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Article	**Objective**	**Methods**	**Findings**
Mengistu DA, et al. Prevalence of occupational exposure to needle-stick injury and associated factors among healthcare workers of developing countries: Systematic review J Occup Health**. 2020**;62:e12179. https://doi.org/10.1002/1348-9585.12179	Aimed to provide the evidence on the prevalence of NSI and associated factors among healthcareworkers of **developing countries**.	Review article Studies published from 2012 to 2019 were identified through systematic searches of electronic databases such as PubMed, Google Scholar, CINAHL, MEDLINE, Scopus, Med Nar, and Science Direct. Assessment and evaluation were taken to confirm the quality and relevance of the included articles, followed by extraction and analysis of data	2021 articles were identified; 13 articles met eligibility criteria and were included in the review. Among 6513 participants, 1009 and 2201 participants involved to determine 1-year and throughout career prevalence, respectively. The prevalence of NSI ranged from 19.9% to 54.0% with an overall prevalence of 35.7% and 38.5 to 100% with an overall prevalence of 64.1% in the previous 1 year and throughout career, respectively. Sex, workload, needle recapping, overuse of injection, and practice of universal precautions, training, occupation, working experience, and personal protective equipment were among the factors associated with the prevalence of NSIs in developing countries. NSIs have been identified as one of the most serious issues that affect the health and well-being of healthcare workers in the majority of healthcare systems of developing countries.
Auta S, et al. Health-care workers' occupational exposures to body fluids in 21 countries in Africa: systematic review and meta-analysis Bull World Health Organ **2017**;95:831–841F doi: http://dx.doi.org/10.2471/BLT.17.195735	To estimate the lifetime and 12-month prevalence of occupational exposure to body fluids among health-care workers **in Africa**.	Embase®, PubMed® and CINAHL databases were systematically searched for studies published between January 2000 and August 2017 The continent-wide prevalence of exposure was estimated using random-effects meta-analysis.	904 articles identified; 65 studies from 21 African countries included. The estimated pooled lifetime and 12-month prevalence of occupational exposure to body fluids were 65.7% (95% CI: 59.7–71.6) and 48.0% (95% CI: 40.7–55.3), respectively. Exposure was largely due to percutaneous injury, with an estimated 12-month prevalence of 36.0% (95% CI: 31.2–40.8). The pooled 12-month prevalence of occupational exposure among medical doctors (excluding surgeons), nurses (including midwives and nursing assistants) and laboratory staff (including laboratory technicians) was 46.6% (95% CI: 33.5–59.7), 44.6% (95% CI: 34.1–55.0) and 34.3% (95% CI: 21.8–46.7), respectively. The risk of exposure was higher among health-care workers with no training on infection prevention and those who worked more than 40 hours per week. Data suggest that almost one half of health-care workers in Africa were occupationally exposed to body fluids annually. However, a lack of data from some countries was a major limitation.

Mossburg S, et al. Occupational Hazards among Healthcare Workers in Africa: A Systematic Review. Annals of Global Health. **2019**; 85(1): 78, 1–13. DOI: https://doi.org/10.5334/aogh.2434	To examine occupational exposure rates to blood and bloodborne pathogen among healthcare workers **in Sub-Saharan Africa**.	Systematic review, November 2017. Studies more than 10 years old, or published in non-English language were excluded	Fifteen studies included. Lifetime prevalence of NSI ranged 22–95%; one-year prevalence ranged 39–91%. Rates of recapping needles ranged from 12–57% in four studies. High burden of blood and bloodborne pathogen exposures
Reddy VK, et al. Devices for preventing percutaneous exposure injuries caused by needles in healthcare personnel. Cochrane Database of Systematic Reviews **2017**, Issue 11. Art. No.: CD009740. https://doi.org/10.1002/14651858.CD009740.pub3	To determine the benefits and harms of safety medical devices aiming to prevent percutaneous exposure injuries caused by needles in healthcare personnel versus no intervention or alternative interventions. **Worldwide**	Intervention review Searched CENTRAL, MEDLINE, EMBASE, NHSEED, Science Citation Index Expanded, CINAHL, Nioshtic, CISdoc and PsycINFO (until 11 November 2016). Included: randomised controlled trials (RCT), controlled before and after studies (CBA) and interrupted time-series (ITS) designs of the effect of safety engineered medical devices on percutaneous exposure injuries in healthcare staff. Assessed study eligibility and risk of bias and extracted data. Synthesized study results with a fixed effect or random-effects model meta-analysis where appropriate.	Included: six RCTs with 1838 participants, two cluster-RCTs with 795 participants and 73,454 patient days, five CBAs with approximately 22,000 participants and eleven ITS with an average of 13.8 data points. For safe blood collection systems, we found very low quality evidence of inconsistent effects on NSIs. For safe passive intravenous systems, we found very low quality evidence of a decrease in NSI and a reduction in the incidence of blood leakage events but moderate quality evidence that active systems may increase exposure to blood. For safe injection needles, the introduction of multiple safety devices or the introduction of sharps containers the evidence was inconsistent or there was no clear evidence of a benefit. There was low to moderate quality evidence that introduction of legislation probably reduces NSI rates. The evidence on safety devices preventing NSI is of low quality and inconsistent. The lack of a strong and consistent helpful effect could be due to bias. This does not mean that these devices are not effective.
