

Occupational Injuries and Their Determinants Among Healthcare Workers in Western Countries: A Scoping Review

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Supplementary Table 1

First author & year	Country	Study design	Methodology	Type of injury/exposure	Type of HCWs	Sample size	Average age (y)	Female (%)	Drop-out rate (%)	Under-reporting (%)
Parks et al., 2000 ¹	USA	Cohort	Database	Blood and other fluids	Residents, MD students	1182	NR	NR	NR	NR
Beltrami et al., 2000 ²	USA, Canada	Cohort	Surveillance program	Blood and other fluids	Home healthcare workers	548	NR	NR	58.0	73.1
McCarthy & Britton, 2000 ³	Canada	Cross-sectional	Questionnaire	Blood and other fluids	Healthcare students	174	27.2	56.4	20.5	NR
Radecki et al., 2000 ⁴	USA	Cohort	Questionnaire	Needlestick & sharp injury	Residents, MD students	433	NR	NR	21.3	NR
Sullivan et al., 2000 ⁵	UK	Cross-sectional	Questionnaire	Needlestick & sharp injury	MD students	130	NR	NR	58.2	0
Engkvist et al., 2000 ⁶	Swede	Case-control	Questionnaire	Musculoskeletal injuries	Nurses	~24500	NR	NR	7.0	95.0
Thomsen et al., 2000 ⁷	USA	Cross-sectional	Questionnaire	Violence	EMS personnel	2224	NR	16.0	17.0	NR
Ness et al., 2000 ⁸	UK	Cross-sectional	Questionnaire	Violence	General practitioners	380	NR	38.9	9.0	NR
West and Gardner, 2001 ⁹	Austral	Cross-sectional	Questionnaire	Any occupational injury	Physiotherapists	219	NR	82.0	47.0	NR
Younai et al., 2001 ¹⁰	USA	Cohort	Surveillance program	Blood and other fluids	HCWs	NR	NR	NR	NR	NR
Puro et al. 2001 ¹¹	Italy	Longitudinal	Database	Blood and other fluids	HCWs	~35000	NR	NR	NR	NR
Reddy and Emery, 2001 ¹²	USA	Cohort	Database	Needlestick & sharp injury	HCWs	NR	NR	NR	NR	NR
Zakrzewska et al., 2001 ¹³	UK	Controlled	Surveillance program	Needlestick & sharp injury	Dentists	NR	NR	NR	NR	NR
Ottenga et al., 2002 ¹⁴	Italy	Cohort	Database	Any occupational accident	HCWs	NR	NR	NR	NR	NR
Bartolucci et al., 2002 ¹⁵	Italy	Longitudinal	Database	Any occupational accident	HCWs	~58000	NR	NR	NR	NR
Paladino et al., 2002 ¹⁶	Italy	Cross-sectional	Questionnaire	Any occupational injury	HCWs	1022	25-45y= 82%	71.8	73.6	84.0
Dobie et al., 2002 ¹⁷	UK	Cross-sectional	Questionnaire	Biological injury	HCWs	84	NR	NR	0	65.0
Whitby and McLaws, 2002 ¹⁸	Australia	Cohort; cross-sectional	Surveillance program + questionnaire	Needlestick & sharp injury	HCWs	1836 injuries	NR	NR	NR	NR
Stewardson et al., 2002 ¹⁹	UK	Cross-sectional	Questionnaire	Occupational exposure	Dental students	185	18-22 years	52.8	0	47% of 3 rd , 40% of 4 th & 15% of 5 th
Grange and Corbett, 2002 ²⁰	USA	Cross-sectional	Questionnaire	Violence	EMS personnel	NR	35.0	7.0	NR	NR
Duchateau et al., 2002 ²¹	France	Cross-sectional	Questionnaire	Violence	EMS personnel	276	37.0	26.0	40.9	NR
Doebbeling et al., 2003 ²²	USA	Cross-sectional	Questionnaire	Blood and other fluids	HCWs	2982	NR	84.0	44.0	32.0
Perry et al., 2003 ²³	UK	Cohort	Database	Needlestick & sharp injury	HCWs	NR	NR	NR	NR	NR
Gillen et al., 2003 ²⁴	USA	Cohort	Surveillance program	Needlestick & sharp injury	HCWs	NR	NR	NR	55.8	NR
O'Connell and Hayes, 2003 ²⁵	Ireland	Cohort	Surveillance program	Needlestick & sharp injury	HCWs	303	29.8	76.2	NR	NR
Patterson et al., 2003 ²⁶	USA	Cross-sectional	Questionnaire	Needlestick & sharp injury	MD students	146	26.0	53.4	34.8	NR
Castella et al., 2003 ²⁷	Italy	Longitudinal	Surveillance program	Needlestick & sharp injury	HCWs	~28000	NR	NR	NR	NR
Horton et al., 2003 ²⁸	USA	Longitudinal	Database	Hazardous substances	ED staff	13173	NR	NR	NR	NR
Papalia & Magnavita, 2003 ²⁹	Italy	Cohort	Questionnaire	Violence	HCWs	74	NR	100.0	NR	NR
Tolhurst et al., 2003 ³⁰	Australia	Cross-sectional	focus groups and questionnaire	Violence	General practitioners	314	44.0	29.0	48.2	NR
Trapé-Cardoso & Schenck, 2004 ³¹	USA	Cohort	Surveillance program	Blood and other fluids	HCWs	NR	NR	NR	NR	NR
Sohn et al., 2004 ³²	USA	Cohort	Database	Blood and other fluids	HCWs	NR	NR	NR	NR	NR
Kotelchuk et al., 2004 ³³	USA	Cross-sectional	Questionnaire	Blood and other fluids	Dental students	204	29.5	49.0	71.7	70.0
Watterson, 2004 ³⁴	UK	Cohort	Surveillance program	Needlestick & sharp injury	All HCWs	NR	NR	NR	NR	NR
