

## How Safe is Primary Care? A Systematic Review

### ONLINE SUPPLEMENT: TABLES

**Table 1: Summary of studies about frequency of safety incidents in primary care**

Author	Study type	Number analyzed	Region	Type of incidents	Rate	Study quality
Bregnhøj L 2007 <sup>W16</sup>	Observational	1621	OECD	Prescribing / medication	39.5 per 100 medicines	High
Gurwitz JH 2003 <sup>W30</sup>	Observational	30397	OECD	Prescribing / medication	5 per 100 people	High
Honigman B 2001 <sup>W33</sup>	Observational	25056	OECD	Prescribing / medication	5.5 per 100 people	High
Lund BC 2010 <sup>W45</sup>	Observational	236	OECD	Prescribing / medication	14.4 per 100 people	High
Olaniyan JO 2014 <sup>W55</sup>	Systematic review	33	OECD	Prescribing / medication	1 to 90 out of 100 prescriptions	High
Sandars J 2003 <sup>W62</sup>	Systematic review	280	OECD	Prescribing / medication	11 per 100 prescriptions	High
Tsang C 2012 <sup>W71</sup>	Systematic review	15	OECD	Prescribing / medication	0.49 per 100 people aged 65+	High
Abramson 2012 <sup>W1</sup>	Observational	9385	OECD	Prescribing / medication	36.7 per 100 prescriptions	Moderate
Al Khaja KA 2011 <sup>W5</sup>	Observational	2773	Other	Prescribing / medication	26.4 per 100 prescriptions	Moderate
Al Khaja KAJ 2007 <sup>W4,W6</sup>	Observational	2282	Other	Prescribing / medication	90.5 per 100 prescriptions	Moderate
Al Khaja KAJ 2010 <sup>W7</sup>	Observational	86	Other	Prescribing / medication	87.2 per 100 prescriptions	Moderate
Avery AJ 2013 <sup>W11</sup>	Observational	6048	OECD	Prescribing / medication	4.9 per 100 prescribed items	Moderate
Bradbury F 2004 <sup>W14</sup>	Observational	8830	OECD	Prescribing / medication	16.6 per 100 people	Moderate
Bradley MC 2012 <sup>W15</sup>	Observational	166108	OECD	Prescribing / medication	34 per 100 people	Moderate
Brekke M 2008 <sup>W17</sup>	Observational	86000	OECD	Prescribing / medication	18.4 per 100 people	Moderate
Brenner S 2012 <sup>W18</sup>	Observational	516	OECD	Prescribing / medication	15 per 100 records	Moderate
Clark RC 2007 <sup>W20</sup>	Observational	127582000	OECD	Prescribing / medication	3.1 per 100 people	Moderate
De Wilde S 2007 <sup>W22</sup>	Observational	171690	OECD	Prescribing / medication	32.2 per 100 people	Moderate
Field TS 2004 <sup>W28</sup>	Observational	31757	OECD	Prescribing / medication	4.8 per 100 people	Moderate
Howard M 2004 <sup>W34</sup>	Observational	777	OECD	Prescribing / medication	16.3 per 100 people	Moderate
Khoja T 2011 <sup>W36</sup>	Observational	5299	Other	Prescribing / medication	18.7 per 100 prescriptions	Moderate
Khoo	Observational	1753	Other	Prescribing /	41.1 per 100	Moderate

