

Hand eczema in hairdressers: a Danish register-based study of the prevalence of hand eczema and its career consequences

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Summary

Background. Occupational hand eczema is common in hairdressers, owing to wet work and hairdressing chemicals.

Objectives. To estimate the prevalence of hand eczema and its career consequences among hairdressers in Denmark.

Methods. A register-based study was conducted, comprising all graduates from hairdressing vocational schools from 1985 to 2007 ($n = 7840$). The participants received a self-administered postal questionnaire including questions on hand eczema, atopic dermatitis, and career change. A response rate of 67.9% ($n = 5324$) was obtained.

Results. Of the respondents, 44.3% no longer worked as hairdressers and had worked for an average of 8.4 years in the profession before leaving it. Hand eczema was more common among ex-hairdressers (48.4%) than among current hairdressers (37.6%) ($p < 0.0001$), and significantly more ex-hairdressers (26.8%) than current hairdressers (15.7%) had chronic hand eczema ($p < 0.0001$). Of the respondents with hand eczema, 75% were aged 15–24 years at onset, and 45.5% gave hand eczema as a reason for career change. In this group, logistic regression analysis showed that chronic hand eczema contributed the most to the decision to change career (odds ratio 50.12; 95% confidence interval 18.3–137).

Conclusions. Hairdressers work an average of 8.4 years in the profession before leaving it, and hand eczema contributes significantly to this career change.

Key words: career change; hairdressers; hand eczema; occupational contact dermatitis.

Occupational hand eczema (OHE) is the most frequently recognized work-related disease in Denmark (1).

Hairdressing is one of the professions in which OHE most commonly occurs (1, 2), and in previous studies the reported prevalence of OHE in hairdressers (1, 3, 4) and hairdresser apprentices (3, 5, 6) was between 35% and 49.4%. Thus, OHE plays a major role in the morbidity of this occupation.

Hand eczema has a multifactorial aetiology with irritant, allergic and endogenous components.

Irritant OHE is a common problem in occupations that involve skin contact with water, soap, cleaning agents, food, metal working fluids, organic solvents, etc. (7). Contact with skin irritants is very frequent in the hairdressing trade. Hairdressers are not only exposed

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to irritants in shampoos and conditioners, but they are also intensively exposed to wet work from washing and handling damp hair. Furthermore, hairdressers are exposed to several chemical substances in hair dyes, permanent wave solutions, and bleaching products – all of which are well-known causes of allergic OHE (8, 9).

There are several publications on hand eczema in the general population and the occurrence of occupational hand eczema in hairdressers and other occupational groups (7, 10–13). Leaving a profession is a recognized phenomenon in jobs such as hairdressing (14), but little is known about the reasons for this decision. Only a few studies have been published on hand eczema as the possible reason for leaving the trade (7, 13–16).

This study aimed to clarify the health complaints that may lead to a career change among hairdressers, with hand eczema as the main focal point.

Materials and Methods

Design

We conducted a register-based questionnaire study with a self-administered postal questionnaire among hairdressers in Denmark, in collaboration with the Danish Hairdressers' and Beauticians' Union and the Danish Hairdresser Association. The study was approved by the Danish Data Protection Agency.

Registers

In order to perform this study, we used information on current postal addresses from the Central Person Registration Office. The Labour Market Supplementary Pension Scheme provided information on the annual affiliation to the hairdressing trade for every individual in the cohort.

Study population

The study population comprised all graduates from hairdressing vocational schools in Denmark between 1985 and 2007 whose current postal addresses were available from the Civil Registration System ($n = 7840$). They received a postal questionnaire in May 2009 and, after two reminders, answers were obtained from 5324 persons (67.9%). In this report, only respondents who provided information on current occupation were included, giving a sample of 5239 individuals aged between 22 and 65 years (Table 1).

