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Twelve-year data on skin diseases in the Finnish Register of Occupational Diseases II: Risk occupations with special reference to allergic contact dermatitis

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Abstract

Background: Detailed epidemiological studies on occupational skin diseases (OSDs) are scarce.

Objectives: To analyze risk occupations for OSDs in the Finnish Register of Occupational Diseases (FROD).

Methods: We retrieved numbers of OSD cases (excluding skin infections) for different occupations from the FROD in 2005-2016. In the FROD, Finnish ISCO-08–based classification of occupations was used since 2011, and the preceding ISCO-88–based version until 2010. We combined cases from the earlier and the later period using conversion tables provided by Statistics Finland. We included occupations with at least five cases and analyzed them in detail. We calculated incidence rates for OSDs and separately for allergic contact dermatitis (ACD) in different risk occupations using national labor force statistics. We also studied causes of ACD in these occupations.

Results: Risk occupations with the largest number of OSD cases included farmers, hairdressers, assistant nurses, cooks, cleaners, machinists, and nurses. Occupations with the highest incidences of OSDs comprised spray painters (23.8/10 000 person years), bakers (20.4), and dental technicians (19.0). Epoxy compounds and acrylates were prominent causes of ACD in occupations with the highest incidences of ACD.

Conclusions: Uniform use of International Standard Classification of Occupations (ISCO) would facilitate comparisons of OSD figures in different countries.

KEYWORDS

allergic contact dermatitis, cooks, dental technicians, epidemiology, hairdressers, incidence, irritant contact dermatitis, ISCO-08, ISCO-88, nurses, spray painters

1 | INTRODUCTION

Skin diseases are among the most common occupational diseases. Although in many countries occupational diseases are recorded and some data published on a regular basis, the information is usually very general. Detailed analyses on epidemiology, diagnoses, and causes of occupational skin disease (OSDs) are not frequently published.[1]

In Finland, all employees are insured for occupational disease, and insurance companies provide data on occupational diseases to the Finnish Register of Occupational Diseases (FROD). We have already described the general characteristics of a 12 years of material of the FROD covering years from 2005 through 2016 focusing on distribution of different diagnoses and causes of allergic contact dermatitis (ACD).[2] In this study we concentrate on occupations. We

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wanted to provide data on number of cases and incidence rates in individual occupations/occupational groups.

2 | METHODS

We described the main characteristics of the FROD and the present 12-year data in the first part of this article series.[2] The Finnish Institute of Occupational Health (FIOH) maintains the Finnish Register of Occupational Diseases (FROD). The data are provided by Finnish Workers' Compensation Center, a coordinator of Finnish insurance institutions that collects data from individual insurance companies. The register contains both recognized and suspected cases of occupational diseases determined by private insurance institutions. The register comprises data on, for example, occupation, branch of industry, up to three causes of occupational disease, and the respective diagnoses (eg, three allergens for ACD). One case can also have up to three different skin diagnoses, for example, ACD, irritant contact dermatitis (ICD), and contact urticaria (CU), but in every combination the total number of causative agents per case is limited to three. Since 2005 we have been able to identify cases that have been recognized as occupational diseases by the insurance company. We restricted the present study to the recognised cases. Any reimbursement requires recognition as an occupational disease, and insurance companies make these decisions case by case. The insurance companies have medical expertise, usually occupational physicians who assess the medical certificates. There is an appeal system with two levels (the Accident Appeal Board and the Insurance Court).

In Finland no official criteria for OSDs exist, but general medical criteria are used in each medical specialty such as dermatology. In practice, ACD cases are always diagnosed by patch testing and by dermatologists, and ICD patients are also patch tested to exclude contact allergies.

Occupations have been coded according to the Finnish Classification of Occupations 2010[3] (based on ISCO-08) since 2011. The preceding 2001 version of the national classification[4] (based on ISCO-88) was used until 2010. We mainly studied occupations with four-digit level codes in the 2010 classification, because most known OSD risk occupations were found there. However, there were exceptions such as dental technicians (code 32141), dental assistants (code 53291), and cooks (code 51201). They are distinct occupations at our national five-digit level and important risk occupations that need to be differentiated from other occupations with the same four-digit level code. In some instances, we decided to use three-digit level codes of the 2010 classification (Nursing and midwifery associate professionals/code 322, ie, nurses and midwives in Table 1; medical doctors/code 221, not shown).