Author	Study type	Number analyzed	Region	Type of incidents	Rate	Study quality
2012 <sup>W38</sup>				medication	records	
Martinez Sanchez A 2011 <sup>W48</sup>	Observational	23995	OECD	Prescribing / medication	1.5 per 100 prescriptions	Moderate
Ryan C 2009 <sup>W61</sup>	Observational	500	OECD	Prescribing / medication	13 per 100 people	Moderate
Schneider JK 1992 <sup>W64</sup>	Observational	463	OECD	Prescribing / medication	21 per 100 people	Moderate
Straand J 1999 <sup>W69</sup>	Observational	16774	OECD	Prescribing / medication	13.5 per 100 prescriptions	Moderate
Tomlin A 2012 <sup>W70</sup>	Observational	173478	OECD	Prescribing / medication	14.4 per 100 people	Moderate
Van Der Hooft CS 2005 <sup>W73</sup>	Observational	25258	OECD	Prescribing / medication	20 per 100 older people	Moderate
Weingart SN 2005 <sup>W76</sup>	Observational	661	OECD	Prescribing / medication	4.7 per 100 people	Moderate
Abramson EL 2013 <sup>W2</sup>	Observational	1905	OECD	Prescribing / medication	3.8 per 100 prescriptions	Low
Khoja TA 1996 <sup>W37</sup>	Observational	6350	Other	Prescribing / medication	11.6 per 100 prescriptions	Low
Koper 2013 <sup>W40</sup>	Observational	169	OECD	Prescribing / medication	56.2 per 100 people	Low
Neville RG 1989 <sup>W52</sup>	Observational	15916	OECD	Prescribing / medication	3.2 per 100 prescribed items	Low
Nicholson D 2006 <sup>W53</sup>	Observational	24	OECD	Prescribing / medication	91.7 per 100 clinicians prescribing	Low
Paille F 1995 <sup>W56</sup>	Observational	4080	OECD	Prescribing / medication	32.5 per 100 prescriptions	Low
Sayers YM 2009 <sup>W63</sup>	Observational	3948	OECD	Prescribing / medication	12.4 per 100 prescriptions	Low
Apeas 2008 <sup>W9,W10</sup>	Observational	96047	OECD	Any safety incident	0.8 to 17.93 per 100 consultations	High
Makeham M 2008 <sup>W46</sup>	Systematic review	49	OECD	Any safety incident	0.0004 to 24 per 100 consultations	High
Makeham MA 2006 <sup>W47</sup>	Observational	166569	OECD	Any safety incident	0.2 per 100 people	High
De Wet C 2009 <sup>W21</sup>	Observational	500	OECD	Any safety incident	9.4 per 100 records	Moderate
Elder NC 2004 <sup>W25</sup>	Observational	351	OECD	Any safety incident	24 per 100 consultations	Moderate
Gaal S 2011 <sup>W29</sup>	Observational	8401	OECD	Any safety incident	2.2 per 100 consultations	Moderate
Smits M 2010 <sup>W67</sup>	Observational	145	OECD	Any safety incident	18.6 per 100 records	Moderate
Tsang C 2013 <sup>W72</sup>	Observational	74763	OECD	Any safety incident	0.6 per 100 people	Moderate
Van Dulmen SA 2011 <sup>W74</sup>	Observational	1000	OECD	Any safety incident	1.8 per 100 records	Moderate
Eggleton KS 2014 <sup>W24</sup>	Observational	170	OECD	Any safety incident	7 per 100 consultations	Low
McKay J 2013 <sup>W50</sup>	Observational	520	OECD	Any safety incident	15 out of 100 records	Low

<b>Author</b>	<b>Study type</b>	<b>Number analyzed</b>	<b>Region</b>	<b>Type of incidents</b>	<b>Rate</b>	<b>Study quality</b>
Al-Elgayoum SME 2009 <sup>W3</sup>	Observational	3203	Other	Diagnosis	70 per 100 blood smears	Moderate
Illboudo TP 2012 <sup>W77</sup>	Observational	1331	Other	Diagnosis	94.1 per 100 people	Moderate
Leon AC 1999 <sup>W44</sup>	Observational	1000	OECD	Diagnosis	16 out of 100 people	Moderate
Wahls TL 2007 <sup>W75</sup>	Observational	9116	OECD	Diagnosis	0.7 per 100 people	Moderate
Casalino LP 2009 <sup>W19</sup>	Observational	1889	OECD	Failure to notify of abnormal result	7.1 per 100 abnormal results	Moderate
Al-Agilly S 2007 <sup>W8</sup>	Observational	258	OECD	Inaccurate records	27.5 per 100 records	Moderate
Farrow SC 1999 <sup>W26</sup>	Observational	82	OECD	Infection control	24.4 per 100 practices	Low
Pandit NB 2008 <sup>W57</sup>	Observational	182	Other	Injection practices	77 out of 100 clinics	Low
Smith PC 2005 <sup>W66</sup>	Observational	1614	OECD	Missing information	13.6 per 100 consultations	Moderate

Note: Studies are arranged in order of type of incident, followed by study quality. Harm rates were devised by extracting figures directly from articles. No recalculations were performed. If studies used slightly different terminology to the definitions of severity of harm listed in Box 1, then the data were categorized into the Box 1 definitions based on descriptions in the articles themselves. For example, if an article stated that 10% of incidents resulted in hospitalization, this would be listed as a moderate harm. Death rates were reported separately where available.