Questionnaire

The respondents completed a questionnaire that consisted of 147 questions concerning topics of both an occupational and a personal nature. Previously validated questions concerning hand eczema from the Nordic Occupational Skin Questionnaire (NOSQ-2002) were used (17). A few of these questions were adapted to match the hairdressing profession. We defined atopic dermatitis according to the UK Working Party's diagnostic criteria (18, 19).

All ex-hairdressers were asked to state whether one or more of the following health complaints caused them to leave the trade: hand eczema, asthma, allergy, musculoskeletal pain, multiple chemical sensitivity (MCS), other disease, or pregnancy. The possible answers were: 'yes', 'no' or 'in doubt' for each health complaint.

The questionnaire was pretested as a peer review among supervisors of the project, the two hairdressing unions, and experts in the fields of smoking and alcohol. The pilot test included 19 hairdressers, who received a postal questionnaire and who were subsequently interviewed by telephone. The questionnaire was corrected accordingly.

Table 1. Characteristics of the 5239 trained hairdressers who provided information on current occupation

	Current hairdressers (%)	Ex-hairdressers (%)	Total (%)	<i>p</i> -value
Current occupation ($n = 5239$)	2918 (55.7)	2321 (44.3)	5239 (100)	—
Sex ($n = 5239$)				0.974
Men	125 (4.3)	99 (4.3)	224 (4.3)	—
Women	2793 (95.7)	2222 (95.7)	5015 (95.7)	—
Age group (years) ($n = 5239$)	Mean: 36.4 Median: 36.5	Mean: 37.7 Median: 38	Mean: 37 Median: 37	<0.0001*
22–32	867 (29.7)	510 (22.0)	1377 (26.3)	—
33–37	770 (26.4)	528 (22.7)	1298 (24.8)	—
38–41	615 (21.1)	586 (25.3)	1201 (22.9)	—
42+	666 (22.8)	697 (30.0)	1363 (26.0)	—

**t*-test for equality of means.

Non-respondents

The questionnaire was not returned by 32.1% ($n = 2516$): 8.8% were men ($n = 221$) and 91.2% were women ($n = 2295$). There were significantly more men in the group of non-respondents than in the group of respondents [$p < 0.0001$; odds ratio (OR) 2.16; 95% confidence interval (CI) 1.78–2.61]. The mean ages were 36.7 and 37 years for the non-respondents and the respondents respectively. There was no significant mean age difference between the two groups ($p = 0.126$; 95% CI for the mean difference -0.62 to 0.505). Significantly more non-respondents than respondents lived in the Capital Region of Denmark ($p < 0.001$; OR 1.19; 95% CI 1.08–1.32), but the geographical distribution was similar in the two groups. According to data from the Labour Market Supplementary Pension Scheme (ATP) 1768 (73.2%) non-respondents no longer worked in the hairdressing trade. For 7.1% ($n = 179$) of the non-respondents, the addresses were not valid according to the Danish Postal Service.

Statistics

Characteristics of the groups were compared by use of the two-tailed χ^2 -test and t -test. A backward logistic regression was performed among all ex-hairdressers who had ever had hand eczema. In the model, 'I left the trade because of hand eczema' ('yes' versus 'no') was used as the dependent variable, and sex ('men' versus 'women'), debut age of hand eczema (age in years), hand eczema prevalence ('now' versus 'within the past 3 months' versus 'between 3 and 12 months ago' versus 'more than 12 months ago'), hand eczema severity ['only once and for less than 2 weeks' versus 'only once but for 2 weeks or more' versus 'several times' versus '(almost) all the time'] and atopic dermatitis ('yes' versus 'no') were included as the independent variables. An interaction variable between atopic dermatitis and hand eczema severity was also included.

ORs with 95% CIs were calculated to describe the associations.

All statistical analyses were carried out with PASW STATISTICS 18 (SPSS, Chicago, IL, USA) for Windows. A p -value < 0.05 was considered to be significant.