Statistics Finland provides conversion tables between the above-mentioned two classifications of occupations (in Finnish[5,6]). We used them to combine cases from the earlier and later periods. In most risk occupations, the conversion was straightforward and involved just two interconvertible codes. In some occupations, however, we chose to present data from the later 6-year period only, because conversion was impossible. "Dental technicians" appeared in the 2010 classification with a code of its own after being classified in "precision-instrument makers and repairers" (code 7311) in the 2001 version. "Chefs" (code 3434) also appeared as an independent occupation in the 2010 classification. Tile setters were first classified in "bricklayers and stonemasons," and in the 2010 classification, they were grouped with floor layers. This shift did not largely change the OSD incidence of floor layers, but that of bricklayers was considerably affected. That is why we presented only the latter 6-year data of bricklayers (without tile setters). In two instances, we formed groups not present in the 2010 classification but independent occupations in the earlier 2001 classification, namely "cleaners" and "waiters, waitresses and bartenders."

For the present analysis, we first excluded skin infections (N = 450) from our analysis, and then occupations with fewer than five cases. This yielded 75 different occupations. We retrieved numbers of cases for all OSDs (infections excluded), ACD, ICD, and contact urticaria/protein contact dermatitis (CU/PCD) for these 75 occupations. We calculated incidence rates by using national labor force data of the year 2012 that we had retrieved from the webpage of Statistics Finland on June 6, 2015 (no longer available on the internet). We also retrieved main causes of ACD in each occupation from the FROD data.

3 | RESULTS

A total of 75 occupations were included in this analysis. These included occupations covered 3938 cases, 82% of the 4815 cases in the whole material (of which infections were excluded). In the 2012 labor force statistics, 792 779 persons were employed in these occupations, that is, 34% of the total labor force of 2 339 904 persons. The incidence of OSDs (infections excluded) was 1.71/10000 person years in the total labor force (95% confidence interval [CI] 1.67-1.76). The overall incidence was 4.1 (95% CI 4.0-4.3) in the 75 included occupations, and 0.47 (95% CI 0.44-0.50) in other occupations. Of the analyzed occupations, only one, "heavy truck and lorry drivers," had an incidence rate below the latter figure (0.30; 95% CI 0.17-0.48).

3.1 | Risk occupations with the largest number of cases

In Table 1, we present 30 occupations that had the highest number of cases. Farmers ("mixed crop and animal producers") formed the largest group followed by "hairdressers," "health care assistants" (practical nurses), "cooks," "cleaners," "metal working machine tool setters and operators" (machinists), and "nursing and midwifery associate professionals" (nurses and midwives).

3.2 | Risk occupations with the highest incidences

Table 2 presents 30 occupations with the highest incidence rates of OSD. "Spray painters and varnishers" had the highest incidence,

TABLE 1 Occupations with largest number of occupational skin disease cases (infections excluded)

Occupation	Code in ISCO-08–based classification (earlier code in ISCO-88–based version)	Occupational skin diseases, N
Mixed crop and animal producers	6130 (6130)	445
Hairdressers	5141 (51411)	268
Health care assistants	5321 (513, 51321, 51322, 51324, 51326)	258
Cooks	51 201 (5122)	216
Cleaners	91 121, 91122, 91129 (91322)	207
Metal working machine tool setters and operators	7223 (7223, 8211)	204
Nursing and midwifery associate professionals	322 (32311, 2312, 3232)	202
Motor vehicle mechanics and repairers	7231 (7231)	157
Farm relief workers	61214 (6123)	109
Kitchen helpers	9412 (91323)	106
Dental assistants	53291 (51325)	87
Plumbers and pipe fitters	7126 (7136)	75
Food and related products machine operators	8160 (827)	72
House builders	7111 (7121)	72
Plastic products machine operators	8142 (8232)	70
Restaurant services supervisors and shift managers	51202 (51211)	69
Waiters, waitresses and bartenders	5131, 5246, 9411, 5132 (5123)	69
Beauticians and related workers	5142 (51412)	62
Spray painters and varnishers	7132 (71412)	62
Toolmakers and related workers	7222 (7222)	61
Bakers, pastry-cooks and confectionery makers	7512 (7412)	60
Gardeners, horticultural and nursery growers	6113 (6112)	52
Construction painters and related workers	7131 (71411)	47
Wood processing plant operators	8172 (8141)	47
Electrical and electronic equipment assemblers	8212 (8282, 8283)	45
Floor layers and tile setters	7122 (7132)	44
Carpenters and joiners	7115 (7124)	41
Welders and flame cutters	7212 (7212)	35
Dentists	2261 (2222)	35
Chemical products plant and machine operators	8131 (8150, 8151, 8222, 8229)	35

23.8/10 000 person years, followed by "bakers, pastry-cooks and confectionery makers" (20.4) and "dental technicians" (19.0).