**Table 2: Prescribing incidents in primary care per 100 prescriptions / people – results from 33 studies arranged in order of study quality**

Study	Study type	Prescribing incidents	Study quality
Bregnhøj <sup>W16</sup>	Observational	39.5 / 100 medicines	High
Gurwitz <sup>W30</sup>	Observational	5 / 100 people	High
Honigman <sup>W33</sup>	Observational	5.5 / 100 people	High
Lund <sup>W45</sup>	Observational	14.4 / 100 people	High
Olaniyan <sup>W55</sup>	Systematic review	90 / 100 prescriptions	High
Sandars <sup>W62</sup>	Systematic review	11 / 100 prescriptions	High
Tsang <sup>W71</sup>	Systematic review	0.49 / 100 people	High
Abramson <sup>95</sup>	Observational	36.7 / 100 prescriptions	Moderate
Al Khaja <sup>W4</sup>	Observational	90.5 / 100 prescriptions	Moderate
Al Khaja <sup>W5</sup>	Observational	26.4 / 100 prescriptions	Moderate
Al Khaja <sup>W6</sup>	Observational	87.2 / 100 prescriptions	Moderate
Avery <sup>W11</sup>	Observational	4.9 / 100 prescribed items	Moderate
Bradbury <sup>W14</sup>	Observational	16.6 / 100 people	Moderate
Bradley <sup>W15</sup>	Observational	34 / 100 people	Moderate
Brekke <sup>W17</sup>	Observational	18.4 / 100 people	Moderate
Clark <sup>W20</sup>	Observational	3.1 / 100 people	Moderate
De Wilde <sup>W22</sup>	Observational	32.2 / 100 people	Moderate
Field <sup>W28</sup>	Observational	4.8 / 100 people	Moderate
Howard <sup>W34</sup>	Observational	16.3 / 100 people	Moderate
Khoja <sup>W36</sup>	Observational	18.7 / 100 prescriptions	Moderate
Khoo <sup>W38</sup>	Observational	41.1 / 100 records	Moderate
Martinez Sanchez <sup>W48</sup>	Observational	1.5 / 100 prescriptions	Moderate
Ryan <sup>W61</sup>	Observational	13 / 100 people	Moderate
Schneider <sup>W64</sup>	Observational	21 / 100 people	Moderate
Straand <sup>W69</sup>	Observational	13.5 / 100 prescriptions	Moderate
Tomlin <sup>W70</sup>	Observational	14.4 / 100 people	Moderate
Van Der Hooft <sup>W73</sup>	Observational	20 / 100 people	Moderate
Weingart <sup>W76</sup>	Observational	4.7 / 100 people	Moderate
Abramson <sup>W1</sup>	Observational	3.8 / 100 prescriptions	Low
Khoja <sup>W36</sup>	Observational	11.6 / 100 prescriptions	Low
Koper <sup>W40</sup>	Observational	56.2 / 100 people	Low
Neville <sup>W52</sup>	Observational	3.2 / 100 prescribed items	Low
Nicholson <sup>W53</sup>	Observational	91.7 / 100 clinicians	Low

Note: the number per 100 prescriptions, medications prescribed, or people is provided as specified. Details of the first author are provided to allow cross-checking to the individual study. Details are in the online supplement.<sup>20</sup> The quality rating is based on validated scales.

**Table 3: Summary of studies about severity of harm from safety incidents in primary care**

Author	Study type	Number of events analyzed	Region	Severity of harm found in studies based on chart review	Severity of harm found in studies based on prescription reviews	Severity of harm found in studies based on incident reports / claims
Apeas 2008 <sup>W9</sup>	Observational	1108	OECD			23.6% no harm 38.6% low harm 32% moderate harm 5.8% severe harm 70.2% preventable
Aranaz-Andrés JM 2012 <sup>W10</sup>	Observational	773	OECD	5.9% severe harm 64.3% preventable		
Avery AJ 2013 <sup>W11</sup>	Observational	6048	OECD		0.2% severe harm	
Beyer M 2005 <sup>W12</sup>	Observational	85	OECD			34% temporary or permanent harm
Bhasale A 1998 <sup>W13</sup>	Observational	142	OECD			42.3% no harm 25.4% low harm 10.6% moderate harm 8.5% severe harm 13.4% death
De Wet C 2009 <sup>W21</sup>	Observational	500	OECD	82.9% low to moderate harm		
Dovey SM 2002 <sup>W23</sup>	Observational	330	OECD			55.8% no harm 12.1% low harm 7.0% moderate harm 5.5% severe harm 0.3% death
Elder NC 2004 <sup>W25</sup>	Observational	351	OECD			24% actual harm (severity not specified)
Fernald DH 2004 <sup>W27</sup>	Observational	209	OECD			64.1% no harm 15.3% low harm 10.1% moderate harm 10.5% severe harm