Results

Information on current occupation was obtained from 5239 respondents: 2321 (44.3%) did not work as hairdressers anymore (ex-hairdressers), and 2918 (55.7%) still worked in the trade (hairdressers). On average, the ex-hairdressers worked for 8.4 years in the hairdressing profession before leaving it ($n = 2272$, range 1–25 years).

Table 1 shows the characteristics of the respondents, divided into two groups. The group of hairdressers was similar to that of ex-hairdressers regarding sex: both groups consisted of 4.3% male and 95.7% female participants. The mean age of the hairdressers was 36.4 years, and they were thus significantly younger than the ex-hairdressers (mean age 37.7 years; $p < 0.0001$; 95% CI for the mean difference -1.622 ; -0.977).

Hand eczema and history of atopic dermatitis

Table 2 shows the results regarding hand eczema in the respondents: 48.4% of the ex-hairdressers and 37.6% of the hairdressers had ever had hand eczema ($p < 0.0001$). Significantly more (22.3%) of the hairdressers than the ex-hairdressers (18.6%) had suffered from hand eczema during the past year ($p = 0.001$). Of the hairdressers, 7.4% had hand eczema when they completed the questionnaire, as compared to 6.9% of the ex-hairdressers ($p = 0.531$). Significantly more ex-hairdressers (26.8%) than current hairdressers (15.7%) had chronic hand eczema ($p < 0.0001$). The initial presentation of hand eczema occurred between the ages of 15 and 24 years for 75% of all respondents with hand eczema. Thus, 68.7% of all respondents with hand eczema were hairdresser apprentices at the time of onset.

Significantly more ex-hairdressers (23.7%) than hairdressers (21.0%) had a history of atopic dermatitis ($p = 0.017$).

Health complaints as a reason for leaving the trade

Table 3 shows the health reasons for leaving the trade among all ex-hairdressers and among hairdressers who left the profession within the first 5 years (see Appendix for the question asked; multiple answers were possible). Among all ex-hairdressers ($n = 2321$), the primary health complaint causing them to leave the trade was musculoskeletal pain (41.9%), and this was followed by hand eczema (23.1%), other disease (20.8%), and allergy (17.9%); the type of allergy was not specified in this particular question.

Notably, among all ex-hairdressers who gave hand eczema as a health reason for leaving the profession, 24% had no other health complaints. For ex-hairdressers who gave 'musculoskeletal pain', 'other disease', and 'allergy', this was the case for 40.7%, 24.8%, and 4.4%, respectively.

Among ex-hairdressers who left the profession within the first 5 years ($n = 588$), the distribution of health complaints was very similar to that among all hairdressers: with the exception of 'musculoskeletal pain' (OR 1.30;

Table 2. The prevalence of hand eczema among 5239 trained hairdressers in Denmark

Hand eczema	Current hairdressers (n = 2918) Total (%)	Ex-hairdressers (n = 2321) Total (%)	Total (%)	p-value
Ever (n = 5112)	1089/2895 (37.6)	1074/2217 (48.4)	2163 (42.3)	<0.0001
One-year prevalence (eczema within the past 12 months) (n = 5112)	645/2895 (22.3)	412/2217 (18.6)	1057 (20.7)	0.001
Point prevalence (current eczema) (n = 5112)	213/2895 (7.4)	153/2217 (6.9)	366 (7.2)	0.531
Onset age (n = 2082) (years)				
Mean	22.0	21.2	21.6	0.001*
Median	20	20	20	—
Onset age in age groups (n = 2082) (years)				
10 and under	18/1048 (1.7)	10/1034 (1.0)	28 (1.3)	—
11–14	15/1048 (1.4)	14/1034 (1.4)	29 (1.4)	—
15–19	392/1048 (37.4)	431/1034 (41.7)	823 (39.5)	—
20–24	352/1048 (33.6)	384/1034 (37.1)	736 (35.4)	—
25–29	144/1048 (13.7)	118/1034 (11.4)	262 (12.6)	—
30–34	73/1048 (7.0)	54/1034 (5.2)	127 (6.1)	—
35–39	35/1048 (3.3)	18/1034 (1.7)	53 (2.5)	—
40 and above	19/1048 (1.8)	5/1034 (0.5)	24 (1.1)	—
Occupation by onset of hand eczema (n = 2109)				
Hair washing assistant	54/1061 (5.1)	42/1048 (4.0)	96 (4.6)	0.233
Hairdresser apprentice	695/1061 (65.5)	753/1048 (71.9)	1448 (68.7)	0.002
Hairdresser	281/1061 (26.5)	207/1048 (19.8)	488 (23.1)	<0.0001
Other	31/1061 (2.9)	46/1048 (4.4)	77 (3.7)	0.072
Severity (how frequently have you had hand eczema?) (n = 2130)				
Only once and for less than 2 weeks	130/1067 (12.2)	60/1063 (5.6)	190 (8.9)	<0.0001
Only once but for 2 weeks or more	115/1067 (10.8)	54/1063 (5.1)	169 (7.9)	<0.0001
Several times	654/1067 (61.3)	664/1063 (62.5)	1318 (61.9)	0.578
(Almost) all the time	168/1067 (15.7)	285/1063 (26.8)	453 (21.3)	<0.0001