Kosgeroglu et al., 2004 ³⁵	Turkey	Cross-sectional	Questionnaire	Needlestick & sharp injury	Nurses	509	NR	NR	34.3	NR
Ayranci, 2004 ³⁶	Turkey	Cross-sectional	Questionnaire	Needlestick & sharp injury	Nurses	289	30.6	NR	NR	NR
Elmiyeh et al., 2004 ³⁷	UK	Cross-sectional	Questionnaire	Needlestick & sharp injury	Nurses, MD doctors	279	NR	NR	7.0	NR
Atenstaedt et al., 2004 ³⁸	UK	Cross-sectional	Questionnaire	Needlestick & sharp injury	General practitioners	249	NR	NR	20.0	NR

Panlilio et al., 2004 ³⁹	USA	Longitudinal	Database	Needlestick & sharp injury	HCWs	23738	NR	NR	NR	NR
Hernández Navarrete et al., 2004 ⁴⁰	Spain	Longitudinal	Database	Needlestick & sharp injury	HCWs	15734	36.6	NR	NR	NR
Waclawski, 2004 ⁴¹	UK	Longitudinal	Database	Needlestick & sharp injury	HCWs	10368	NR	NR	NR	NR
Oh et al., 2005 ⁴²	S.	Cohort	Database	Blood and other fluids	HCWs	959	28.8	45.6	NR	NR
Smith et al., 2005 ⁴³	Austral	Cohort	Database	Needlestick & sharp injury	HCWs	NR	NR	NR	NR	NR
Sindoni et al., 2005 ⁴⁴	Italy	Cohort	Database	Needlestick & sharp injury	HCWs	NR	NR	NR	NR	NR
Lee et al., 2005 ⁴⁵	USA	Cross-sectional	Questionnaire	Needlestick & sharp injury	Nurses	400	34.5	61.8	NR	NR
Smith and Leggat, 2005a ⁴⁶	Austral	Cross-sectional	Questionnaire	Needlestick & sharp injury	Nursing students	274	23.0	84.7	14.1	39.5
Smith and Leggat, 2005b ⁴⁷	Austral	Cross-sectional	Questionnaire	Needlestick & sharp injury	MD students	254	NR	61.4	2.7	NR
Vitale et al., 2005 ⁴⁸	Italy	Cross-sectional	Questionnaire	Needlestick & sharp injury	Dentists	254	NR	NR	NR	NR
Bilski, 2005 ⁴⁹	Poland	Cross-sectional	Questionnaire	Needlestick & sharp injury	Nurses	232	35.0	100	NR	NR
Shah et al., 2005 ⁵⁰	USA	Longitudinal	Database	Needlestick & sharp injury	HCWs	3,303 claims	NR	NR	NR	NR
Thomas et al., 2006 ⁵¹	USA	Case-control	Database	Any occupational injury	HCWs	2050	NR	58.4	NR	NR
Stone and Gershon, 2006 ⁵²	USA	Cohort; cross-sectional	Database + questionnaire	Any occupational injury	Nurses	NR	NR	NR	NR	NR
Papetti et al., 2006 ⁵³	Italy	Longitudinal	Database	Any occupational injury	HCWs	2043	NR	NR	NR	NR
Bi et al., 2006 ⁵⁴	Austral	Cohort	database	Blood and other fluids	HCWs	NR	NR	NR	NR	NR
Bakaeen et al., 2006 ⁵⁵	USA	Cohort	Database	Blood and other fluids	HCWs	NR	NR	NR	NR	NR
van Wijk et al., 2006 ⁵⁶	Netherl	Cohort	Database	Blood and other fluids	HCWs	454	NR	NR	NR	NR
Smith et al., 2006 ⁵⁷	S.	Cohort	Questionnaire	Needlestick & sharp injury	Nurses	274	NR	NR	14.1	39.5
Vos et al., 2006 ⁵⁸	Netherl	Cross-sectional	Questionnaire	Needlestick & sharp injury	HCWs	NR	NR	NR	NR	NR
Deisenhammer et al., 2006 ⁵⁹	Germa	Cross-sectional	Questionnaire	Needlestick & sharp injury	MD students	1317	23.0	58.7	15.2	45.0
Leggat and Smith, 2006 ⁶⁰	Austral	Cross-sectional	Questionnaire	Needlestick & sharp injury	Dental care workers	285	45.2	26.7	28.8	NR
Raghavendran et al., 2006 ⁶¹	UK	Cross-sectional	Questionnaire	Needlestick & sharp injury	Doctors, nurses	258	NR	NR	32.0	NR
Smith et al., 2006 ⁶²	Austral	Cross-sectional	Questionnaire	Needlestick & sharp injury	Nurses	220	NR	NR	23.3	41.0
Tabak et al., 2006 ⁶³	Israel	Cross-sectional	Questionnaire	Needlestick & sharp injury	HCWs	183	19-66 y	NR	34.0	NR
Rico et al., 2006 ⁶⁴	Mexico	Cross-sectional	Questionnaire	Needlestick & sharp injury	Dental students	103	NR	NR	28.5	NR
Alamgir et al., 2007 ⁶⁵	Canada	Cohort	Database	Any occupational injury	Nurses, care aides	NR	NR	NR	NR	NR
Mariani et al., 2007 ⁶⁶	Italy	Cohort	Surveillance program	Any occupational injury	HCWs	NR	NR	NR	NR	NR
Sacco et al., 2007 ⁶⁷	Italy	Cohort	Database	Any occupational injury	Nursing students	1040	NR	NR	NR	NR
Craib et al., 2007 ⁶⁸	Canada	Cross-sectional	Questionnaire	Any occupational injury	HCWs	648	NR	NR	NR	NR
Davanzo et al., 2007 ⁶⁹	Italy	Cohort	Database	Blood and other fluids	HCWs	NR	NR	NR	NR	NR
Falagas et al., 2007 ⁷⁰	Greece	Cohort	Surveillance program	Blood and other fluids	HCWs	1411	NR	66.1	NR	NR
Schmid et al., 2007 ⁷¹	Germa	Cross-sectional	Questionnaire	Blood and other fluids	HCWs, MD students	787	NR	NR	NR	45.0
O'Malley et al., 2007 ⁷²	USA	Pharmacoeconomy	NR	Blood and other fluids	HCWs	NR	NR	NR	NR	NR
Yoshikawa et al., 2007 ⁷³	Japan	Cohort	Database	Needlestick & sharp injury	HCWs	NR	NR	NR	NR	NR