Author	Study type	Number of events analyzed	Region	Severity of harm found in studies based on chart review	Severity of harm found in studies based on prescription reviews	Severity of harm found in studies based on incident reports / claims
Gaal S 2011 <sup>W29</sup>	Observational	1000	OECD	38.6% no harm 50.5% low harm 6.9% moderate harm 4.0% 'unknown harm'		
Gurwitz JH 2003 <sup>W30</sup>	Observational	30397	OECD			38% severe harm (serious, life threatening or fatal)
Hickner J 2010 <sup>W31</sup>	Observational	507	OECD			1.6% severe harm
Hoffmann B 2008 <sup>W32</sup>	Observational	78	OECD			3.9% no harm 25.6% actual harm (severity unknown)
Kennedy AG 2008 <sup>W35</sup>	Observational	216	OECD			90% no harm 8.7% low harm 1.8% moderate harm 0% severe harm
Khoja T 2011 <sup>W36</sup>	Observational	5299	Other		53.2% no harm 8.7% low harm 37.3% moderate harm 0.8% severe harm	
Khoo 2012 <sup>W38</sup>	Observational	1753	Other	39.9% severe harm 93.5% preventable		
Kingston-Reichers J 2010 <sup>W39</sup>	Systematic review	Review	OECD	9% to 52% harm (severity not specified) 42% to 83% preventable		
Kostopoulou O 2007 <sup>W41</sup>	Observational	78	OECD			3.9% no harm 16.7% severe harm or death
Kuo GM 2008 <sup>W42</sup>	Observational	194	OECD			41% no harm 35% low harm 21% moderate harm 3% severe harm

Author	Study type	Number of events analyzed	Region	Severity of harm found in studies based on chart review	Severity of harm found in studies based on prescription reviews	Severity of harm found in studies based on incident reports / claims
Kuzel AJ 2004 <sup>W43</sup>	Observational	170	OECD			76.9% harm (severity unknown)
Makeham M 2008 <sup>W46</sup>	Systematic review	Review	OECD	17% to 39% harm (severity not specified) 0% to 4% severe harm 45% to 76% preventable		
Makeham MA 2006 <sup>W47</sup>	Observational	166569	OECD			0.25% harm (severity not specified)
McKay J 2009 <sup>W49</sup>	Observational	191	OECD			57.1% no harm 7.3% low harm 11.5% moderate harm 4.7% severe harm 1.6% death 17.8% not classified
McKay J 2013 <sup>W50</sup>	Observational	520	OECD	44% moderate to severe harm 45% preventable		
Murie J 2003 <sup>W51</sup>	Observational	55	OECD			47.3% no harm 9.1% low harm 3.6% moderate harm 18.2% severe harm 21.8% death
O'Beirne M, 2013 <sup>W54</sup>	Observational	264	OECD			50% harm (any type) 1% severe harm 93% preventable
Pearson A 2009 <sup>W58</sup>	Systematic review	Review	OECD	24% to 42% harm (severity not specified)		
Phillips Jr RL 2004 <sup>W59</sup>	Observational	26126	OECD			18.7% low harm 26.0% moderate harm 19.0% severe harm 36.3% death

Author	Study type	Number of events analyzed	Region	Severity of harm found in studies based on chart review	Severity of harm found in studies based on prescription reviews	Severity of harm found in studies based on incident reports / claims
Phillips RL 2006 <sup>W60</sup>	Observational	701	OECD			20.7% no harm 30.0% low harm 30.0% moderate harm 14.3% severe harm 8.1% death
Schneider JK 1992 <sup>W64</sup>	Observational	332	OECD	3.6% severe harm		
Singh H 2013 <sup>W65</sup>	Observational	190	OECD	86% moderate or severe harm		
Smits M 2010 <sup>W67</sup>	Observational	145	OECD	29.6% moderate harm 0% death		
Statham MO 2008 <sup>W68</sup>	Observational	123	OECD			51.2% low harm 39.8% moderate harm 8.9% severe harm 11.6% preventable