The respondents are divided into 'current hairdressers' and 'ex-hairdressers' according to their own information on current occupation at the time of answering the questionnaire. The varying n-values in the subsamples are attributable to missing data for the individual items.

*t-test for equality of means.

95% CI 1.06–1.58) and 'other disease' (OR 1.33; 95% CI 1.03–1.71), there was no statistical significant difference between the health complaints resulting in career change for the two groups. Thus, leaving the trade because of 'musculoskeletal pain' and 'other disease' was reported to a lower extent by ex-hairdressers who left the trade within the first 5 years.

Respondents with only a single health complaint causing a change of profession were analysed separately (Table 3). This did not significantly change the mutual distribution of the individual health complaints. With the exception of 'musculoskeletal pain', which was reported more frequently as a reason for leaving the profession in the whole group of ex-hairdressers than by

hairdressers who left within the first 5 years (OR 1.33; 95% CI 1.03–1.71), there were no statistically significant differences between the single health complaints resulting in career change for the two groups.

Hand eczema as a reason for leaving the trade

Hand eczema was the predominant reason for career change among ex-hairdressers who had ever had hand eczema, 45.5% (n = 459) stating that it was a reason for leaving the trade. The construction of the question made multiple answers possible, and the other health reasons for career change among these 459 ex-hairdressers are shown in Fig. 1. Notably, 51.4% also gave allergy as a

Table 3. Health reasons for leaving the hairdressing trade among all ex-hairdressers and ex-hairdressers who left the profession within the first 5 years

	All ex-hairdressers (n = 2321) Total (%)	Ex-hairdressers who left within the first 5 years (n = 588) Total (%)	Crude OR (95% CI)*
Hand eczema	480/2077 (23.1)	141/527 (26.8)	0.82 (0.66–1.02)
- as a single reason	115/2077 (5.5)	36/527 (6.8)	0.80 (0.54–1.18)
Asthma	124/2038 (6.1)	34/510 (6.7)	0.91 (0.61–1.34)
- as a single reason	5/2038 (0.2)	1/510 (0.2)	1.25 (0.15–10.74)
Allergy	366/2040 (17.9)	101/520 (19.4)	0.91 (0.71–1.16)
- as a single reason	16/2040 (0.8)	4/520 (0.8)	1.02 (0.34–3.06)
Musculoskeletal pain	874/2087 (41.9)	188/526 (35.7)	1.30 (1.06–1.58)
- as a single reason	356/2087 (17.1)	69/526 (13.1)	1.36 (1.03–1.80)
Multiple chemical sensitivity	212/2035 (10.4)	49/510 (9.6)	1.09 (0.79–1.52)
- as a single reason	9/2035 (0.4)	4/510 (0.8)	0.56 (0.17–1.83)
Other disease	427/2051 (20.8)	85/514 (16.5)	1.33 (1.03–1.71)
- as a single reason	106/2051 (5.2)	25/514 (4.9)	1.07 (0.68–1.67)
Pregnancy, physical problems	130/2033 (6.4)	31/510 (6.1)	1.06 (0.70–1.58)
- as a single reason	25/2033 (1.2)	7/510 (1.4)	0.89 (0.38–2.08)
Pregnancy, chemical influence	69/2020 (3.4)	17/507 (3.4)	1.02 (0.59–1.75)
- as a single reason	3/2020 (0.2)	1/507 (0.2)	0.75 (0.08–7.25)