Trinkoff et al., 2007 ⁷⁴	USA	Cohort	Questionnaire	Needlestick & sharp injury	Nurses	2624	NR	100.0	38.0	NR
Lamontagne et al., 2007 ⁷⁵	France	Cohort	Questionnaire	Needlestick & sharp injury	Nurses	1506	NR	NR	NR	NR
Clarke et al., 2007 ⁷⁶	USA, UK, Canada	Cross-sectional	Questionnaire	Needlestick & sharp injury	Nurses	34318	NR	NR	NR	NR
Gershon et al., 2007 ⁷⁷	USA	Cross-sectional	Questionnaire	Needlestick & sharp injury	HCWs	310	NR	NR	NR	51.0
Atenstaedt et al., 2007 ⁷⁸	UK	Cross-sectional	Questionnaire	Needlestick & sharp injury	HCWs	249	NR	NR	20.0	NR

Massaro et al., 2007 ⁷⁹	Italy	Cross-sectional	Questionnaire	Needlestick & sharp injury	Nursing students	223	NR	NR	NR	14.0
Wada et al., 2007 ⁸⁰	Japan	Cross-sectional	Questionnaire	Needlestick & sharp injury	Resident physicians, fellows	192	NR	NR	NR	NR
Venier et al., 2007 ⁸¹	France	Longitudinal	Surveillance	Needlestick & sharp injury	Physicians, nurses	13041	33.9	NR	NR	NR
Valls et al., 2007 ⁸²	Spain	Quasi-experimental	Surveillance	Needlestick & sharp injury	HCWs	1000	NR	NR	NR	NR
Boyle et al., 2007 ⁸³	Austral	Cross-sectional	Questionnaire	Violence	Paramedics	260	NR	25.0	72.0	NR
Koritsas et al., 2007 ⁸⁴	Austral	Cross-sectional	Questionnaire	Violence	General practitioners	211	48.2	34.7	78.9	NR
Alamgir and Yu, 2008 ⁸⁵	Canada	Surveillance	Surveillance program	Any occupational injury	Cleaners	NR	NR	NR	NR	NR
Alamgir et al., 2008b ⁸⁶	Canada	Longitudinal	Surveillance program	Biological injury	HCWs	22324	40-59y=68.3%	87.3	NR	NR
Davanzo, 2008 ⁸⁷	Italy	Cohort	database	Blood and other fluids	HCWs	NR	NR	88.0	NR	NR
Ertem et al., 2008 ⁸⁸	Turkey	Cohort	Surveillance program	Blood and other fluids	HCWs	236	NR	NR	NR	NR
Lopez et al., 2008 ⁸⁹	USA	cross-sectional	Questionnaire	Hand injuries	Hand surgeons	200	NR	NR	85.5	NR
Leigh et al., 2008 ⁹⁰	USA	Cohort	Database	Needlestick & sharp injury	HCWs	NR	NR	NR	NR	NR
Whitby et al., 2008 ⁹¹	Austral	Cohort	Surveillance program	Needlestick & sharp injury	HCWs	NR	NR	NR	NR	NR
Vandijck et al., 2008 ⁹²	Belgiu	Cross-sectional	Questionnaire	Needlestick & sharp injury	Nursing students	495	NR	NR	35.4	28.8
Wicker et al., 2008 ⁹³	Germa	Cross-sectional	Questionnaire	Needlestick & sharp injury	MD students	312	27.1	60	8.0	61.7
Kiss et al., 2008 ⁹⁴	Belgiu	Surveillance	Surveillance program	Needlestick & sharp injury	Nurses	NR	NR	NR	NR	NR
Alamgir et al., 2008c ⁹⁵	Canada	Cohort	Surveillance program	Musculoskeletal injuries	long-term care HCW	NR	NR	NR	NR	NR
Bell et al., 2008 ⁹⁶	USA	Cohort	Surveillance program	Slips, Trips, and Falls	HCWs	NR	NR	NR	NR	NR
Alamgir et al., 2008a ⁹⁷	Canada	Longitudinal	Surveillance program	Needlestick & sharp injury , Musculoskeletal injuries	Nurses	8640	1<y<50= 52.4%	95.0	NR	NR
Smith et al., 2009a ⁹⁸	Austral	Cross-sectional	Questionnaire	Any occupational injury	Dental students	56	22.5	43.0	NR	NR
Glenngård & Persson, 2009 ⁹⁹	Swede	Longitudinal	Database	Any occupational injury	Nurses	~284000	NR	NR	NR	NR
Alamgir et al., 2009 ¹⁰⁰	Canada	Longitudinal	Database	Any occupational injury	HCWs	42332	40-59y=61%	89.0	NR	NR
Rodríguez-Acosta et al., 2009 ¹⁰¹	USA	Longitudinal	Database	Any occupational injury	Nurses, care aides	6771	34.1	89.0	NR	NR
Lipscomb et al., 2009 ¹⁰²	USA	Cross-sectional	Questionnaire	Biological injury	Home care aides & nurses	2678	NR	81.0	NR	NR
Talas, 2009 ¹⁰³	Turkey	Cross-sectional	Questionnaire	Biological injury	Nursing students	473	NR	NR	29.0	NR
Petrucci et al., 2009 ¹⁰⁴	Italy	Cohort	Questionnaire	Blood and other fluids	Nursing students	2215	25.0	69.8	NR	NR
Nagao et al., 2009 ¹⁰⁵	Japan	Cohort	Database +	Blood and other fluids	Operative care line HCWs	164	NR	NR	36.9	78.0
Leiss et al., 2009 ¹⁰⁶	USA	Cross-sectional	Questionnaire	Blood and other fluids	Paramedics	2664	30-49y=70%	NR	45.0	NR
Leiss et al., 2009b ¹⁰⁷	USA	Cross-sectional	Questionnaire	Blood and other fluids	Nurses	1473	36-55y=62.1%	95.3	43.0	NR
Smith et al., 2009b ¹⁰⁸	Japan	Cross-sectional	Questionnaire	Needlestick & sharp injury	Nurses	995	34.0	96.5	14.6	57.8
Sharma et al., 2009 ¹⁰⁹	USA	cross-sectional	Questionnaire	Needlestick & sharp injury	MD students	699	NR	68.5	NR	NR
Kerr et al., 2009 ¹¹⁰	UK	Cross-sectional	Questionnaire	Needlestick & sharp injury	Surgeons	164	NR	NR	18.0	51.7
