Occupational Burn Injuries in Finland 2011-2015

Lotta Purola (✉ lotta.purola@helsinki.fi)

Oulu University Hospital <https://orcid.org/0000-0003-2511-8198>

Jyrki Vuola

Töölön sairaala

Heli Kavola

Töölö Hospital

Original Contribution

Keywords: Burn injury, occupational, work-related, insurance, return to work

Posted Date: December 23rd, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-1174948/v1>

License: This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Introduction

This study comprises all hospitalized work related burn injuries in one country during 2011-2015. The purpose was to describe demographics, causes and risk factors of occupational burn injuries with special focus on the outcome of return to work.

Material and methods

This is a retrospective study on two data sources of which Finnish Workers' Compensation Center's (FWCC) register includes all work-related burn cases at a given time. Additional data has been obtained from those patients, who were referred to the National Burn Centre (NBC) during the same time according to the Emergency Management of Severe Burns (EMSB) criteria. We compare demographics, injury mechanisms and general burn data of these two patient groups.

Results

Based on FWCC register, in 2011-2015 occurred 11623 work related burn cases of whom 54% were men. During the study period NBC admitted 26 patients fulfilling EMSB criteria. The most severe patients treated in NBC had injuries affecting multiple body parts. In FWCC data hand was most injured body part. Kitchen/bakery work was the most common profession in FWCC register but in NBC material industrial and transport professions dominated. In FWCC register patients had lower mean age (37 years vs. 43 years). Most severe injuries occurred among older patients: in NBC data those with total body surface area 40% or over had mean age 53 years. Majority of patients returned to work.

Conclusion

Safety at work in Finland is good and the vast majority of work-related burn injuries are minor. Young adults working in kitchen and bakery work are susceptible to minor burn injuries whereas, unexpectedly, elderly men working in transports and industry sustain most severe burn accidents.

Retirement after work related injury becomes very expensive for all parties and this data can be used in preventing those cases as well as the minor accidents.

I. Introduction

Burn injury is one of the most common traumas worldwide, and among adults, working-age men are the highest risk subgroup. Occupational burn injuries are common: in western countries they comprise 15-30.2% of all medically treated burn injuries to working age adults (1-4). Their costs are higher than of those other occupational injuries and 20% of the overall costs of burn care are due to absence from work (5-8).

Previous studies have found the total body surface area burned (TBSA) to be the most important predictor of overall recovery. Hand/upper arm injuries and older age have a negative association with the length of sick leave and return to work (2, 9, 10). The majority of occupational burn injuries are rather small, with total TBSA less than 10%, enabling good recovery. This is an important goal, as the cost of retirement due to any injury is high from both financial and individual perspectives (1).

Finland is a high-income country with a population of 5.5 million. Population density is low at 18.2 /m², with a notable difference between urban and rural areas corresponding to geographical differences: Southern Finland is mainly urban with five major cities, whereas the northern part of the country is sparsely populated with large forest and wilderness areas. The cornerstone of Finnish welfare is education: the literacy rate is 99%, 66% of the population has a secondary education diploma, and 41% has a tertiary-level education. Nevertheless, the professions of men and women have traditionally differed in Finland (11).

Taxation is the main funding of health and medical care in Finland. The public sector, including municipal health care and university hospitals, provide these services. The private sector also offers basic health care services, and many insurance companies work in co-operation with them.

As a part of the social security system, employers are legally obliged to insure their employees against occupational accidents and diseases. Private insurance companies entitled to practice health insurance business perform the functions of the law. Due to this obligation, occupational health services in Finland are of high quality and severe accidents are rare: in 50 years the number of annual fatal accidents at work has fallen from over 90 to 30. Every employee has an obligation to report any, even minor, accident at work, and this is a prerequisite for claiming compensation: In the case of a work-related accident, the person is generally entitled to compensation for the loss of income, functional limitation, and rehabilitation. They are entitled to a workers' compensation pension if they are unable to return to work after one year (12).