Auta S, et al. Global prevalence of percutaneous injuries among healthcare workers: a systematic review and meta-analysis International Journal of Epidemiology **2018**. 47 ;6 :1972–1980 https://doi.org/10.1093/ije/dyy208	Review article To estimate the global and regional 1-year prevalence of percutaneous injuries (PCIs) among HCWs. **Worldwide**	Systematically searched EMBASE, PubMed, CINAHL and PsychInfo databases for studies published from January 2008 to January 2018 that reported the prevalence of PCIs among HCWs. A random-effects meta-analysis was conducted to estimate pooled prevalence of PCIs among HCWs.	Of the 5205 articles identified, 148 studies from 43 countries met the inclusion criteria. The pooled global 1-year prevalence estimate of PCIs was 36.4% [95% CI: 32.9–40.0]. There were substantial regional variations in the 1-year prevalence of PCIs, ranging from 7.7% (95% CI: 3.1–12.4) in South America to 43.2% (95% CI: 38.3–48.0) in Asia. The estimates for Africa and Europe were comparable with values of 34.5% (95% CI: 29.9–39.1) and 31.8% (95% CI: 25.0–38.5), respectively. The highest 1-year prevalence by job category was among surgeons, at 72.6% (95% CI: 58.0–87.2). The estimates for medical doctors (excluding surgeons), nurses (including midwives) and laboratory staff (including laboratory technicians) were 44.5% (95% CI: 37.5–51.5), 40.9% (95% CI: 35.2–46.7) and 32.4% (95% CI: 20.9–49.3), respectively. PCIs commonly occurred among HCWs working in hospital

			(41.8%, 95% CI: 37.6–46.0) than non-hospital (7.5%, 95% CI: 5.9–9.1) settings. Data suggest high rates of PCIs among HCWs with direct patient care across many regions of the world. However, paucity of data from some countries was a major limitation.
Xu X, et al. Prevalence of needle-stick injury among nursing students: A systematic review and meta-analysis Front. Public Health **2022**. 10. 10:937887. doi: 10.3389/fpubh.2022.937887 2022 https://doi.org/10.3389/fpubh.2022.937887	Study aimed to estimate the pooled prevalence of NSI among nursing students. **Worldwide**	Systematic review Study was conducted by searching for articles in Web of Science, PubMed, Scopus, Embase, and Google Scholar without time limitation using the following keywords: needle-stick, needle stick, sharp injury, and nursing student. The data were analyzed using the meta-analysis method and random-effects model. The quality of the articles was evaluated with Newcastle-Ottawa Quality Assessment Scale (NOS). The heterogeneity of the studies was examined using the I2 index, and the collected data were analyzed using the STATA Software Version 16.	1,134 articles were retrieved, of which 32 qualified articles were included in the analysis. Nursing students reported 35% of NSI (95% CI: 28–43%) and 63% (95% CI: 51–74%) did not report their needle-stick injuries. The highest prevalence was related to studies conducted in Asia (39.7%; 95% CI: 31.7–47.7%). There was no significant correlation among NSI prevalence and age of samples, and article year of publication. A third of nursing students reported experiencing NSI.