Quinn, 2009 ¹¹¹	USA	cross-sectional	Questionnaire	Needlestick & sharp injury ;	Nurses, care aides	1255	47.0	96.0	31.0	50.0
Darragh, 2009 ¹¹²	USA	Cross-sectional	Questionnaire	Musculoskeletal injuries	Physiotherapists,	1189	43.0	41.2	64.0	NR
Schoenfisch & Lipscomb, 2009 ¹¹³	USA	cross-sectional	Questionnaire	Musculoskeletal injuries	Nurses, care aides	585	18-50 y=80%	NR	65.1	NR
Gershon, 2009 ¹¹⁴	USA	Cross-sectional	Questionnaire	stress, violence, NSI, PSI	Nurses	738	49.9	95.1	NR	45.8
Koritsas et al., 2009 ¹¹⁵	Austral	cross-sectional	Questionnaire	Violence	Paramedics	930	40.6	24.3	72.0	NR
Heick et al., 2009 ¹¹⁶	USA	Cross-sectional	Questionnaire	Violence	EMS personnel	659	26-45	34.0	44.0	NR
Reichard and Jackson, 2010 ¹¹⁷	USA	Longitudinal	Surveillance program	Any occupational injury	EMS personnel	21900	NR	NR	NR	NR
Boal et al., 2010 ¹¹⁸	USA	cross-sectional	Questionnaire	Blood and other fluids	Paramedics	2664	NR	NR	45.0	NR
Karadağ, 2010 ¹¹⁹	Turkey	cross-sectional	Questionnaire	Blood and other fluids	Nursing & midwifery student	141	18-23y=86.8%	100.0	30.5	NR
Fica et al., 2010 ¹²⁰	Chile	Cross-sectional	Surveillance program	Needlestick & sharp injury	healthcare students	17204	NR	NR	NR	NR
Wicker and Rabenau, 2010 ¹²¹	Germa	cross-sectional	Questionnaire	Needlestick & sharp injury	Dental care workers	265	27.0	69.4	41.1	NR
Jagger et al., 2010 ¹²²	USA	Longitudinal	Database	Needlestick & sharp injury	HCWs	111030	NR	NR	NR	NR

Sossai et al., 2010 ¹²³	Italy	Longitudinal	Surveillance program	Needlestick & sharp injury	HCWs	4636	NR	NR	NR	NR
Ngan et al., 2010 ¹²⁴	Canada	Longitudinal	Database	Musculoskeletal injuries	HCWs	23742	39-59 y= 54%	87.0	NR	NR
Cappell et al., 2010 ¹²⁵	USA	Cohort	Database	Slips, Trips, and Falls	Endoscopy personnel	126	44.7	NR	NR	NR
Drebit et al., 2010 ¹²⁶	Canada	Longitudinal	Database	Slips, Trips, and Falls	HCWs	~23000	NR	NR	NR	NR
Rodrigues-Acosta et al., 2010 ¹²⁷	USA	Longitudinal	Surveillance program	Violence	Nurses, care aides	13290	NR	NR	NR	NR
Reichard et al., 2011 ¹²⁸	USA	Longitudinal	Database	Any occupational injury	EMS personnel, paramedics	~883,500 FTEs	Fatalities 25-34y=37%	26.0	NR	NR
Siow et al., 2011 ¹²⁹	USA	Longitudinal	Surveillance program	Any occupational injury	HCWs	42771	NR	88.2	NR	NR
Amuwo et al., 2011 ¹³⁰	USA	cross-sectional	Questionnaire	Blood and other fluids	Home care aides	971	NR	NR	27.0	NR
Lazenby et al., 2011 ¹³¹	UK	Cross-sectional	Questionnaire	Blood and other fluids	Oral & maxillofacial surgeon:	148	48.5	NR	57.0	68.8
Ghuri et al., 2011 ¹³²	UK	Cohort	Database	Needlestick & sharp injury	HCWs	NR	NR	NR	NR	NR
Frijstein et al., 2011 ¹³³	Netherl	cross-sectional	Surveillance program	Needlestick & sharp injury	HCWs	1601	NR	NR	NR	NR
Fullerton and Gibbons ¹³⁴	New	Cross-sectional	Questionnaire	Needlestick & sharp injury	HCWs	1346	44.0	NR	50.8	33.0
Kessler et al., 2011 ¹³⁵	USA	Cross-sectional	Questionnaire	Needlestick & sharp injury	Residents, MD students; nurses; dental care workers	455	NR	NR	28.9	37.0
Irmak and Baybuga, 2011 ¹³⁶	Turkey	Cross-sectional	Questionnaire	Needlestick & sharp injury	Nursing students	310	21.0	62.9	25.2	68.3
Lukianskyte et al., 2011 ¹³⁷	Lithua nia	Cross-sectional	Questionnaire	Needlestick & sharp injury	Nurses, nursing students	196	18-30y=52.0%	100.0	21.6	45.9% among the staff nurses; 92% among the nursing students
O'Connor et al., 2011 ¹³⁸	Ireland	Cross-sectional	Questionnaire	Needlestick & sharp injury	Non-consultant hospital doctors	158	27.7	46.0	14.6	NR
Garus-Pakowska and Szatko, 2011 ¹³⁹	Poland	cross-sectional	Questionnaire	Needlestick & sharp injury	HCWs	151	NR	NR	NR	NR
O'Sullivan et al., 2011 ¹⁴⁰	Ireland	Cross-sectional	Questionnaire	Needlestick & sharp injury	Interns	31	25.3	67.7	NR	NR
Laramie et al., 2011 ¹⁴¹	USA	Longitudinal	Surveillance program	Needlestick & sharp injury	HCWs	16158 injuries	NR	NR	NR	NR
Cappell, 2011 ¹⁴²	USA	Cohort	Database	Slips, Trips, and Falls	Endoscopy personnel	126	NR	NR	NR	NR
Alamgir et al., 2011 ¹⁴³	Canada	Longitudinal	Database	Slips, Trips, and Falls	HCWs	48519 FTEs	NR	NR	NR	NR
Magin et al., 2011 ¹⁴⁴	Austral ia	Cross-sectional; case-control	Questionnaire	Violence	HCWs	125	NR	NR	45.0	NR