## References

- W1.** Abramson EL, Bates DW, Jenter C, Volk LA, Barron Y, Quaresimo J, et al. Ambulatory prescribing incidents among community-based providers in two states. *J Am Med Inform Assoc* 2012;19(4):644-8
- W2.** Abramson EL1, Malhotra S, Osorio SN, Edwards A, Cheriff A, Cole C, Kaushal R. A long-term follow-up evaluation of electronic health record prescribing safety. *J Am Med Inform Assoc* 2013;20(e1):e52-58
- W3.** Al-Elgayoum SME, El-Feki AE-KA, Mahgoub BA, El-Rayah E-A, Giha HA: Malaria overdiagnosis and burden of malaria misdiagnosis in the suburbs of central Sudan: special emphasis on artemisinin-based combination therapy era. *Diagnostic Microbiology & Infectious Disease*, 2009; 64(1):20-26.
- W4.** Al Khaja KAJ, Damanhori AHH, Al-Ansari TM, Sequeira RP. Topical corticosteroids in infants: prescribing pattern and prescribing incidents in Bahrain. *Pharmacy World & Science* 2007;29(4):395-399.
- W5.** Al Khaja KA, Sequeira RP, Damanhori AH. Medication prescribing incidents pertaining to cardiovascular/antidiabetic medications: a prescription audit in primary care. *Fundam Clin Pharmacol* 2011 Jan 25.
- W6.** Al Khaja KAJ, Al Ansari TM, Damanhori AHH, Sequeira R. Evaluation of drug utilization and prescribing incidents in infants: a primary care prescription-based study. *Health Policy* 2007;81(2-3):350-357.
- W7.** Al Khaja KAJ, Sequeira RP, Al-Ansari T, Damanhori AHH, James H, Handu SS. Pediatric iron preparations for infants in Bahrain: some therapeutic concerns. *International Journal of Clinical Pharmacology & Therapeutics* 2010;48(3):200-205.
- W8.** Al-Agilly S, Neville RG, Robb H, Riddell S: Involving patients in checking the validity of the NHS shared record: A single practice pilot. *Informatics in primary care* 2007, 15 (4):217-220.
- W9.** APEAS Study. Patient Safety in primary Health Care. Madrid: Ministry of Health and Consumer Affairs, 2008
- W10.** Aranaz-Andrés JM, Aibar C, Limón R, Mira JJ, Vitaller J, Agra Y, Terol E. A study of the prevalence of adverse events in primary healthcare in Spain. *Eur J Public Health* 2012, 22(6):921-925.
- W11.** Avery AJ1, Ghaleb M, Barber N, Dean Franklin B, Armstrong SJ, Serumaga B, Dhillon S, Freyer A, Howard R, Talabi O, Mehta RL. The prevalence and nature of prescribing and monitoring incidents in English general practice: a retrospective case note review. *Br J Gen Pract* 2013;63(613):e543-553.
- W12.** Beyer M, Rohe J, Rusitska M, Blauth E, Gerlach FM: The German incident reporting system for general practice: Structure, first results. [German]. *Zeitschrift fur Allgemeinmedizin* 2005, 81 (4):147-153.
- W13.** Bhasale A: The wrong diagnosis: identifying causes of potentially adverse events in general practice using incident monitoring. *Fam Pract* 1998, 15(4):308-318
- W14.** Bradbury F: How important is the role of the physician in the correct use of a drug? An observational cohort study in general practice. *International Journal of Clinical Practice (Supplement)* 2004;58:27-33.
- W15.** Bradley MC, Fahey T, Cahir C, Bennett K, O'Reilly D, Parsons C, Hughes CM. Potentially inappropriate prescribing and cost outcomes for older people: a cross-sectional study using the Northern Ireland Enhanced Prescribing Database. *Eur J Clin Pharmacol.* 2012 Oct;68(10):1425-33.
- W16.** Bregnhøj L, Thirstrup S, Kristensen MB, Bjerrum L, Sonne J: Prevalence of inappropriate prescribing in primary care. *Pharmacy World and Science* 2007;29(3):109-115.
- W17.** Brekke M, Rognstad S, Straand J, Furu K, Gjelstad S, Bjorner T, Dalen I: Pharmacologically inappropriate prescriptions for elderly patients in general practice: How common? Baseline data from The Prescription Peer Academic Detailing (Rx-PAD) study. *Scand J Prim Health Care* 2008, 26(2):80-85.
- W18.** Brenner S, Detz A, López A, Horton C, Sarkar U.: Signal and noise: applying a laboratory trigger tool to identify adverse drug events among primary care patients. *BMJ Qual Saf* 2012;21(8):670-675.
- W19.** Casalino LP, Dunham D, Chin MH, Bielang R, Kistner EO, Karrison TG, Ong MK, Sarkar U, McLaughlin MA, Meltzer DO: Frequency of failure to inform patients of clinically significant outpatient test results. *Archives of Internal Medicine* 2009;169(12):1123-1129.
- W20.** Clark RC, Maxwell SRJ, Kerr S, Cuthbert M, Buchanan D, Steinke D, Webb DJ, Bateman ND: The influence of primary care prescribing rates for new drugs on spontaneous reporting of adverse drug reactions. *Drug Safety* 2007;30(4):357-366.
- W21.** De Wet C, Bowie P: The preliminary development and testing of a global trigger tool to detect incident and patient harm in primary-care records. *Postgraduate Medical Journal* 2009;85(1002):176-180.
- W22.** De Wilde S, Carey IM, Harris T, Richards N, Victor C, Hilton SR, Cook DG. Trends in potentially

inappropriate prescribing amongst older UK primary care patients. *Pharmacoepidemiol Drug Saf* 2007;16(6):658-667.