3.3 | Occupations at risk of ACD

In Table 3, we present 16 occupations with the highest incidence rates of ACD. "Spray painters and varnishers" had the highest incidence of both total OSD and ACD. They often work as car painters or industrial painters and only rarely in the construction trade. The main cause of their ACD was epoxy compounds.

Dental technicians had the second highest incidence of ACD. It is noteworthy that the occupation "life science technicians excluding medical" (code 3141; ie, laboratory workers) comprised quite many dental laboratory assistants with acrylate contact allergy. The latter do not have any classification code of their own. They produce dentures, which does not fit particularly well with the task description of laboratory workers (code 3141). Other occupations with many cases of acrylate ACD include beauticians, glaziers, and dental assistants (Table 3).

"Floor layers and tile setters" had the third highest incidence of ACD. Other construction-related occupations with high incidences were "bricklayers" and "construction painters." Epoxy compounds were the main cause of ACD in these three occupations. Epoxy compounds were also important causes of ACD in "aircraft engine mechanics and repairers" and "plastic product plant operators." The latter occupation comprises, for example, lamination workers.

"Wood processing plant operators" include mainly plywood factory workers with phenol formaldehyde resin contact allergy. "Toolmakers" share the common causes of ACD of machinists ("metal

TABLE 2 Occupations with the highest incidence rates of occupational skin disease (infections excluded)

Occupation	Code in ISCO-08–based classification(earlier code in ISCO-88–based version)	Labor force in 2012	Occupational skin diseases, infections excluded		
			N	Incidence/10000 person year	95% Confidence interval
Spray painters and varnishers	7132 (71412)	2172	62	23.79	18.40-30.29
Bakers, pastry-cooks and confectionery makers	7512 (7412)	2450	60	20.41	15.71-26.27
Dental technicians[a]	32141[a]	614	7[a]	19.00	8.31–37.59
Mixed crop and animal producers	6130 (6130)	21 562	445	17.20	15.66-18.85
Hair dressers	5141 (51411)	13 706	268	16.29	14.43-18.34
Farm relief workers	61 214 (6123)	5810	109	15.63	12.90-18.78
Floor layers and tile setters	7122 (7132)	2511	44	14.60	10.74-19.43
Dental assistants	53 291 (51325)	5194	87	13.96	11.25-17.13
Beauticians and related workers	5142 (51412)	3997	62	12.93	10.00-16.46
Veterinary technicians and assistants	3240 (3227)	440	6	11.36	4.61-23.64
Plastic products machine operators	8142 (8232)	5903	70	9.88	7.76-12.41
Bricklayers and related workers[a]	7112[a]	1051	6[a]	9.52	3.86-19.79
Metal working machine tool setters and operators	7223 (7223, 8211)	17 444	204	9.75	8.48-11.15
Aircraft engine mechanics and repairers	7232 (7232)	719	8	9.27	4.31-17.61
Toolmakers and related workers	7222 (7222)	5579	61	9.11	7.03-11.63
Dental assistants and therapists (Dental hygienists)	3251 (3225)	1638	17	8.65	5.21-13.57
Cooks	51 201 (5122)	22 194	216	8.11	7.08-9.25
Construction painters and related workers	7131 (71411)	4922	47	7.96	5.91-10.49
Wood processing plant operators	8172 (8141)	5357	47	7.31	5.43-9.64
Life science technicians (excluding medical)	3141 (3211)	3436	30	7.28	5.00-10.26
Shoemaking and related machine operators	8156 (8266)	819	7	7.12	3.12-14.09
Dentists	2261 (2222)	4182	35	6.97	4.93-9.59
Glaziers	7125 (7135)	743	6	6.73	2.73-14.00
Woodworking-machine tool setters and operators	7523 (7423)	3365	26	6.44	4.30-9.30
Chefs[a]	3434[a]	1914	7[a]	6.10	2.67-12.06
Gardeners, horticultural and nursery growers	6113 (6112)	7161	52	6.05	4.57-7.874
Metal polishers, wheel grinders and tool sharpeners	7224 (7224)	1116	8	5.97	2.77-11.34
Electrical and electronic equipment assemblers	8212 (8282, 8283)	6342	45	5.91	4.37-7.84
Cabinet-makers and related workers	7522 (7422)	4243	30	5.89	4.05-8.31
Veterinarians	2250 (2223)	1309	9	5.73	2.79-10.51

[a]Only the latter 6 years 2011-2016 were analyzed due to problems in conversion between the two classifications of occupations.