Voide et al., 2012 ¹⁴⁵	Switzer land	Cross-sectional	Questionnaire	Any occupational injury	HCWs	2691	40.2	73.0	56.4	58.6
Darragh et al., 2012 ¹⁴⁶	USA	Cross-sectional	Questionnaire	Any occupational injury	Physiotherapists, occupational therapists	1158	NR	NR	64.5	NR
Unver et al., 2012 ¹⁴⁷	Turkey	Cross-sectional	Questionnaire	Any occupational injury	Nursing students	218	20.9	NR	NR	NR
Leiss, 2012 ¹⁴⁸	USA	Cross-sectional	Questionnaire	Blood and other fluids	Nurses	833	35-54y=63%	96.0	31.0	NR
Costigliola et al., 2012 ¹⁴⁹	Belgiu m, Swede n, France	Cross-sectional	Questionnaire	Needlestick & sharp injury	Nurses	634	NR	NR	NR	NR
Ozer and Bektas, 2012 ¹⁵⁰	Turkey	Cross-sectional	Questionnaire	Needlestick & sharp injury	Nursing students	285	20.9	100.0	10.7	NR
Van der Molen et al., 2012 ¹⁵¹	Netherl ands	Randomized Clinical Trial	Questionnaire	Needlestick & sharp injury	HCWs	796	NR	NR	NR	NR
Taylor et al., 2012 ¹⁵²	USA	Cross-sectional	Questionnaire	Needlestick & sharp injury ; Slips, Trips, and Falls	Nurses	723	NR	NR	NR	NR

Magnavita & Heponiemi, 2012 ¹⁵³	Italy	Cross-sectional	Questionnaire	Violence	HCWs	1166	43.0	66.8	NR	NR
Gatto et al., 2013 ¹⁵⁴	Italy	Longitudinal	Surveillance program	Blood and other fluids	Dental care workers, and dental students	4355	NR	NR	NR	NR
Phillips et al., 2013 ¹⁵⁵	USA	Cohort	database	Needlestick & sharp injury	HCWs	NR	NR	NR	NR	NR
Cho et al., 2013 ¹⁵⁶	South Korea	Cross-sectional	Questionnaire	Needlestick & sharp injury	Nurses	3079	28.0	94.9	NR	NR
Rybacki et al., 2013 ¹⁵⁷	Poland	Cross-sectional	Questionnaire	Needlestick & sharp injury	HCWs	1138	46.4	NR	NR	39.7
Bernard et al., 2013 ¹⁵⁸	USA	Cross-sectional	Questionnaire	Needlestick & sharp injury	MD students and doctors	180	NR	NR	48.3	51.2
Yoshikawa et al., 2013 ¹⁵⁹	Japan	Longitudinal	Surveillance program	Needlestick & sharp injury	HCWs	5463 injuries	NR	NR	NR	NR
Yeoh t al., 2013b ¹⁶⁰	USA	Cohort	database	Slips, Trips, and Falls	HCWs	NR	NR	NR	NR	NR
Yeoh et al., 2013a ¹⁶¹	USA	Longitudinal	database	Slips, Trips, and Falls	HCWs	73030 injuries	45-64y=50.9%	91.9	NR	NR
Bell et al., 2013 ¹⁶²	USA	Longitudinal	Database	Slips, Trips, and Falls	HCWs	4433 FTEs	NR	86.0	NR	NR
Maguire et al., 2014 ¹⁶³	Australia	Longitudinal	Database	Any occupational injury	Paramedics	6725 injuries	NR	NR	NR	NR
Grimmond and Naisoro et al., 2014 ¹⁶⁴	Australia	Epidemiological survey six-year (2004 to 2010)	Database	Container-associated sharp injury	HCWs	NR	NR	NR	NR	NR
Leavy et al., 2014 ¹⁶⁵	UK	Cross-sectional	Questionnaire	Blood and other fluids	Dental care workers	300	45.0	35.0	58.0	NR
Lauer et al., 2014 ¹⁶⁶	Germany	Cross-sectional	Questionnaire	Needlestick & sharp injury	MD students	2131	25.0	65.1	NR	53.0
Róžańska et al., 2014 ¹⁶⁷	Poland	Longitudinal	Database	Needlestick & sharp injury	HCWs	3165	NR	NR	NR	NR
Yonezawa et al., 2015 ¹⁶⁸	Japan	Cohort	Database	Any occupational injury	Surgeons using general anesthesia	NR	NR	NR	NR	NR
Stefanati et al., 2015 ¹⁶⁹	Italy	Cohort	Database	Biological injury	Nurses, nursing students	NR	NR	NR	NR	5.72
Maniar et al., 2015 ¹⁷⁰	USA	Cross-sectional	Questionnaire	Blood and other fluids	Orthopaedic surgeons	117	NR	NR	NR	NR
Kevitt and Hayes et al., 2015 ¹⁷¹	Ireland	Cohort	Database	Needlestick & sharp injury	HCWs	286	NR	75.2	NR	NR
Rice et al., 2015 ¹⁷²	UK	Longitudinal	Database	Needlestick & sharp injury	HCWs	2947 injuries	NR	NR	NR	NR
Türe et al., 2016 ¹⁷³	Turkey	Case-control	Database + questionnaire	Any occupational injury	HCWs	331	NR	NR	NR	NR
Garus-Pakowska et al., 2016a ¹⁷⁴	Poland	Cross-sectional	Database	Any occupational injury	Paramedics	NR	NR	NR	NR	NR
Quinn et al., 2016 ¹⁷⁵	USA	Cross-sectional	Questionnaire	Any occupational injury	Home care aides	1249	47.0	87.0	42.4	NR
Yilmaz et al., 2016 ¹⁷⁶	Turkey	Cross-sectional	Questionnaire	Any occupational injury	EMS personnel	163	NR	NR	NR	NR
Garus-Pakowska et al., 2016b ¹⁷⁷	Poland	Cross-sectional	Questionnaire	Any occupational injury	Denturists	103	34.0	55.0	8.0	NR
Sossai et al., 2016 ¹⁷⁸	Italy	Quasi-experimental	Database	Biological injury	HCWs	122464 person-years	NR	NR	NR	NR
Kanamori et al., 2016 ¹⁷⁹	USA	Cohort	Database	Blood and other fluids	Resident physicians, fellows	NR	NR	NR	NR	NR