**W23.** Dovey SM, Meyers DS, Phillips Jr RL, Green LA, Fryer GE, Galliher JM, Kappus J, Grob P: A preliminary taxonomy of medical incidents in family practice. *Quality and Safety in Health Care* 2002; 11(3):233-238.

**W24.** Eggleton KS, Dovey SM. Using triggers in primary care patient records to flag increased adverse event risk and measure patient safety at clinic level. *N Z Med J.* 2014 Mar 7;127(1390):45-52.

**W25.** Elder NC, Vonder Meulen M, Cassidy A: The identification of medical incidents by family physicians during outpatient visits. *Annals of Family Medicine*, 2004; 2(2):125-129.

**W26.** Farrow SC, Zeuner D, Hall C: Improving infection control in general practice. *The Journal of the Royal Society for the Promotion of Health* 1999, 119(1):17-22.

**W27.** Fernald DH, Pace WD, Harris DM, West DR, Main DS, Westfall JM: Event reporting to a primary care patient safety reporting system: a report from the ASIPS collaborative. *Annals of Family Medicine*, 2004; 2(4):327-332.

**W28.** Field TS, Gurwitz JH, Harrold LR, Rothschild JM, Debellis K, Seger AC, Fish LS, Garber L, Kelleher M, Bates DW: Strategies for detecting adverse drug events among older persons in the ambulatory setting. *Journal of the American Medical Informatics Association* 2004, 11 (6):492-498.

**W29.** Gaal S, Verstappen W, Wolters R, Lankveld H, van Weel C, Wensing M: Prevalence and consequences of patient safety incidents in general practice in the Netherlands: a retrospective medical record review study. *Implementation Science*;2011;6(1):37.

**W30.** Gurwitz JH, Field TS, Harrold LR, Rothschild J, Debellis K, Seger AC, Cadoret C, Fish LS, Garber L, Kelleher M et al: Incidence and preventability of adverse drug events among older persons in the ambulatory setting. *JAMA: Journal of the American Medical Association* 2003, 289(9):1107-1117.

**W31.** Hickner J, Zafar A, Kuo GM, Fagnan LJ, Forjuoh SN, Knox LM, Lynch JT, Stevens BK, Pace WD, Hamlin BN, Scherer H, Hudson BL, Oppenheimer CC, Tierney WM. Field test results of a new ambulatory care Medication Incident and Adverse Drug Event Reporting System-MEADERS. *Ann Fam Med.* 2010 Nov-Dec;8(6):517-25.

**W32.** Hoffmann B, Beyer M, Rohe J, Gensichen J, Gerlach FM: "Every incident counts": a web-based incident reporting and learning system for general practice. *Qual Saf Health Care* 2008, 17(4):307-312.

**W33.** Honigman B, Lee J, Rothschild J, Light P, Pulling RM, Yu T, Bates DW. Using computerized data to identify adverse drug events in outpatients. *J Am Med Inform Assoc.* 2001 May-Jun;8(3):254-66

**W34.** Howard M, Dolovich L, Kaczorowski J, Sellors C, Sellors J. Prescribing of potentially inappropriate medications to elderly people. *Family Practice* 2004;21(3):244-247.

**W35.** Kennedy AG, Littenberg B, Senders JW: Using nurses and office staff to report prescribing incidents in primary care. *Int J Qual Health Care* 2008, 20(4):238-245.

**W36.** Khoja T, Neyaz Y, Qureshi NA, Magzoub MA, Haycox A, Walley T. Medication incidents in primary care in Riyadh city, *Saudi Arabia.* *Eastern Mediterranean Health Journal* 2011;17(2):156-160.

**W37.** Khoja TA, Al-Shammari SAI, Farag MK, Al-Mazrou Y: Quality of prescribing at primary care centers in Saudi Arabia. *Journal of Pharmacy Technology* 1996, 12 (6):284-288.

**W38.** Khoo EM, Lee WK, Sararaks S, Abdul Samad A, Liew SM, Cheong AT, Ibrahim MY, Su SH, Mohd Hanafiah AN, Maskon K, Ismail R, Hamid MA. Medical incidents in primary care clinics--a cross sectional study. *BMC Fam Pract.* 2012;13:127.