TABLE 3 Occupations with highest incidences of allergic contact dermatitis (ACD)

Occupation	Code in ISCO-08–based classification (earlier code in ISCO-88–based version)	Labor force in 2012	Allergic contact dermatitis		
			N	Incidence/10 000 person year (95% CI)	Main causes (N)
Spray painters and varnishers	7132 (71412)	2172	39	14.96 (10.79-20.25)	Epoxy compounds (20)
Dental technicians[a]	32141[a]	614	5[a]	13.57 (4.97-30.08)	Acrylates (5)[a]
Floor layers and tile setters	7122 (7132)	2511	37	12.28 (8.77-16.75)	Epoxy compounds (24) isocyanates (4)
Beauticians and related workers	5142 (51412)	3997	48	10.01 (7.46-13.16)	Acrylates (25), isothiazolinones (9), fragrances (6)
Hairdressers	5141 (51411)	13 706	137	8.33 (7.02-9.815)	Hair colors (52) persulfates (31) isothiazolinones (21)
Aircraft engine mechanics and repairers	7232 (7232)	719	7	8.11 (3.55-16.05)	Epoxy compounds (7)
Bricklayers and related workers[a]	7112[a]	1051	5[a]	7.93 (2.91-17.57)	Epoxy compounds (3)[a]
Glaziers	7125 (7135)	743	6	6.73 (2.73-14.00)	Acrylates (2)
Construction painters and related workers	7131 (71411)	4922	38	6.43 (4.62-8.74)	Epoxy compounds (17), isothiazolinones (15)
Plastic products machine operators	8142 (8232)	5903	45	6.35 (4.69-8.43)	Epoxy compounds (29)
Dental assistants	53 291 (51325)	5194	39	6.26 (4.51-8.47)	Acrylates (11), rubber (9)
Wood processing plant operators	8172 (8141)	5357	34	5.29 (3.72-7.31)	Phenol formaldehyde resins (20)
Rubber products machine operators	8141 (8231)	1366	8	4.88 (2.27-9.27)	Rubber (6), colophonium (2)[2]
Life science technicians (excl. medical)	3141 (3211)	3436	19	4.61 (2.86-7.06)	Acrylates (7), metals (4)
Toolmakers and related workers	7222 (7222)	5579	28	4.18 (2.83-5.96)	Metals (8), formaldehyde (4), isothiazolinones (3)
Metal working machine tool setters and operators	7223 (7223, 8211)	17 444	86	4.11 (3.31-5.08)	Formaldehyde (25), ethanolamines (22), metals (13), isothiazolinones (6), colophonium (5)

[a]Only the latter 6 years were analyzed due to problems in conversion between the two classifications of occupations.

working machine tool setters and operators"), namely formaldehyde, metals, and isothiazolinones.

3.4 | Occupations at risk of ICD

ICD was the dominating diagnosis of "cooks," "food machine operators," "cleaners," "restaurant service supervisors and shift managers," "health care assistants," "nursing and midwifery associate professionals," "waiters, waitresses and bartenders," and "hospital and institutional helpers." In all these occupations, ICD outnumbered ACD and CU/PCD more than twice. The diagnosis of ICD was made in 1827 cases of the analyzed occupations (46%).

The 15 occupations with the highest incidences rates of ICD (7.67-2.82/10000 person year) were all included in Table 2. Cleaners had an incidence rate of 2.12 in the 26th position. The incidence rates of ICD in "assistant nurses" and "nurses" were also relatively low ("health care assistants" 1.76/ 32th position; "nursing and midwifery associate professionals" 1.72/ 37th position).