Morinaga et al., 2016 ¹⁸⁰	Japan	Cohort	Database	Needlestick & sharp injury	Dental care workers	NR	NR	NR	NR	NR
Wada et al., 2016 ¹⁸¹	Japan	Cohort	Surveillance program	Needlestick & sharp injury	HCWs	NR	NR	NR	33.3	NR
Marnejon et al., 2016 ¹⁸²	USA	Cohort	Database	Needlestick & sharp injury	Resident physicians	924	NR	NR	NR	NR

d'Ettoire et al., 2016 ¹⁸³	Italy	Cohort	pharmaco-economic appraisal and database survey	Needlestick & sharp injury	Nurses	765	45.1	72.3	NR	NR
Gülen et al., 2016 ¹⁸⁴	Turkey	Cross-sectional	Questionnaire	Violence, NSI	Paramedics, Ambulance service personnel	901	29.5	53.6	NR	90.5
Gormley et al., 2016 ¹⁸⁵	USA	Cohort	Questionnaire	Violence	EMS personnel	1789	32.3	32.2	40.7	NR
Boyle and McKenna, 2016 ¹⁸⁶	Australia	Cross-sectional	Questionnaire	Violence	Paramedic students, midwifery students	393	26.0	78.7	65.4	NR
Garus-Pakowska et al., 2017 ¹⁸⁷	Poland	Cohort	Database	Any occupational injury	Paramedics	1113	47.4	NR	NR	45.0
Reichard et al., 2017 ¹⁸⁸	USA	Cross-sectional	Questionnaire	Any occupational injury	HCWs	572	18-29y=42%	33.3	26.0	NR
Stefanati et al., 2017 ¹⁸⁹	Italy	Cohort	Database	Biological injury	Resident physicians	NR	NR	NR	NR	NR
Pérez Ruiz et al., 2017 ¹⁹⁰	Spain	Cohort	Database	Blood and other fluids	HCWs	NR	NR	NR	NR	NR
Grimmon and Good, 2017 ¹⁹¹	USA	Cross-sectional	Questionnaire	Blood and other fluids	HCWs	NR	NR	NR	NR	NR
Lee et al., 2017 ¹⁹²	South Korea	Longitudinal	Database	Blood and other fluids	HCWs	10452	NR	NR	NR	NR
Brouillette, 2017 ¹⁹³	USA	Cross-sectional	Questionnaire	Needlestick & sharp injury	Home care aides, home care nurses	1178	46-63 range	NR	NR	NR
Dulon et al., 2017 ¹⁹⁴	Germany	Cross-sectional	Questionnaire	Needlestick & sharp injury	HCWs	540	NR	82.2	17.0	NR
Ouyang et al., 2017 ¹⁹⁵	Canada	Cross-sectional	Questionnaire	Needlestick & sharp injury	MD students, resident physicians, and fellows	350	NR	54.0	58.0	NR
Choi et al., 2017 ¹⁹⁶	USA	Cross-sectional	Questionnaire	Needlestick & sharp injury	MD Students, Surgical Residents, Faculty, Operating Room Staff	195	NR	NR	63.0	36.0
Marjadi et al., 2017 ¹⁹⁷	Australia	Cross-sectional	Questionnaire	Needlestick & sharp injury	MD students	153	NR	NR	86.2	52.0
d'Ettoire, 2017 ¹⁹⁸	Italy	Cross-sectional; Nested case-control analysis	Surveillance program	Needlestick & sharp injury	Nurses	765	NR	72.7	NR	NR
Merryweather et al., 2017 ¹⁹⁹	USA	Cross-sectional	Surveillance program	Slips, Trips, and Falls	HCWs	870	NR	NR	NR	NR
Sossai et al., 2017 ²⁰⁰	Italy	Cross-sectional	Questionnaire	Violence	HCWs	539 events	39.0	81.3	NR	NR
Boyle and McKenna, 2017 ²⁰¹	Australia	Cross-sectional	Questionnaire	Violence	Paramedic students	133	23.0	60.9	70.2	NR
Maguire et al., 2017 ²⁰²	USA	Longitudinal	Database	Violence	EMS personnel	1630 claims	25-44 y=63.2%	38.7	NR	NR
Rubbi et al., 2018 ²⁰³	Italy	Cohort	Database	Any occupational injury	Nursing students	1403	NR	NR	NR	NR
Unruh et al., 2018 ²⁰⁴	USA	Cross-sectional	Questionnaire	Any occupational injury	Nurses	414	35.0	91.2	NR	NR
Jończyk et al., 2018 ²⁰⁵	Poland	Cross-sectional	Questionnaire	Any occupational injury	Nurses	107	41-50y=34.6%	98.1	NR	NR
Reichard et al., 2018 ²⁰⁶	USA	Longitudinal	Database	Any occupational injury	Ambulance service personnel	5882 claims	25-44y=63.5%	45.3	NR	NR
Cofini et al., 2018 ²⁰⁷	Italy	Cohort	Database	Biological injury	HCWs	NR	NR	NR	NR	NR
Nunn et al., 2018 ²⁰⁸	USA	Cohort	Surveillance program	Blood and other fluids	ED staff	1360	30.0	9.5	NR	NR
Garus-Pakowska et al., 2018a ²⁰⁹	Poland	Cross-sectional	Questionnaire	Blood and other fluids	Dentists	192	NR	84.4	28.1	NR

Schuermans et al., 2018 ²¹⁰	Netherlands	Cohort	Database	Needlestick & sharp injury		NR	NR	NR	NR	NR	NR
Dulon et al., 2018 ²¹¹	Germany	Cohort	Database + questionnaire	Needlestick & sharp injury	HCWs	1602	NR	NR	NR	NR	NR
Garus-Pakowska et al., 2018b ²¹²	Poland	Cohort	Database	Needlestick & sharp injury	HCWs	243	NR	NR	NR	NR	NR
Garus-Pakowska et al., 2018c ²¹³	Poland	Longitudinal	Database	Needlestick & sharp injury	HCWs	66057	NR	NR	NR	NR	NR
Trayner et al., 2018 ²¹⁴	UK	Cross-sectional	Questionnaire	Needlestick & sharp injury	Dental care workers	796	NR	NR	72.0	35.0	
Alhazmi et al., 2018 ²¹⁵	USA	Cross-sectional	Questionnaire	Needlestick & sharp injury	EMS personnel	247	18-39y=67.1%	32.8	52.7	NR	