Cooke CE, et al. Clinical, economic, and humanistic burden of needlestick injuries in healthcare workers Med Devices (Auckl). **2017**; 10: 225–235.	To perform a systematic literature review on NSI and active safety-engineered devices for hypodermic injection **Worldwide**	Systematic review MEDLINE, EMBASE, and COCHRANE databases were searched for studies that evaluated the clinical, economic, or humanistic outcomes of NSI or active safety-engineered devices.	NSIs have been reported by 14.9%–69.4% of HCWs with the wide range due to differences in countries, settings, and methodologies used to determine rates. Exposure to contaminated sharps is responsible for 37%–39% of the worldwide cases of hepatitis B and C infections in HCWs. HCWs may experience serious emotional effects and mental health disorders after a NSI, resulting in work loss and post-traumatic stress disorder. In 2015 International US$ (IntUS$), the average cost of a NSI was IntUS$747 (range IntUS$199–1,691). Hypodermic injections, the most frequent cause of NSI, are responsible for 32%–36% of NSIs. The use of safety devices that cover the needle-tip after hypodermic injection lowers the risk of NSI per HCW by 43.4%–100% compared to conventional devices. The economic value of converting to safety injective devices shows net savings, favorable budget impact, and overall cost-effectiveness. The clinical, economic, and humanistic burden is substantial for HCWs who experience a NSI. Safety-engineered devices for hypodermic injection demonstrate value by reducing NSI risk, and the associated direct and indirect costs, psychological stress on HCWs, and occupational blood-borne viral infection risk.

Cheetham S, et al. Education and training for preventing sharps injuries and splash exposures in healthcare workers Cochrane Database of Systematic Reviews **2021**, Issue 4. Art. No.: CD012060. https://doi.org/10.1002/14651858.CD012060.pub2	To assess the effects of education and training interventions compared to no intervention or alternative interventions for preventing sharps injuries and splash exposures in HCWs. **Worldwide**	Intervention review Searched: CENTRAL, MEDLINE, Embase, NHSEED, Science Citation Index Expanded, CINAHL and OSH-update (from all time until February 2016). I In addition, searched: the databases of Global Health, AustHealth and Web of Science (from all time until February 2016). The original search strategy was re-run in November 2019, and again in February 2020. In April 2020, the search strategy was updated and run in CINAHL, MEDLINE, Scopus and Web of Science (from 2016 to current). Were considered: randomized controlled trials (RCTs), cluster-randomized trials (cluster-RCTs), controlled clinical trials (CCTs), interrupted time series (ITS) study designs, and controlled before-and-after studies (CBA), that evaluated the effect of education and training interventions on the incidence of	Seven studies met our inclusion criteria: one cluster-RCT, three CCTs, and three ITS studies. The baseline rates of sharps injuries varied from 43 to 203 injuries per 1000 HCWs per year in studies with hospital registry systems. In questionnaire-based studies, the rates of sharps injuries were higher, from 1800 to 7000 injuries per 1000 HCWs per year. The majority of studies utilised a combination of education and training interventions, including interactive demonstrations, educational presentations, web-based information systems, and marketing tools which we found similar enough to be combined. We found low- to very low-quality evidence that education and training interventions may cause small decreases in the incidence of sharps injuries two to twelve months after the intervention. There was very low-quality evidence that educational interventions may improve knowledge and behaviors related to sharps injuries in the short term but we are uncertain of this effect.

		sharps injuries and splash exposures compared to no-intervention. Studies were analyzed, risk of bias assessed, and pooled using random- effect meta-analysis, where applicable, according to their design types. As primary outcome we looked for sharps injuries and splash exposures and calculated them as incidence of injuries per 1000 health care workers per year. For the quality of evidence we applied GRADE for the main outcomes.	