Since the 1960s, Finland has had a national civil register system of especial identification numbers. This enables a wide range of government-maintained national registers. The combination of these registers provides unique, even individual-level medical information. Different public organizations govern these and data are available on the basis of detailed applications.

In this study, we combined two data sources: the register data of the Finnish Workers' Compensation Center (FWCC) and the patient data of the National Burn Centre (NBC). This approach enables the creation of unique data that covers all the work-related burn injuries in Finland in 2011–2015. To our knowledge, earlier studies utilizing both medical and insurance registers on occupational burn patients are either scarce or non-existent.

The aim of this study was to describe the demographics and risk factors of occupational burn injuries with a focus on the outcome of return to work. A second purpose was to provide new information for future preventive measures.

II. Material And Methods

2.1 Data Sources

In Finland the municipalities form hospital districts, which provide second-level special health care at central hospitals (16 units). Five catchment areas organized around five university hospitals are responsible for highly specialized tertiary level medical care. The treatment of some demanding, rare illnesses or diseases has been centralized nationally to one hospital or health care unit. All severe burns are treated in the NBC of Helsinki University Hospital.

The data were extracted from two sources:

a) National Burn Centre (NBC)

Records of occupational burn patients treated at the NBC in 2011–2015. Until 2016 there were two burn centers in Finland, one in Helsinki and another in Kuopio. Approximately 2/3 of burn patients requiring tertiary-level burn care were treated in Helsinki.

Since 2016, the Helsinki Burn Centre has served the entire country as an NBC. Due to the local organization of medical care in the Helsinki and Uusimaa Hospital district, the NBC also treats minor burn injuries in the area.

Helsinki University Hospital has an electrical patient information system which uses ICD-10 coding. In the case of any trauma, the report includes both the location and mechanism of the event. ICD-10 code Y96 represents occupational injury. Finnish legislation on occupational injuries is highly detailed, and due to this, these cases are reported promptly in health care.

Our data included all occupational burn injuries from January 2011 to December 2015 treated at the NBC. Further analysis included occupational burn patients who met the Emergency Management of Severe Burns (EMSB) criteria of specialized burn care for adults (13). Referral criteria are based on Australian and New Zealand Burn Association (ANZBA) guidelines which cover patients with burns of $\geq 20\%$ (10% for children and elderly) of the TBSA, $\geq 5\%$ TBSA of full thickness burn, burns of special areas (i.e. face, hands, feet, genitalia, perineum, major joints, circumferential limb/chest burns), burns with inhalation injury, electrical and chemical burns, burns with pre-existing illness or with associated trauma, and burns on pregnant women. Patients who did not meet these criteria were excluded from further analysis.

b) The Finnish Workers' Compensation Center [Tapaturmavakuutuskeskus] (14)

The FWCC collects information on compensated work-related injuries. All accidents that happen at the workplace must be reported according to Finnish legislation based on the European Statistics on Accidents at Work (ESAW) system (15), which is different to the ICD-10 coding system.

The Information unit of the FWCC provided the data on compensated occupational burn injuries based on descriptive request from 2011–2015.

2.2. Collected data

General demographics were collected from both data sources. The NBC provided medical information based on the ICD-10 coding system. The data contained the time of hospitalization, possible operations, and outpatient visits. The FWCC data included injury type, injured body part, length of sick leave, and total sum of compensations paid by insurance companies. It contained all reported cases, including those with no medical contact.

2.3. Data handling

The NBC utilizes ICD-10 coding in its registers. In contrast, the FWCC utilizes ESAW coding. Due to this, data on professions, for example, were not directly comparable.

2.3. Statistics

This study was epidemiological and descriptive in most purposes. Data analysis and visualization was performed using R software (16). The differences between groups were presented by mean, median and standard deviations, according to adequacy. The Chi-squared test, Welch Two Sample t-test and Anova test were used for analysing the differences between the groups as far as this was reasonable. The groups were assumed to have normal distribution.