4 | DISCUSSION

We have described the general structure of the FROD and the main results on analysis of OSDs in the FROD in 2005 through 2016 in our previous paper.[2] In the present study, we concentrated on occupations. We excluded from our analyses occupations with fewer than five OSD cases during the 12-year period, and ended up studying 75 different occupations. Our analysis covered a vast majority (82%) of all OSD cases in the FROD; 34% of the Finnish labor force working in these 75 occupations. With the exception of "heavy truck and lorry drivers," all of the included occupations were risk occupations for OSD, according to our clinical experience. Although drivers' work is not totally devoid of skin exposures that may cause OSDs, it is an

occupation that we sometimes recommend for hand dermatitis patients.

In Finland, an OSD is related to our statutory insurance system that covers all employees, but not entrepreneurs (with the exception of farmers). People working on their own, such as many hairdressers, can have a voluntary insurance for occupational disease. In this situation, their OSDs will be recorded in the FROD. Without insurance coverage, their skin diseases fail to be included in the official figures. The true incidence of OSDs of hairdressers might thus be substantially higher than what we have calculated based on the official figures.

OSD risk occupations usually involve exposure to skin irritants in addition to possible sensitizing factors. This holds true, at least to some extent, for all the 75 occupations analyzed in the present study. However, the diagnosis of ICD was made in fewer than half of the cases (46%). In Finland, it is customary to give ACD and CU/PCD precedence over ICD, and a diagnosis of ICD is not made, although it could be equally justified. Thus, comparing incidences of ICD in different occupations is of limited value.

In the FROD, we do not have access to the comprehensive medical certificates and thus cannot assess the quality of the diagnoses of individual cases. Detailed patient series with exposure data from a single or a few clinics provide better data on OSD in this respect. FROD provides national data from all parts of the country that would be difficult to organize in studies of patient series. Patch test result databases often gather information from large geographical areas, but they usually lack comprehensive relevance data of individual allergic reactions (eg, past/present; occupational/non-occupational). Although we could not ourselves assess the relevance of OSD causes in the FROD, in Finland, occupational contact dermatitis cases (ACD, ICD, and CU/PCD) are patch tested and diagnosed by dermatologists, with few exceptions. Dermatologists need to name specific causes for an OSD in their medical certificates (for example, allergens in ACD) and demonstrate exposure to the causative agents at work. Occupational physicians in insurance companies check the medical certificates and control whether the requirements for an OSD are fulfilled. Only recently have patch test databases started to resolve the problem of recording relevance data of individual patch test reactions.[7]

Regarding classification of occupations, the ISCO-08 at the four-digit level is generally suitable, but not perfect, for analyses of OSD cases. We have pointed out some of its weak points in the methods section. Sometimes the four-digit level classification is not detailed enough, and sometimes the three-digit level better corresponds to risk occupations in the dermatological literature. However, not all known OSD risk occupations have their own codes in the ISCO-08; for example, florists and boat builders lack their own codes, and consequently are difficult to find in the registry data. The standard industrial classification can be used to find cases in these occupations: Flower-related trades yielded 23 OSD cases and boat-related manufacture trades 28 cases.

In the present material, occupation was unknown in 100 cases. In 86 of these, the industrial code referred to education, most often to "technical and vocational secondary education." We assume that these cases were mostly students, as the statutory insurance for occupational diseases also covers them. We also assume that some of the cases with unknown occupation had stopped working in the occupation that had caused the skin disease. Naturally, the original occupation and industry should have been reported to the FROD.

Occupations with the largest number of cases are often seen in occupational dermatology clinics. We presented them in Table 1. Incidences of OSD in these occupations were not necessarily particularly high: For example, "health care assistants" (assistant nurses), "cleaners," and "nursing and midwifery associate professionals" (nurses) had relatively low incidences, 2.68, 3.27, and 2.55, respectively. High numbers of cases in these occupations above all result from a large labor force. In Denmark in 2010, health care workers constituted by far the largest occupational group with occupational dermatitis, followed by kitchen personnel and cleaning personnel.[8] Accordingly, in the present material, assistant nurses (certified nursing assistants; practical nurses; "health care assistants" in the ISCO-08) and nurses ("nursing and midwifery associate professionals" in the ISCO-08) were in the third and seventh positions, and combined, they would form the largest group. Similarly, cooks were the fourth largest group in the FROD, and cleaners were in the fifth position (Table 1). Hairdressers were large groups in both the Danish and the present material.