Mengistu DA, et al. Global Occupational Exposure to Blood and Body Fluids among Healthcare Workers: Systematic Review and Meta-Analysis Canadian Journal of Infectious Diseases and Medical Microbiology **2022**. Volume 2022, Article ID 5732046, 16 pages https://doi.org/10.1155/2022/5732046	To determine the career time and previous one-year global pooled prevalence of occupational exposure to blood and body fluids among healthcare workers. **Worldwide**	Review article. Searched using: the electronic databases (SCOPUS/Science Direct, PubMed, Web of Science, Google Scholar, CINAHL, MEDLINE, Cochrane Library, DOAJ, and MedNar with a combination of Boolean logic operators (AND, OR, and NOT), Medical Subject Headings (MeSH), and keywords. A quality assessment was conducted to determine the relevance of the articles using JBI critical appraisal tools. Furthermore, several steps of assessment and evaluation were taken to select and analyze the relevant articles	Of the 3912 articles identified through the electronic database search, 33 that met the inclusion criteria and were included in the final analysis. The global pooled prevalence of blood and body fluids among healthcare workers during career time and in the previous one year accounted for 56.6% (95% CI: 47.3, 65.4) and 39.0% (95% CI: 32.7, 45.7), respectively. Based on subgroup analysis by publication year, survey year, and World Health Organization regions, the highest prevalence of blood and body fluid exposure in the last 12 months was observed among articles published between 2004 and 2008 (66.3%), conducted between 2003 and 2008 (66.6%), and conducted in the Southeast Asia Region (46.9%). (e highest career time prevalence was 60.6%, 71.0%, and 68.4% for articles published between 2015 and 2020, conducted between 2015 and 2019, and reported in the African region, respectively. Data revealed a high prevalence of occupational exposure to blood and body fluids among healthcare workers.
Ou YS, Wu HC, Guo YL, Shiao JSC.	To determine whether	Meta-analysis	11 articles were included in the meta-analysis from 9

Comparing risk changes of needlestick injuries between countries adopted and not adopted the needlestick safety and prevention act: A meta-analysis. Infect Control Hosp Epidemiol. **2022** Sep;43(9):1221-1227. doi: 10.1017/ice.2021.372.	countries that adopted the Needlestick Safety and Prevention Act (NSPA) achieved a reduced risk of needle-stick injuries (NSIs). **Worldwide**	3 international databases (Embase, PubMed, and MEDLINE EBSCO) and 1 Chinese database (Airiti Library) were searched using appropriate keywords to retrieve relevant articles, including multiyear NSI incidences that were published after 2010. The Joanna Briggs Institute Critical Appraisal Checklist for Prevalence Studies was used to evaluate article prevalence. A binary random-effects model was used to estimate risk ratio as summary effect. A log scale was used to evaluate differences in risk ratios of NSIs between countries that adopted versus those that did not adopt the NSPA.	countries, and NSI incidence rates were surveyed between 1993 and 2016. The risk ratios of NSIs in countries with and without the NSPA were 0.78 (95% CI, 0.67–0.91) and 0.98 (95% CI, 0.85–1.12), respectively, and the ratio of risk ratios was 0.79 (95% CI, 0.65–0.98). Reduction in NSI incidence was more prominent in nurses than in physicians. Findings suggest that the mandatory use of safety-engineered medical devices in countries that adopted the NSPA had lower NSI incidence in healthcare workers compared with countries without needlestick safety and prevention regulatory policies.
Dulon M, et al. Causes of Needlestick and Sharps Injuries When Using Devices with and without Safety Features Int. J. Environ. Res. Public Health **2020,** 17, 8721 https://doi.org/10.3390/ijerph17238721	To analyze NSIs associated with SEDs and non-SEDs among HCP in hospitals, medical offices and care facilities **in Germany**	The study was based on data collected via the online NSI tool between April 2014 and March 2019. A total of 2063 data sets were received and used as the data source.	835 data (40.5%) satisfied the inclusion criteria and were included. Injuries with SEDs accounted for 35.0% of all NSIs; the proportions were higher in medical offices and lower in care facilities. NSIs in nurses were more often associated with SEDs than NSIs in physicians. NSIs from intravenous needles were associated with SEDs in more than 60% of cases in hospitals and medical offices and in about 30.0% of cases in care facilities. Suturing was associated with every fourth NSI in hospitals, of which fewer than 10.0% were associated with SEDs. In care facilities, SEDs were involved in 36.1% of NSIs during subcutaneous injections. NSIs during disposal accounted for 29.2% of total NSIs, of which 36.1% were associated with SEDs. Frequent reasons for SED-associated NSIs were technical problems, unexpected patient movement and problems during disposal.