Hasak et al., 2018 ²¹⁶	USA	Cross-sectional	Questionnaire	Needlestick & sharp injury	MD students	150	NR	NR	75.2	33.0	
Manoli et al., 2018 ²¹⁷	USA	Cross-sectional	Questionnaire	Needlestick & sharp injury	Orthopedic residents	54	NR	NR	13.0	NR	
Oranye et al., 2018 ²¹⁸	Canada	Longitudinal	Database	Musculo-skeletal and other injuries	HCWs	2223 claims	42.0	90.9	NR	NR	
Amaro et al., 2018 ²¹⁹	Portugal	Cohort	Database	Musculoskeletal injuries	HCWs	824	30-50y=59.7%	81.7	NR	NR	
Parikh et al., 2018 ²²⁰	USA	Cross-sectional	Questionnaire	Musculoskeletal injuries	Radiologists	7642	35-55y=61.3%	21.5	NR	NR	
Anyfantis et al., 2018 ²²¹	Greece	Cross-sectional	Questionnaire	Musculoskeletal injuries	Physiotherapists	252	42.2	47.6	NR	NR	
Khansa et al., 2018 ²²²	USA, Canada, Norway	Cross-sectional	Questionnaire	Musculoskeletal symptoms	Plastic surgeons	865	NR	24.2	73.9	NR	
Ho et al., 2018 ²²³	USA	Cross-sectional	Questionnaire	Musculoskeletal symptoms	Otolaryngologists	377	40.2	27.3	87.5	NR	
Penkala et al., 2018 ²²⁴	Australia	Cross-sectional	Questionnaire	Musculoskeletal symptoms	MD students	110	21	69.1	61.8	NR	
Kaeser et al., 2018 ²²⁵	Switzerland	Cohort	Database	Violence	ED staff	NR	NR	NR	NR	NR	
Schablon et al., 2018 ²²⁶	Germany	Cross-sectional	Questionnaire	Violence	Nurses, care aides	1984	40-59y=52.3%	79.0	58.1	NR	
Maguire et al., 2018 ²²⁷	Australia	Cross-sectional	Questionnaire	Violence	EMS personnel	1778	25-45y=52%	31.0	NR	NR	
Ramacciati et al., 2018 ²²⁸	Italy	Cross-sectional	Questionnaire	Violence	Emergency nurses	816	41.0	58.8	NR	NR	
Rosenthal et al., 2018 ²²⁹	USA	Cross-sectional	Questionnaire	Violence	HCWs	802	NR	78.8	NR	NR	
Groenewold et al., 2018 ²³⁰	USA	Longitudinal	Surveillance program	Violence	HCWs	3263 injuries	18-54y=85.6%	66.4	NR	NR	
Maguire et al., 2018 ²³¹	Australia	Longitudinal	Database	Violence	Paramedics, Ambulance service personnel	300 claims	NR	36.7	NR	NR	
Boland et al., 2018 ²³²	USA	Cross-sectional	Questionnaire	Violence and burnout	Paramedics, Ambulance service personnel	266	NR	NR	44.0	NR	
Çelikkalp et al., 2019 ²³³	Turkey	Cross-sectional	Questionnaire	Any occupational accident	Nurses	108	26.4	83.3	29.0	NR	
Kim et al., 2019 ²³⁴	USA	Cross-sectional	Questionnaire	Any occupational injury	Nurses	419	48.0	90.5	NR	73.7	
El Ghaziri et al., 2019 ²³⁵	USA	Cross-sectional	Questionnaire	Any occupational injury	Nurses	95	44.0	75.0	29.0	NR	
Anderson et al., 2019 ²³⁶	Australia	Longitudinal	Database	Any occupational injury	Allied health professionals	7023 injuries	NR	NR	NR	NR	

Papadopoli et al., 2019 ²³⁷	Italy	Cross-sectional	Questionnaire	Needlestick & sharp injury	Resident physicians, healthcare students	642	25.7	67.5	95.3	NR
Garus-Pakowska et al., 2019 ²³⁸	Poland	Cross-sectional	Questionnaire	Needlestick & sharp injury	HCWs	487	NR	56.9	NR	73.6
Ganczak et al., 2019 ²³⁹	Poland	Cross-sectional	Questionnaire	Needlestick & sharp injury	HCWs	306	47.8	88.6	NR	NR
Garus-Pakowska et al., 2019 ²⁴⁰	Poland	Longitudinal	Database	Needlestick & sharp injury	HCWs	9775 injuries	NR	56.9	NR	54.2
Çiçek-Şentürk et al., 2019 ²⁴¹	Turkey	Longitudinal	Database	Needlestick & sharp injury	HCWs	546 injuries	27.0	68.9	NR	NR
Morris et al., 2019 ²⁴²	USA	Longitudinal	Database	Needlestick & sharp injury	Resident physicians	464 injuries	NR	NR	NR	NR
Bianco et al., 2019 ²⁴³	Italy	Longitudinal	Database	Needlestick & sharp injury	HCWs	1477 injuries	39.4	45.0	NR	NR
Andersen et al., 2019 ²⁴⁴	Denmark	Cohort	Questionnaire	Musculoskeletal injuries	HCWs	2080	48.0	87.1	46.0	NR
Austin et al., 2019 ²⁴⁵	USA	Cross-sectional	Questionnaire	Musculoskeletal injuries	Gastroenterology fellows	165	31-35y=67%	35.2	NR	89.0
Greiner et al., 2019 ²⁴⁶	Ireland	Cross-sectional	Questionnaire	Musculoskeletal symptoms	Physiotherapists	347	23-72y range	67.0	NR	NR
Howarth et al., 2019 ²⁴⁷	USA	Cross-sectional	Questionnaire	Musculoskeletal symptoms	Microsurgeons	117	31-50y=69%	20.0	NR	83.3
Howarth et al., 2019 ²⁴⁸	USA	Cross-sectional	Questionnaire	Musculoskeletal symptoms	Craniofacial and Maxillofacial Surgeons	95	31-50y=56%	25.0	NR	76.3
Diaconita et al., 2019 ²⁴⁹	Canada	Cross-sectional	Questionnaire	Musculoskeletal symptoms and injuries	Ophthalmologists, optometrists	290	NR	44.1	89.1	NR
