Ischaemic stroke (420)	Statins	Adherence in last 6 months (dichotomised)	Fixed window (one record within each 6 month period during 2-year follow-up)	K: 0.10; Percent agreement: 70%	Moderate agreement	Different predictors for adherence according to each method
Van Beek[189] (2022, US)	Disease registry (national), medical records (used as reference)	Patients receiving dermatological care (1,098)	All medications	Medication name	Extracted directly	Percent agreement: 98%	Good agreement	
Waaseth[190] (2022, Norway)	Prescription registry (national), self-report, drug levels	Women with cancer (70,191; 136 with blood samples)	Selective serotonin reuptake inhibitors	Current use	Legend-time	Registry vs self-report: K: 0.80; Sn: 0.90; Sp: 0.99; PPV: 0.74; NPV: 1.00 Registry vs blood levels: K: 0.91; Sn: 0.93; Sp: 0.99; PPV: 0.93; NPV: 0.91	High agreement	6 month window better than 3 months and better than legend-time; self-report may be better than registry; triangulation of evidence improves estimates
					Fixed window (6 months)	Registry vs self-report: K: 0.83; Sn: 0.85; Sp: 0.99; PPV: 0.74; NPV: 1.00 Registry vs blood levels: K: 0.93; Sn: 0.94; Sp: 0.99; PPV: 0.98; NPV: 0.94		
					Fixed window (3 months)	Registry vs self-report: K: 0.74; Sn: 0.89; Sp: 0.98; PPV: 0.66; NPV: 1.00 Registry vs blood levels: K: 0.82; Sn: 0.84; Sp: 0.99; PPV: 0.98; NPV: 0.86		

First author (year, country)	Sources compared†	Population (sample size)	Drugs assessed	Outcome	Analysis method RCD)	Summary results‡	Conclusion	Other comments
					N/A	Self-report vs blood levels: K: 0.99; Sn: 1.00; Sp: 0.99; PPV: 0.99; NPV: 1.00		
Young[191] (2022, US)	Claims data (national), medical records	Patients undergoing surgery (11,128)	Opioids	Use before admission (6 months)	Fixed window	Confirmed in both sources: 43%	Little agreement	
				Use within admission		Confirmed in both sources: 43%		
				Use at discharge		Confirmed in both sources: 48%		
				Use during follow-up		Confirmed in both sources: 19%		
Tessier[192] (2023, UK)	Vaccination registry (national), self-report (used as reference)	Random sample of patients undergoing COVID-19 testing (1,129)	COVID-19 vaccination	Ever use	Extracted directly	K: 0.98	High agreement	

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