The Research Ethics Committee of Helsinki University approved the study. None of the patients were contacted during the study.

iii. Results

Based on the FWCC register, between 2011 and 2015, 11623 work-related burn injuries occurred in Finland (54% men). During the same time period, the NBC treated 26 occupational burn patients (96% men), who met the Emergency Management of Severe Burns (EMSB) referral criteria for specialized burn care. The NBC data had only one female (1/26) and the patients were older than those in the FWCC register, p-value 0.004, (Table 1).

Table 1: INJURIES IN DIFFERENT AGE GROUPS						
Age	Male		Female		All	
	FWCC*	NBC**	FWCC	NBC	FWCC	NBC
<18	103 (2%)	0	104 (2%)	0	207 (2%)	0
18-30	2354 (38%)	8 (31%)	2155 (41%)	1 (100%)	4509 (39%)	9 (35%)
31-40	1429 (23%)	0	863 (17%)	0	2292 (20%)	0
41-50	1212 (19%)	8 (31%)	968 (19%)	0	2180 (19%)	8 (31%)
51-60	918 (15%)	6 (24%)	927 (18%)	0	1845 (16%)	6 (23%)
61-70	206 (3%)	3 (12%)	186 (4%)	0	392 (3%)	3 (12%)
71-	3 (0.05%)	0	1 (0.02%)	0	4 (0.03%)	0
Total	225 (54%***)	25 (96%***)	204 (46%***)	1 (4%***)	11492	26
mean	37	43	36	28	37	43
median	35	47	34	28	35	47
SD	13	14	14		13	14
*Finnish Workers' Compensation Center						
**National Burn Center						
*** The gender percentage of all patients in the same register						

Table 2 shows the top ten professions in the FWCC register. The majority of the women did kitchen-/bakery work, but among the men, jobs varied more widely. In the NBC material, industrial professions (27%) and electricians (23%) dominated.

TABLE 2: PROFESSIONS IN FINNISH WORKERS' COMPENSATION CENTER (FWCC) REGISTER

Male		Female		NBC*	
FWCC		FWCC		NBC*	
Mechanics	729 (22%)	Kitchen/Bake	2514 (57%)	Industry	7 (27%)
Kitchen/Bake	697 (21%)	Waitresses, l	664 (15%)	Electricity	6 (23%)
Excavation	520 (16%)	Sellers	325 (7%)	Property mai	5 (19%)
Plumbers	373 (11%)	Nursing	321 (7%)	Road work	4 (15%)
Electrical-/pl	300 (9%)	Cleaners	217 (5%)	House buildi	2 (8%)
Welders	286 (9%)	Office- and n	173 (4%)	Traffic	1 (4%)
Property mai	231 (7%)	Social work	141 (3%)	Waitresses, l	1 (4%)
Lorry drivers	164 (5%)	Teaching	86 (2%)		
TOTAL	3300 (100%)		4441 (100%)		26 (100%)
*Genders are not separated since NBC data includes only one female (group: waitresses, bartenders)					

The injury mechanisms (Table 3) and injured body parts (Figure 1) differed in the NBC and FWCC registers: in the NBC, the 'multiple body part' group dominated, but in the FWCC, hand injuries were the most common.

Table 3: INJURY MECHANISM						
Mechanism	Male		Female		All	
	FWCC*	NBC**	FWCC	NBC	FWCC	NBC
Heat***	4329 (62%)	5 (20%)	4684 (82%)	0	8923 (71%)	5 (19%)
Dangerous st	1673 (25%)	3(12%)	754 (13%)	0	2427 (19%)	3 (12%)
Electricity an	568 (8%)	15 (60%)	135 (2%)	0	703 (6%)	15 (58%)
Dangerous st	58 (1%)	0	32 (1%)	0	90 (1%)	0
Dangerous st	7 (0.1%)	0	8 (0.1%)	0	15 (0.1%)	0
Other (hot w	247 (4%)	2 (8%)	124 (2%)	1 (100%)	371 (3%)	3 (12%)
TOTAL	6729	25	5737	1	12529	26
*Finnish Workers' Compensation Center (FWCC)						
**National Burn Center (NBC)						
*** FWCC registry doesn't specify different mechanisms that result in injuries caused by high temperature						
The same burn classification has also been applied to the NBC.						