Kaur M, et al Needlestick And Sharps Injuries At A German University Hospital: Epidemiology, Causes And Preventive Potential – A Descriptive Analysis International Journal of Occupational Medicine and Environmental Health	To analyze the number, epidemiology, and circumstances of needlestick and sharps injuries (NSSI) and exposures to body fluids and to identify further preventive measures to	Setting: German university tertiary-care referral center. Retrospective study based on injury documentation sheets of the hospital's staff and faculty health service and, if given, on reports by continuity doctors and by the accident and emergency department in January 2014–June	567 injuries were registered with a significant decrease of cases over the study period. The majority of accidents occurred in the operating theater (35%). Stress, time pressure, overstrain, carelessness and distraction were found to be the main reasons for injuries. At least 30% of the cases were preventable, mainly by wearing personal protective equipment (PPE), by proper disposal of an item and by early replacement of overfilled sharps containers (SC). In 20% of

2022;35(4):497 – 507 https://doi.org/10.13075/ijomeh.1896.01854	improve the occupational safety of health care workers (HCW). **Germany**	2016.	the cases involving an item, the injury was caused by a safety-engineered device (SED). Almost one-third of these injuries were attributable to an improper use of the SED. Despite many efforts made to reduce their number, NSSI still occur.
Garus-Pakowska A, et al. Epidemiology of needlestick and sharp injuries among health care workers based on records from 252 hospitals for the period 2010–2014, Poland BMC Public Health **2019**. 19:634 https://doi.org/10.1186/s12889-019-6996-6	To assess the failure to report injuries and then to estimate the actual number of NSIs among healthcare workers (HCWs) in Poland based on the collected data. **Poland**	Analysis of injury registers on the basis of 252 hospitals in Poland. Conducting 487 surveys among doctors, nurses and paramedics. Calculation of rates of injuries per 1000 workers per year (with 95% CI). We collected data in 2015 for the period 2010–2014.	9775 NSIs were registered in the hospitals. Majority of the NSIs were recorded among nurses (72.6%,$p < 0.01$). The needle was the tool responsible for the greatest number of the NSIs in all professional groups (79.5%, $p < 0.01$). The average annual NSIs rates based on hospital registers were: 16.0/1000 doctors, 20.5/1000 nurses, 16.8/1000 paramedics. Every second NSIs was not reported (45.2%). We estimated that there are probably 13,567 NSIs every year among hospital care workers in Poland. NSIs are a significant health problem for HCWs.
Garus-Pakowska A, et al. Did legal regulations change the reporting frequency of sharp injuries of medical personnel? Study from 36 hospitals in Łódź Province, Poland. Int J Occup Med Environ Health. **2018** Jan 1;31(1):37-46. doi: 10.13075/ijomeh.1896.01045.	To analyze the epidemiological data on sharp injuries among health care workers before and after the implementation of regulations related to the conduct of the register of sharp injuries, dating back to 2013. **Poland**	We compared the data from before and after the entry regulations. Data was collected from the records of occupational exposure/accidents at work in hospitals in the Łódź Province during 2010-2014. The feedback came from 36 hospitals (return index = 51.5%), representing a total annual average of 13 211 medical workers.	The incidence of injuries did not change significantly over the period 2010-2014, and the number of reported injuries in 2014 (the year when the Regulation had already been effective) was even lower than in the previous years. The average annual injury index was 12.31 injuries per 1000 employees (95% confidence interval: 11.48-13.16/1000). The incidence of injuries among nurses was significantly higher than in other groups of medical professionals ($p < 0.05$). These injuries most often occur while using needles ($p < 0.05$). The obligation to record occupational exposures set forth in current regulations is not likely to improve the reliability of reporting the incidents actually taking place.