Udoji et al., 2019 ²⁵⁰	USA	Cross-sectional	Questionnaire	Violence	Anesthesiologists	2694	NR	NR	NR	NR
Marte et al., 2019 ²⁵¹	Italy	Cross-sectional	Questionnaire	Violence	HCWs	203	40.5	60.1	NR	NR
García-Gámez et al., 2020 ²⁵²	Spain	Longitudinal	Database	Any occupational accident	Nursing students	1638 claims	NR	72.5	NR	NR
Xia et al., 2020 ²⁵³	Australia	Longitudinal	Database	Any occupational injury	HCWs	43910 claims	NR	NR	NR	NR
Boucaut et al., 2020 ²⁵⁴	Australia	Longitudinal	Database	Any occupational injury	Nurses, nursing students	120 injuries	NR	NR	NR	NR
Aljabri et al., 2020 ²⁵⁵	USA	Longitudinal	Database	Any occupational injury	HCWs	23599	44.4	68.2	NR	27.0
Black Thomas et al., 2020 ²⁵⁶	USA	Cross-sectional	Questionnaire	Blood and other fluids	Nursing students	4140	29.7	88.1	NR	NR
Maida et al., 2020 ²⁵⁷	Italy	Longitudinal	Database	Blood and other fluids	HCWs	899 injuries	36.0	NR	NR	NR
Foytl et al., 2020 ²⁵⁸	UK	Longitudinal	Database	Blood and other fluids	MD students	35 injuries	NR	NR	NR	NR
Ganczak et al., 2020 ²⁵⁹	Poland	Cross-sectional	Questionnaire	Needlestick & sharp injury	Paramedics	286	37.0	23.5	9.1	NR
Hanania et al., 2020 ²⁶⁰	USA	Cross-sectional	Questionnaire	Musculoskeletal injuries	Radiation therapists	2747	45.0	NR	NR	83.0
Howarth et al., 2020 ²⁶¹	Canada	Cross-sectional	Questionnaire	Musculoskeletal injuries	Chiropractors	432	25-49y=68.4%	39.8	NR	88.2
Gadjradj et al., 2020 ²⁶²	Netherlands	Cross-sectional	Questionnaire	Musculoskeletal symptoms	Neurosurgeons	417	48.2	16.1	NR	NR
Rypicz et al., 2020 ²⁶³	Poland	Cross-sectional	Questionnaire	Musculoskeletal symptoms	Anesthesiology, intensive care, and surgical nurses	136	42.9	100.0	NR	NR
Wyatt et al., 2020 ²⁶⁴	USA	Cross-sectional	Questionnaire	Musculoskeletal symptoms and injuries	Orthopedic surgeons	685	41-60y=50.2%	8.7	NR	NR
Çevik et al., 2020 ²⁶⁵	Turkey	Cross-sectional	Questionnaire	Violence	Physicians	948	36.2	57.1	NR	NR
Wizner et al., 2021 ²⁶⁶	USA	Longitudinal	Database	Any occupational injury	HCWs	626032 injuries	32-52=75%	78.1	NR	NR
Nicholas et al., 2021 ²⁶⁷	USA	Cross-sectional	Questionnaire	Blood and other fluids	OR staff members	112	NR	NR	67.0	32.0

Erturk Sengel et al., 2021 ²⁶⁸	Turkey	Longitudinal	Database	Blood and other fluids	HCWs	965 injuries	30.5	68.4	NR	NR
Ferrario et al., 2021 ²⁶⁹	Italy	Longitudinal	Database	Blood and other fluids	Nurses	3294	45.3	81.4	NR	NR
Tabachnick et al., 2021 ²⁷⁰	USA	Cross-sectional	Questionnaire	Needlestick & sharp injury	OR staff members	24 injuries	18-39y=79.1%	58.3	NR	NR
Bahat et al., 2021 ²⁷¹	Israel	Cross-sectional	Questionnaire	Needlestick & sharp injury	HCWs	844	31-50y=60%	66.0	60.0	46.0
Ahadizadeh et al., 2021 ²⁷²	USA	Cross-sectional	Questionnaire	Needlestick & sharp injury	Otolaryngology residents	314	NR	NR	36.8	25.9
Ugonabo et al., 2021 ²⁷³	USA	Longitudinal	Database	Needlestick & sharp injury	Resident physicians	715 injuries	NR	NR	NR	NR
Pawa et al., 2021 ²⁷⁴	USA	Cross-sectional	Questionnaire	Endoscopy-related injury	Gastroenterologists	1698	NR	NR	NR	NR
Macaluso et al., 2021 ²⁷⁵	USA	Cohort	Database	Musculoskeletal disorder (MSD)	Nurses, Allied health professionals	569	18-35y=75%	87.4	NR	NR
Aaron et al., 2021 ²⁷⁶	USA	Cohort	Questionnaire	Musculoskeletal injuries	Surgical specialists	155	NR	40.1	NR	57.1
Kapoor et al., 2021 ²⁷⁷	Australia, New Zealand	Cross-sectional	Questionnaire	Musculoskeletal injuries	Obstetricians and gynaecologists	679	41-60y=60.6%	51.9	NR	61.7
Al-Rifaie et al., 2021 ²⁷⁸	UK	Cross-sectional	Questionnaire	Musculoskeletal injuries	Colonoscopists	319	31-60y=89.5%	32.0	NR	82.5
Campbell et al., 2021 ²⁷⁹	USA	Cross-sectional	Questionnaire	Musculoskeletal injuries	Gastroenterologists	203	NR	NR	NR	93.8
Anderson et al., 2021 ²⁸⁰	Australia	Cross-sectional	Questionnaire	Musculoskeletal injuries	Prosthetists and orthotists	129	34.0	56.0	NR	44.0
Gilchrist et al., 2021 ²⁸¹	Czech Republic	Cross-sectional	Questionnaire	Musculoskeletal symptoms	Nurses	569	42.0	95.6	NR	NR
Adams et al., 2021 ²⁸²	UK	Cross-sectional	Questionnaire	Musculoskeletal symptoms and injuries	Podiatrists	148	40-54y=56%	85.0	NR	NR

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