**W39.** Kingston-Reichers J, Ospina M, Jonsson E, Childs P, Mcleod L and Mazted J. (2010). Patient Safety in Primary care. Edmonton, AB: Canadian Patient Safety Institute and BC Patient Safety and Quality Council

**W40.** Koper D, Kamenski G, Flamm M, Böhmendorfer B, Sönnichsen A. Frequency of medication incidents in primary care patients with polypharmacy. *Fam Pract.* 2013;30(3):313-9.

**W41.** Kostopoulou O, Delaney B: Confidential reporting of patient safety events in primary care: results from a multilevel classification of cognitive and system factors. *Qual Saf Health Care* 2007, 16(2):95-100.

**W42.** Kuo GM, Phillips RL, Graham D, Hickner JM: Medication incidents reported by USA family physicians and their office staff. *Qual Saf Health Care* 2008, 17(4):286-290.

**W43.** Kuzel AJ, Woolf SH, Gilchrist VJ, Engel JD, LaVeist TA, Vincent C, Frankel RM: Patient reports of preventable problems and harms in primary health care. *Ann Fam Med* 2004, 2(4):333-340.

**W44.** Leon AC, Portera L, Olfson M, Kathol R, Farber L, Lowell KN, Sheehan DV: Diagnostic incidents of primary care screens for depression and panic disorder. *International Journal of Psychiatry in Medicine* 1999, 29(1):1-12.

**W45.** Lund BC, Carnahan RM, Egge JA, Chrischilles EA, Kaboli PJ. Inappropriate prescribing predicts adverse

drug events in older adults. *Annals of Pharmacotherapy* 2010;44(6):957-963.

**W46.** Makeham M, Dovey S, Runciman W and Larizgoitia I. Methods and measures used in primary care patient safety research. Available online at [www.who.int/patientsafety/research/methods\\_measures/primary\\_care\\_ps\\_research/en/index.html](http://www.who.int/patientsafety/research/methods_measures/primary_care_ps_research/en/index.html) (Last accessed 31 July 2014)

**W47.** Makeham MA, Kidd MR, Saltman DC, Mira M, Bridges-Webb C, Cooper C, Stromer S: The Threats to Australian Patient Safety (TAPS) study: incidence of reported incidents in general practice. *Med J Aust* 2006;185(2):95-98.

**W48.** Martinez Sanchez A, Campos RM: Detection of prescribing related problems at the community pharmacy. *International Journal of Clinical Pharmacy* 2011;33(1):66-69.

**W49.** McKay J, Bradley N, Lough M, Bowie P. A review of significant events analysed in general practice: implications for the quality and safety of patient care. *BMC family practice* 2009;10:61.

**W50.** McKay J, de Wet C, Kelly M, Bowie P. Applying the Trigger Review Method after a brief educational intervention: potential for teaching and improving safety in GP specialty training? *BMC Med Educ* 2013;13:117.

**W51.** Murie J, McGhee C: Clinical governance in action. Assessing risk by analysing significant events in primary care. *Quality in Primary Care* 2003, 11(3):205-211.

**W52.** Neville RG, Robertson F, Livingstone S, Crombie IK: A classification of prescription incidents. *The Journal of the Royal College of General Practitioners* 1989;39(320):110-112.

**W53.** Nicholson D, Hersh W, Gandhi TK, Weingart SN, Bates DW: Medication incidents: not just a "few bad apples". *Journal of Clinical Outcomes Management* 2006, 13(2):114-116.

**W54.** O'Beirne M, Sterling PD, Zwicker K, Hebert P, Norton PG. Safety incidents in family medicine. *BMJ Qual Saf* 2011;20(12):1005-10

**W55.** Olaniyan JO1, Ghaleb M, Dhillon S, Robinson P. Safety of medication use in primary care. *Int J Pharm Pract* (published online June 2014).

**W56.** Paille F, Pissochet P. Drug interactions in primary health care: Prospective study of 896 patients treated for hypertension. [French]. *Therapie* 1995;50(3):253-258.

**W57.** Pandit NB, Choudhary SK: Unsafe injection practices in Gujarat, India. *Singapore Medical Journal* 2008, 49 (11):936-939.