Garus-Pakowska A, et al. Non-Safety and Safety Device Sharp Injuries—Risk of Incidents, SEDs Availability, Attitudes and Perceptions of Nurses According to Cross-Sectional Survey in Poland Int. J. Environ. Res. Public Health **2022**, 19, 11315. https://doi.org/10.3390/ijerph191811315	To examine the frequency of sharps injuries among nurses (who have the most frequent contact with infectious material) when using devices with and without safety features, then to analyse the factors associated with such injuries and to compare the risk of injuries with safety engineered	Online cross-sectional survey was conducted between October 2021 and March 2022.	Survey was completed by 280 nurses. The incidence of exposure to sharp injury during their professional life was 51.4%. The percentage of nurses experiencing a sharp injury in the year preceding the study was 29% and 9.6% for superficially and deep injury, respectively. Ampoules and conventional hollow-bore needles caused the most injuries (25.92% and 22.64% of nurses in the last year). Factors including sex (males), age and seniority (elderly), education (higher), work exhaustion and being left-handed were associated with the occurrence of conventional hollow-bore needle injuries. In the case of SEDs: age, seniority and right/left-handed were the most frequent risk factors associated with the occurrence of sharp injuries. SEDs injuries were much less frequent than

	devices (SEDs) and non-safety engineered devices (non-SEDs). **Poland**		non-SEDs. There was a significant difference between the risk of injuries with safety and non-safety needles, central cannulas and ampoules. Fisher's exact test (p-value = 0.000) and positive Spearman's rho statistics (0.2319, p-value = 0.0001) confirmed that in accredited hospitals, the availability of safety needles was higher. Almost half of the nurses (n = 115, 41.07%) stated that staff had little influence on the type of medical sharp instruments supplied.
De Carli G, et al. Prevention from Sharp Injuries in the Hospital Sector: An Italian National Observatory on the Implementation of the Council Directive 2010/32/EU before and during the COVID-19 Pandemic Int. J. Environ. Res. Public Health **2022**, 19, 11144 https://doi.org/10.3390/ijerph191711144	To assess the level of implementation of the Directive 2010/32/EU in Italy, a national survey was conducted in 2017 and again in 2021, evaluating the progress and possible drawbacks of the COVID-19 pandemic. **Italy**	Altogether, 285 safety managers and 330 nurses from a representative sample of 97 and 117 public hospitals were interviewed using a standardized questionnaire.	Knowledge of the Directive requirements decreased significantly, with <60% of participants answering correctly in 2021, and nurses' attendance in specific courses dropped to 25% in 2021 compared to 54% in 2017. Over 75% of hospitals introduced multiple safety-engineered devices (SED), though total replacement occurred in <50% of cases; routine SED availability increased for blood collection (89%) and venous access devices (83%). Incorrect behaviors in handling sharps decreased significantly over time. Nurses' HBV vaccination coverage was high (89% in both surveys); in the last year, 97% were vaccinated against COVID, and 47% against influenza. Average annual injuries per hospital did not increase significantly (32 in 2021 vs. 26 in 2017). In 2017, nurses' perceived safety barriers were working in emergency situations (49%) and lack of resources (40%); in 2021, understaffing (73%), physical fatigue (62%), and handling difficulties while wearing full protective equipment (59%). Safety measures were implemented in Italian hospitals, and although the average injuries per hospital did not show a decrease, these measures could have helped protect healthcare workers during the pandemic, mitigating its potential impact on the increase in situations at risk of injury.
Brusini A. Needle stick injuries among nurses in Italy: a review. G Ital Med Lav Ergon. **2022** Sep;44(3):391-396. PMID: 36622828. https://www.researchgate.net/publication/366985147NeedlestickinjuriesamongnursesinItalyareview	To determine an incidence rate and causes of NSI in nurses **Italy**	Review Search conducted on the main international databases; only studies conducted in Italian nurses were considered	The incidence rate of NSI varies from 2.2 to 10.77 per 100 nurses per year. Major causes: large night shift, working in the operating block and medical departments, failure to use adequate devices.