Men had more severe burn injuries: in the FWCC register, the sum of compensation represented the severity of the accident. During the study period, insurance companies received 11,234 claims for occupational burn injuries. The mean sum of compensation was EUR 1233 (median EUR 248, SD EUR 8143, max EUR 450,587). Men received 69% of all compensation over EUR 1000.

The mean TBSA of the patients who met the EMSB referral criteria for specialized burn care was 22% (Table 4.). The TBSA correlated with length of hospital stay, length of absence from work, and number of follow-up visits. The highest mean TBSA (37%) was in the 51–60- and 61–70-year age groups. The mean age of the patients with a TBSA of 40% or over (n=7) was 53 years. Their professions were similar to those of the other NBC patients.

Table 4. PATIENTS REFERRED TO THE NATIONAL BURN CENTER ACCORDING TO EMSB CRITERIA

Age	Number	M/F*	TBSA	LOS**	Follow-up visits	Returned to work
18-30	9	8/1	12	8	6	8
31-40	0	0	0	0	0	0
41-50	8	8/0	18	14	6	4
51-60	6	6/0	37	31	5	4
61-70	3	3/0	37	60	10	1
total		25/1				17/26
mean			22	21	6	
median			10	12	3	
range			1-80	2 - 133	1 - 18	
* male/female						
**length of stay						

Recovery among the patients in the NBC was good: 17 patients were able to return to work life (Table 4) and four patients changed professions for different reasons (psychological reasons, inability to stand for long periods). One patient retired (TBSA over 50%) but, based on outpatient reports, had a good quality of life. Two patients with TBSA over 50% died. The FWCC data contained four more deaths, the injury details of which were unknown. These patients probably died during emergency care or in the emergency room.

Iv. Discussion

This study provides information on all occupational burn injuries in Finland in 2011–2015. According to our knowledge, such comprehensive data on one country has not previously been published.

Our data consisted of two sources which were rather different. The FWCC is a non-medical register that contains literally all the occupational burn cases of a given year. The data are based on compensation claims and collected from insurance companies. From the NBC, we collected the reports on occupational burn patients who met the EMSB referral criteria for specialized burn care. These cases represented approximately 2/3 of the severe cases in the country that needed specialized care.

Several earlier studies have shown that men are at the highest risk of both occupational accidents and burn injuries (1, 17–20). Our data showed different results: the gender distribution in the FWCC register was almost even (men 54%) but men dominated (25/26 cases) in the NBC data. Based on this result, women tend to have occupational burn injuries almost as often as men, but their injuries are minor. Similarly, men dominated the group in the FWCC, with compensation of over EUR 1000, which supports the result that men sustained more severe occupational burn injuries. Patients also had non-identical professional profiles: the NBC patients mainly worked in industrial professions, electrical injuries being

the most common. In the FWCC, the men had similar professions, but the women mainly worked in the service sector, in kitchen and bakery work.

In Finland, women work outside the home almost as often as men, but professions are still segregated. Men dominate in construction work, transportation and logistics, for example, whereas women more often work in the social and service sectors (21). Risk profiles are very different, and one can also speculate whether women have more careful working habits and follow safety regulations more precisely. Another explanation might be that our data covered work-related injuries comprehensively, even minor ones, which earlier studies may have not recognized.

The NBC patients were older than those in the FWCC register. Further, in the NBC, older patients had more severe injuries: in the 51–60- and the 61–70-year age groups, the mean TBSA was 37% vs 22% in the entire NBC data. The mean age in the NBC was 43 years but those with a TBSA of 40% or over had a mean age of 53 years.

Notably, the NBC data did not contain any 31–40-year-olds, whereas in the FWCC register this age groups was well represented: males 23% and females 20%. We do not know the reason for this. It may be merely a statistical item due to the small number of cases, but other factors may also be at play. This is a group that already has good professional skills but is not overconfident and perhaps follows safety regulations better than older people.