**W58.** Pearson A and Aromataris A. Patient Safety Primary Healthcare: a review of the literature (2009 – Australian Commission on Safety and Quality in healthcare. Available online at [www.health.gov.au/internet/safety/publishing.nsf/Content/DBDB4EAE1386D1ABCA257753001ECA09/\\$File/26889-Literature-Review.PDF](http://www.health.gov.au/internet/safety/publishing.nsf/Content/DBDB4EAE1386D1ABCA257753001ECA09/$File/26889-Literature-Review.PDF) (Last accessed December 2014)

**W59.** Phillips Jr RL, Bartholomew LA, Dovey SM, Fryer Jr GE, Miyoshi TJ, Green LA: Learning from malpractice claims about negligent, adverse events in primary care in the United States. *Quality and Safety in Health Care* 2004, 13 (2):121-126.

**W60.** Phillips RL, Dovey SM, Graham D, Elder NC and Hickner JM. Learning from different lenses: reports of medical incidents in primary care by clinicians, staff and patients. *J Patient Saf* 2006; 2(3): 140 -146

**W61.** Ryan C, O'Mahony D, Kennedy J, Weedle P, Byrne S. Potentially inappropriate prescribing in an Irish elderly population in primary care. *British Journal of Clinical Pharmacology* 2009;68(6):936-947.

**W62.** Sandars J, Esmail A: The frequency and nature of medical incident in primary care: understanding the diversity across studies. *Fam Pract* 2003, 20(3):231-236.

**W63.** Sayers YM, Armstrong P, Hanley K: Prescribing incidents in general practice: A prospective study. *European Journal of General Practice* 2009;15(2):81-83.

**W64.** Schneider JK, Mion LC, Frengley JD. Adverse drug reactions in an elderly outpatient population. *Am J Hosp Pharm.* 1992;49(1):90-96.

**W65.** Singh H, Giardina TD, Meyer AN, Forjuoh SN, Reis MD, Thomas EJ. Types and origins of diagnostic incidents in primary care settings. *JAMA Intern Med.* 2013 Mar 25;173(6):418-25.

**W66.** Smith PC, Araya-Guerra R, Bublitz C, Parnes B, Dickinson LM, Van Vorst R, Westfall JM, Pace WD: Missing clinical information during primary care visits. *Journal of the American Medical Association* 2005, 293 (5):565-571.

**W67.** Smits M, Huibers L, Kerssemeijer B, de Feijter E, Wensing M, Giesen P: Patient safety in out-of-hours primary care: a review of patient records. *BMC Health Services Research*, 2010; 10:335.

**W68.** Statham MO, Sharma A, Pane AR: Misdiagnosis of acute eye diseases by primary health care providers: incidence and implications. *Medical Journal of Australia*, 2008; 189(7):402-404.

- W69.** Straand J, Rokstad KS. Elderly patients in general practice: diagnoses, drugs and inappropriate prescriptions. A report from the More & Romsdal Prescription Study. *Family Practice* 1999;16(4):380-388.
- W70.** Tomlin A, Reith D, Dovey S, Tilyard M. Methods for retrospective detection of drug safety signals and adverse events in electronic general practice records. *Drug Saf.* 2012;35(9):733-43.
- W71.** Tsang C, Majeed A, Aylin P. Routinely recorded patient safety events in primary care: a literature review. *Fam Pract* 2012;29(1):8-15
- W72.** Tsang C, Bottle A, Majeed A, Aylin P. Adverse events recorded in English primary care: observational study using the General Practice Research Database. *Br J Gen Pract* 2013;63(613):e534-42.
- W73.** Van Der Hooft CS, G.W TJ, Dieleman JP, Verdamme KMC, Van Der Cammen TJM, Stricker BHC, Sturkenboom MCJM: Inappropriate drug prescribing in older adults: The updated 2002 Beers criteria - A population-based cohort study. *British Journal of Clinical Pharmacology* 2005, 60 (2):137-144.
- W74.** van Dulmen SA, Tacken MA, Staal JB, Gaal S, Wensing M, Nijhuis-van der Sanden MW. Patient safety in primary allied health care: what can we learn from incidents in a Dutch exploratory cohort study? *Med Care.* 2011, 49(12):1089-1096.
- W75.** Wahls TL, Cram PM: The frequency of missed test results and associated treatment delays in a highly computerized health system. *BMC Fam Pract* 2007, 8:32.
- W76.** Weingart SN, Gandhi TK, Seger AC, Seger DL, Borus J, Burdick E, Leape LL, Bates DW: Patient-reported medication symptoms in primary care. *Archives of Internal Medicine* 2005, 165 (2):234-240.
- W77.** Ilboudo TP, Chou YJ, Huang N. Assessment of providers' referral decisions in rural Burkina Faso: a retrospective analysis of medical records. *BMC Health Serv Res* 2012;12:54.