Ottino MC, et al. Needlestick prevention devices: data from hospital surveillance in Piedmont, Italy—comprehensive analysis on needlestick injuries between healthcare workers after the introduction of safety devices BMJ Open **2019**;9:e030576. doi:10.1136/bmjopen-2019-030576 http://dx.doi.org/10.1136/bmjopen-2019-030576	This surveillance investigated the frequency and the modality of SED-related NSIs in the Piedmont region to verify changes in the epidemiology of these events since the implementation of the European Directive 32/2010 regarding the mandatory use of safety-engineered devices (SEDs) **Italy**	We analysed the exposure records of NSIs, device usage data and structural data of 42 acute care hospitals and compared conventional and safety devices. We calculated the accident rates per 100 000 needles and, as a measure of SED efficacy, the relative risk between the use of safety and non-safety devices with a 95% CI. We also described the dynamics of the NSIs and the most involved professional groups of HCWs, procedures and devices.	Total and specific device accident rates for 100 000 needles were lower with the use of SEDs. In 2015–2016, there were 1640 NSIs, with a decreasing absolute number during the observation period; 18% were SEDs related. Half of the total accidents with SEDs occurred in the patient's room, and nurses were involved in 78% of the cases. The most involved devices were the butterfly needles and peripheral venous catheters, and the most involved procedures were venous sampling (40%) and phlebotherapy (16%). The exposures occurred mostly during the procedure, and 45% of the SED-related injuries occurred during the disposal of the device; 92% of the SEDs involved had a manual activation mechanism. Limitations of the study: The size of the region included and the rate of under-reporting of percutaneous accidents (which is reported to be as high as 20%–30%) In agreement with the results of other European studies, our results show that SEDs reduce the risk of percutaneous exposure of HCWs, but in introducing SEDs, we must select those with a higher level of safety (with a passive activation mechanism) and improve the healthcare staff training programmes
Cofini V, et al. Trend analysis and factors associated with biological injuries among health care workers in Southern Italy. Med Lav. **2018** Aug 28;109(4):308-315. doi: 10.23749/mdl.v109i4.7245.	To estimate the injuries' incidence, job distribution and temporal trend in a hospital in Southern Italy **Italy**	Data on accidents, collected from January 2010 to December 2016, were analyzed. Poisson distribution was used to calculate incidence rates and respective 95% confidence intervals. Trends were analyzed using the Joinpoint regression model. A multiple logistic regression model was used to identify factors associated with injuries.	Three hundred and thirty-five injuries were reported from 2010 to 2016, occurring mainly in the morning (54%) and frequently caused by needlestick (70%). We observed a significant decline in the incidence rates of the total amount of injuries (ACP=-11.3; 95% CI: -16.3 - -5.9), for nurses (ACP=-15.7; 95% CI: -24.3 - -6.2) and for health and social care assistants (ACP=-13.2; 95% CI: -23.1 - -2.0). Among male physicians the risk of biological accident was higher than female physicians (OR=3.67; 95% CI:1.9-7.1), while among male nurses the risk was lower than among female nurses (OR=0.31; 95% CI: 0.17-0.59). For the nursing category, "afternoon" and "night" represented risk factors with OR=2.19 (95% CI: 1.2-3.7) and OR=8.8 (95% CI: 3.4-22.8) respectively. For physicians, surgical intervention was a risk factor (OR=7.71; 95% CI: 3.2-18.4).
Jahic R, et al. Epidemiological Characteristics of the Accidental Exposures to Blood-Borne Pathogens Among Workers in the Hospital Med Arch. **2018** Jun;72(3):187-191.	To determine the epidemiological characteristics of accidental exposures to blood-borne pathogens	A cross-sectional study was conducted using the "Questionnaire on the HCWs exposure to blood and blood transmitted infections" at the University Clinical Centre Tuzla,	Exposure incident was recorded in 1231 participants (54.8%) at least once in the last 12 months. An average number of exposure incidents per HCWs in total years of service was 7.07± 8.041. Out of total sample, 70% reported at least one type of exposure incident.

doi: 10.5455/medarh.2018.72.187-191.	among different professional groups of health care workers (HCWs) **Bosnia and Herzegovi-na**	Bosnia and Herzegovina, from the 1st of March to the 31st of December 2014. Study sample consisted of 1031 participants (65% of total employees) stratified into three occupational groups: doctors, nurses and support staff.	Nurses had a higher frequency of multiple contacts compared to doctors and support staff ($\chi 2=37.73$; df=4; $p<0.001$). The frequency of reported incidents among nurses at the surgical departments was almost two times higher (1.7). 75.5% (778/1031) of the participants, reported not having been exposed to these incidents. Doctors were significantly less likely to report exposure incidents than nurses and support staff. There were significant differences in reporting rate ($\chi 2=32,66$; df=4; $p<0.001$). HCWs in hospitals have a high prevalence of occupational exposure to blood-borne infections. Seventy percent of the HCWs is periodically or constantly exposed to or contact related to blood. Nurses are most frequently exposed occupational group among HCWs, while the lowest re- porting rate on an exposure incident is among doctors.