Many earlier studies have shown different results: a US study by Guerin et al. (2020) showed that younger employees suffered more work-related injuries than employees over 24 years of age

(22). Rommel et al. (2016) had similar results in Germany: older men had less work-related injuries than younger ones (23). In our study, the number of patients in the NBC data was low, but the trend was obvious. Those with major injuries had high risk professions (industrial, transportation etc.). The accidents were sudden (transport accidents, falling into hot water, explosions) but in principle, avoidable events. We did not study the working conditions or events prior to the accident. One reason for our different results might be that an experienced employee may be tempted to perform repeated tasks routinely and some safety habits may become neglected over time. In addition, safety regulations are very strict in Finland and young people may not be allowed to carry out dangerous work before proper training, which may not be the case in many other countries.

Earlier, Finnish studies have shown that TBSA accurately predicts return to work (9, 24). In our study, TBSA was only available in the NBC medical reports and correlated with length of absence from work.

Almost all the patients NBC returned to work: only one patient retired, and five patients had to change professions but returned to work life. A Danish study by Rikhardsson et al. (2004) showed that the average cost of occupational accident per employee is EUR 4200, 60% of which is due to absence from work, emphasizing that return to work life is also an important goal from the financial point of view (25).

Finnish legislation on occupational injuries is strong and the employer is responsible for compensation. In the case of retirement due to occupational accidents, compensation is 85% of the employee's former salary until the employee is 65 years old. Costs are covered by insurance, but to the employer the loss of competent worker is expensive: in the short run, the employer must hire a new employee, who probably lacks the required know-how. Work capacity is lower because of the training period, and in the long run, the prices of insurance may rise due to severe injuries. On the individual level, retirement at a young age is devastating, and highly expensive for society. One important goal of specialized burn care of working-aged people is to guarantee the ability to return to work life. According to the NBC data, this was well achieved.

Eurostat is the statistical office of the European Union, responsible for publishing high-quality, Europe-wide statistics. According to their data, in 2018 the incidence of occupational accidents in Europe was 1659/100,000. In Finland, the corresponding figure was clearly higher, at 1887/100,000. Since the safety regulations are strict in Finland and accidents are accurately registered, one can postulate that the Eurostat statistics may be biased. Even in their own analysis, reporting mistakes are recognized (26). In Finland, everyone has a unique social security number and general attitudes toward registers are positive. Based on Finnish legislation, actors in social and health care are registered and must report patient/client information (12, 27)

Safety at work has improved substantially over recent decades in Finland and the number of fatal occupational accidents has declined. The expected retirement age has risen in all age groups (28–30).

Both data sources have limitations: the FWCC register is not a medical register and does not include ICD-10 diagnoses; the data are thus not directly comparable with medical data.

The NBC occupational burn patient data from 2011 to 2015 were collected on the basis of ICD-10 Y96 codes. The data search yielded only 51 cases, of whom only five were women. Of these, 26 patients met the EMSB criteria (one woman). During the same time period, the NBC had approximately 20 patients per year with burn injuries with a TBSA over 20% and who needed intensive care. Further statistical analysis of genders or age groups is not possible due to the small number of cases. On the other hand, such a small number of occupational burn patients in a tertiary-level burn unit shows that safety at work in Finland is at a good level.

The FWCC register includes practically all the occupational burn injuries in the entire country during the study period. Unfortunately, the register does not contain information on the length of hospital stay, the number of outpatient visits, or the length of sick leave, etc. These variables form the total cost of burn injury together with many other factors (physio- and occupational therapy, mental care, special clothing, travelling costs, etc). Furthermore, the FWCC register does not include TBSA. Due to this, the severity of the burn injury is evaluated indirectly, based on the total sum of compensation.

V. Conclusions

These data on all work-related burn injuries in one country recognize several high-risk groups. Young adults in kitchen and bakery work are susceptible to minor burn injuries, whereas, unexpectedly, elderly men working in transport and industry suffer the most severe burn accidents. Although return to previous work was mostly achieved even after severe accidents, elderly employees may have had earlier health problems and been at a higher risk of retirement. Retirement due to occupational accidents is very expensive, thus focusing on prevention and safety regulations is important.