Occupations with high incidences of OSD also included professions with a relatively small labor force, such as "dental technicians," "veterinary technicians and assistants," and "aircraft engine mechanics and repairers." Dermatologists rarely see these patients, but it is important to know their typical OSD diagnoses and their causes.

A North-Bavarian study provided incidence data on 24 occupational groups, with the highest incidences from two time periods in the 1990s, 1990 to 1992, and 1993 to 1999.[9] Hairdressers had by far the highest incidence, in the later period 57.9/10000 workers per year. Finnish hairdressers had an incidence of 16.3. However, not all North-Bavarian figures were larger than ours. The incidence of OSD in "bakers, pastry cooks and confectionary makers" was 20.4 in Finland, and those of "bakers" and "pastry cooks" were 19.8 and 17.3, respectively, in North Bavaria. Finnish dental technicians had an incidence of 19.0, and the corresponding figure was 9.5 in North Bavaria. Another relatively simple comparison could be made: Machinists had an incidence of 6.0 in North Bavaria, and the Finnish figure was 9.7 ("metal working machine tool setters and operators").

An Australian study on OSD also provides incidence rates of occupational groups,[10] but we had difficulties in comparing these with our own results. "Hair and beauty" had an incidence of 7.0, whereas our "hairdressers" and "beauticians" had 16.3 and 12.9 cases/10 000 workers per year, respectively. Similarly, the Australian incidence of cleaners was 0.6, much lower than the Finnish figure, 3.2.

The two comparisons presented in the preceding text show that Finnish incidences of those occupations that could be easily compared were of the same order of magnitude, even if some figures were lower and some higher than those in the North-Bavarian and Australian studies. Comparison with previous literature was often difficult because the exact methods of forming different occupational groups

were unknown. Uniform use of International Classification of Occupations (ISCO) would help to overcome these difficulties.

5 | CONCLUSIONS

Based on data of the FROD from a period of 2005 through 2016, we present the number of cases and incidence rates of OSDs in occupations defined by ISCO-08–based national classification of occupations. In Finland, incidences in occupations that could be easily compared were of the same order as reported in the former literature. Uniform use of ISCO in dermatological studies would facilitate comparisons of OSD figures in different countries.

DISCLOSURES

No conflicts of interest.

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REFERENCES

1. Uter W. Surveillance in Occupational Contact Dermatitis. In: John SM, Johansen JD, Rustemeyer T, Elsner P, Maibach HI, eds. *Kanerva's Occupatioal Dermatology*. Cham, Springer; 2018.
2. Aalto-Korte K, Koskela K, Pesonen M. 12-year data on dermatologic cases in the Finnish Register of Occupational Diseases I: Distribution of different diagnoses and main causes of allergic contact dermatitis. *Contact Dermatitis*. in press;2020. https://doi.org/10.1111/cod.13488
3. Finnish Classification of Occupations 2010. http://www.stat.fi/meta/luokitukset/ammatti/001-2010/index_en.html. Accessed March 2, 2020.
4. The Finnish Classification of Occupations 2001. http://www.stat.fi/meta/luokitukset/ammatti/001-2001/index_en.html. Accessed March 2, 2020.
5. Conversion table for 2010 and 2001 versions of Finnish Classification of Occupations. http://www.stat.fi/meta/luokitukset/ammatti/001-2010/luokitusavain.html. Accessed March 2, 2020.
6. Conversion table for 2001 and 2010 versions of the Finnish Classification of Occupations. http://www.stat.fi/meta/luokitukset/ammatti/001-2010/luokitusavain_2.html#7. Accessed March 2, 2020.
7. Uter W, Bauer A, Bensefa-Colas L, et al. Pilot study on a new concept of documenting the clinical relevance of patch test results in contact dermatitis patients. *Contact Dermatitis*. 2018;79(6):370-377.
8. Carøe TK, Ebbehøj N, Agner T. A survey of exposures related to recognized occupational contact dermatitis in Denmark in 2010. *Contact Dermatitis*. 2014;70(1):56-62.
9. Dickel H, Kuss O, Blesius CR, Schmidt A, Diepgen TL. Occupational skin diseases in Northern Bavaria between 1990 and 1999: a population-based study. *Br J Dermatol*. 2001;145(3):453-462.
10. Cahill JL, Williams JD, Matheson MC, et al. Occupational skin disease in Victoria, Australia. *Australas J Dermatol*. 2016;57(2):108-114.

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