Mandić B, et al. Occupational exposure to blood and bodily fluids among healthcare workers in Serbian general hospitals Arh Hig Rada Toksikol **2017**;68:61-68 DOI: 10.2478/aiht-2018-69-3047	To estimate occupational exposure to bloodborne infections among general hospital workers in Serbia. **Serbie**	Cross-sectional study conducted in the spring of 2013 and included 5,247 healthcare workers from 17 general hospitals. The questionnaire was anonymous, self-completed, and included sociodemographic information with details of blood and bodily fluid exposure over the career and in the previous year (2012). Significant predictors of sharps injuries were determined with multiple logistic regressions.	The distribution of accidents in 2012 was equal between the genders (39 %), but in entire career it was more prevalent in women (67 %). The most vulnerable group were nurses. Most medical doctors, nurses, and laboratory technicians reported stabs or skin contact with patients' blood/other bodily fluid/tissue as their last accident. Healthcare workers from the north/west part of the country reported a significantly lower number of accidents over the entire career than the rest of the country ($p<0.001$). The south of Serbia stood out as the most accident-prone in 2012 ($p=0.042$).
Diktas H, et al. What were the changes during the COVID-19 pandemic era concerning occupational risks among health care workers? J Infect Public Health. **2021** Oct; 14(10): 1334–1339. doi: 10.1016/j.jiph.2021.06.006	To assess the occupational injuries, we compared rates, distribution, and type of exposure to blood and body fluids and NSSIs of health care workers for 2019 (pre-pandemic era) and 2020 (pandemic era) years, respectively. **Turquie**	Surveillance conducted at Sisli Hamidiye Etfal Training and Research Hospital, a 600-bed tertiary care hospital in Istanbul, Turkey Data collected by the 'Hospital Infection Control Committee' for the years 2019–2020, using the active surveillance method were analyzed retrospectively.	During 2019 (pre-pandemic period) and 2020 (pandemic period), 112 (27.65‰) and 82 (21.4‰) NSSIs reported, respectively. Of the exposed HCWs in 2019 (pre-pandemic period), 16.8‰ (14) were doctor, 53.6‰ (60) were nurse and 47.4‰ (14) were intern doctors. In the 2020 (pandemic period), NSSIs were observed most frequently in nurses and cleaning staff, 50.24‰ and 33.64‰, respectively. Concerning the total percentage of exposure to blood and other body fluids, a slight increase was revealed from 1.48‰ to 2.62‰ in 2019 and 2020, respectively. A significant decrease in exposure rate was reported among the doctors between the pre-pandemic and pandemic era; 3.6‰ and 1.19‰ in 2019 and 2020, respectively. A significant increase in exposure rate was reported among the nurses between pre-pandemic and pandemic era; 0.8‰ and

			6.89‰, respectively.
Tejada-Pérez JJ, et al. Biohazard Accidents, Harmful Elements to the Wellness of Healthcare Workers, and Their Risk Factors. Int J Environ Res Public Health. **2022** Oct 14;19(20):13214. doi: 10.3390/ijerph192013214.	To indicate and quantify the risk associated with higher threatening situations, such as biohazard accidents on repeated occasions or incorrect notifications to injured healthcare professionals. **Spain**	A cross-sectional study was conducted at the Poniente Hospital in Almeria (Spain). In total, 592 participants reported 1062 accidents and their characteristics and notifications were analyzed	It was found that women (OR = 1.29) working in the surgical area (OR = 2.92), those on indefinite contracts (OR = 1.67), and those with high work experience (OR = 1.14) were the main risk factors for multiple biohazard accidents. Concerning the incorrect notification of these accidents, the main risk factors were work performance during the afternoon shift (OR = 1.72) and the fact that the accident was caused by the injured worker himself (OR = 1.53)