Finland has achieved its goal improving safety at work during the last decades, but more detailed cost analysis of occupational burn accidents would be beneficial, especially after centralization of the care of severe burn injuries.

Declarations

Funding:

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Data availability:

The datasets generated during and/or analysed during the current study are not publicly available due to possibility to identify patients but are available from the corresponding author on reasonable request.

Declaration of interests:

The Authors declare that there is no conflict of interest.

Authors' contributions:

Lotta Purola: Data collection, analysing and major contribution of writing. Tables and figures.

Jyrki Vuola: Senior researcher, text analysis and secondary writer. Data check up.

Heli Kavola: Checked text and tables.

References

- 1.Mian MA, Mullins RF, Alam B, Brandigi C, Friedman BC, Shaver JR, et al. Workplace-related burns. Ann Burns Fire Disasters. 2011;24(2):89-93.
- 2.Rossignol AM, Locke JA, Boyle CM, Burke JF. Epidemiology of work-related burn injuries in Massachusetts requiring hospitalization. J Trauma. 1986;26(12):1097-101.;doi: 10.1371/journal.pone.0148798

3. Carroll SM, Gough M, Eadie PA, McHugh M, Edwards G, Lawlor D. A 3-year epidemiological review of burn unit admissions in Dublin, Ireland: 1988-91. *Burns*. 1995;21(5):379-82.; doi: 10.1016/0305-4179(94)00019-0
4. Ng D, Anastakis D, Douglas LG, Peters WJ. Work-related burns: a 6-year retrospective study. *Burns*. 1991;17(2):151-4.; doi: 10.1016/0305-4179(91)90140-c
5. Haikonen K, Lillsunde PM, Vuola J. Inpatient costs of fire-related injuries in Finland. *Burns*. 2014;40(8):1754-60.; doi: 10.1016/j.burns.2014.03.016
6. Hop MJ, Wijnen BF, Nieuwenhuis MK, Dokter J, Middelkoop E, Polinder S, et al. Economic burden of burn injuries in the Netherlands: A 3 months follow-up study. *Injury*. 2016;47(1):203-10.; doi: 10.1016/j.injury.2015.09.009
7. Onarheim H, Jensen SA, Rosenberg BE, Guttormsen AB. The epidemiology of patients with burn injuries admitted to Norwegian hospitals in 2007. *Burns*. 2009;35(8):1142-6.; doi: 10.1016/j.burns.2009.06.191
8. Smith Gordon S WHM, Sorock Gary S., Warner Margaret, Courtney Theodore K., Pransky Glenn S, Fingerhut Lois A. Injuries at work in the US adult population: contributions to the total injury burden. *American Journal of Public Health*. 2005;95(7):1213–9.; doi: 10.2105/AJPH.2004.049338
9. Palmu R, Partonen T, Suominen K, Vuola J, Isometsa E. Return to work six months after burn: a prospective study at the Helsinki Burn Center. *Burns*. 2015;41(6):1152-60.; doi: 10.1016/j.burns.2015.06.010
10. Goei H, Hop MJ, van der Vlies CH, Nieuwenhuis MK, Polinder S, Middelkoop E, et al. Return to work after specialised burn care: A two-year prospective follow-up study of the prevalence, predictors and related costs. *Injury*. 2016;47(9):1975-82.; doi: 10.1016/j.injury.2016.03.031
11. Statistics Finland: Job quality profiles reveal division: men clearly more often in “good jobs” than women. <https://www.stat.fi/tietotrendit/artikkelit/2021/job-quality-profiles-reveal-division-men-clearly-more-often-in-good-jobs-than-women/>. Accessed 29 Oct 2021.
12. Finlex, 24.4.2015/459. <https://finlex.fi/fi/laki/ajantasa/2015/20150459>. Accessed 1 Nov 2021.
13. Breederveld RS, Nieuwenhuis MK, Tuinebreijer WE, Aardenburg B. Effect of training in the Emergency Management of Severe Burns on the knowledge and performance of emergency care workers as measured by an online simulated burn incident. *Burns*. 2011;37(2):281-7.; doi: 10.1016/j.burns.2010.08.011
14. Finnish Worker's Compensation Center. <https://www.tvk.fi/en>. Accessed 28 Oct 2021
15. European Statistics on Accidents at Work (ESAW) - Summary methodology - 2013 edition

<https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-ra-12-102>. 20 Aug 2021

16. R-Project: What is R?. <https://www.r-project.org/about.html>. Accessed 25 Aug 2021

17. Reichard AA, Konda S, Jackson LL. Occupational burns treated in emergency departments. *Am J Ind Med*. 2015;58(3):290-8.; doi: 10.1002/ajim.22407

18. Hansen CD. Comparing fatal occupational accidents in Denmark and Sweden 1993-2012. *Occup Med (Lond)*. 2019;69(4):283-6.; doi: 10.1093/occmed/kqz064

19. Hanvold TN, Kines P, Nykanen M, Thomee S, Holte KA, Vuori J, et al. Occupational Safety and Health Among Young Workers in the Nordic Countries: A Systematic Literature Review. *Saf Health Work*. 2019;10(1):3-20.; doi: 10.1016/j.shaw.2018.12.003

20. Tanttula K, Haikonen K, Vuola J. Hospitalized burns in Finland: 36305 cases from 1980-2010. *Burns*. 2018;44(3):651-7.; doi: 10.1016/j.burns.2017.09.001

21. Finnish Institute for Health and Welfare (THL): Ammattialojen sukupuolen mukainen segregatio. <https://thl.fi/fi/web/sukupuolten-tasa-arvo/tasa-arvon-tila/tyo-ja-toimeentulo/ammattialojen-sukupuolen-mukainen-segregatio>. Accessed 24 Oct 2021

22. Guerin RJ, Reichard AA, Derk S, Hendricks KJ, Menger-Ogle LM, Okun AH. Nonfatal Occupational Injuries to Younger Workers - United States, 2012-2018. *MMWR Morb Mortal Wkly Rep*. 2020;69(35):1204-9.; doi: 10.15585/mmwr.mm6935a3

23. Rommel A, Varnaccia G, Lahmann N, Kottner J, Kroll LE. Occupational Injuries in Germany: Population-Wide National Survey Data Emphasize the Importance of Work-Related Factors. *PLoS One*. 2016;11(2):e0148798.; doi: 10.1371/journal.pone.0148798

24. Tanttula K, Vuola J, Asko-Seljavaara S. Return to employment after burn. *Burns*. 1997;23(4):341-4.; doi: 10.1016/s0305-4179(97)89876-2

25. Rikhardsson PM, Impgaard M. Corporate cost of occupational accidents: an activity-based analysis. *Accid Anal Prev*. 2004;36(2):173-82.; doi: 10.1002/ajim.22407

26. Eurostat: Accidents at Work. https://ec.europa.eu/eurostat/statistics-explained/index.php/Accidents_at_work_statistics#Number_of_accidents. Accessed 20 Oct 2021

27. Use of Registers and Administrative Data Sources for Statistical Purposes - Best Practices of Statistics Finland. <https://unstats.un.org/unsd/EconStatKB/KnowledgebaseArticle10169.aspx>. Accessed 15 Aug 2021

28. Statistics Finland: Population Contents. https://www.stat.fi/tup/suoluk/suoluk_vaesto_en.html. Accessed 15 July 2021

29. Oksa P, Sauni R, Talola N, Virtanen S, Nevalainen J, Saalo A, et al. Trends in occupational diseases in Finland, 1975-2013: a register study. *BMJ Open*. 2019;9(4):e024040.; doi: 10.1136/bmjopen-2018-024040

30. Valtioneuvosto: Occupational safety and health in Finland. <http://urn.fi/URN:ISBN:978-952-00-3063-6>. 2010. Accessed 15 July 2021

Figures

Figure 1

Injured Body Parts