CI, confidence interval; OR, odds ratio.

As multiple answers were possible (see Appendix), each health complaint is represented by two lines. The lower of the two illustrates the number of respondents who only had a single health reason for leaving the trade. The varying n-values in the subsamples are attributable to missing data for the individual items. Bold type indicates significant associations.

*OR (95% CI) comparing the occurrence of the listed health reasons for leaving the hairdressing trade for all ex-hairdressers with that for ex-hairdressers who left the trade within the first 5 years.

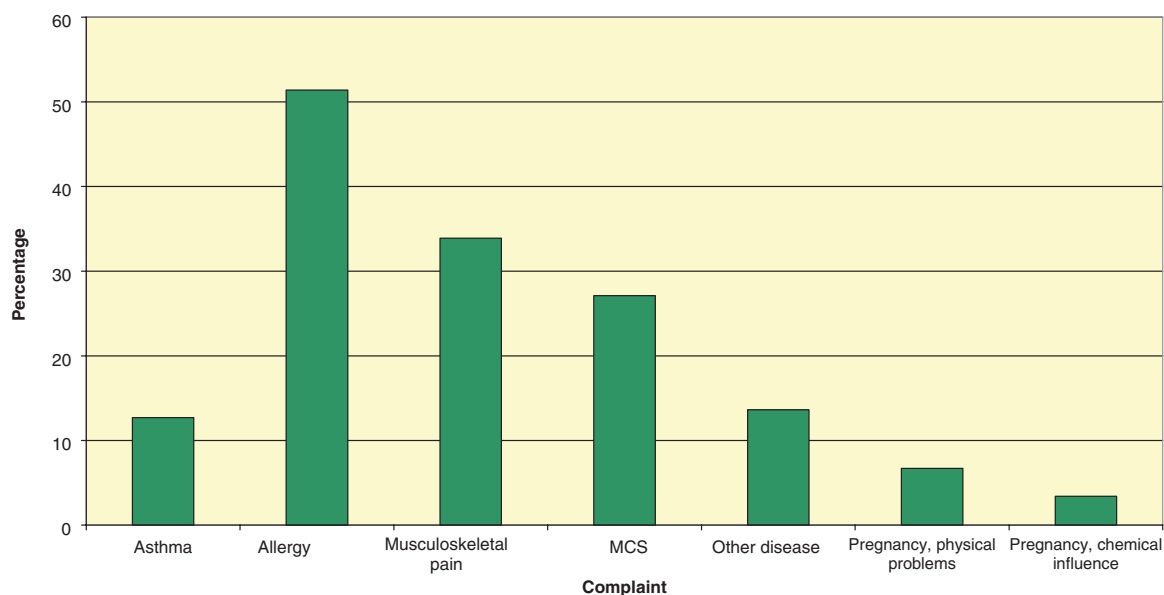


Fig. 1. Other health reasons for leaving the hairdressing trade among ex-hairdressers who left the trade because of hand eczema, n = 459[†]. Multiple answers were possible (see question asked in Appendix). [†]Cross-checked with a positive answer to 'Have you ever had hand eczema?' MCS, multiple chemical sensitivity.

Table 4. Backward logistic regression analysis with the outcome 'I left the trade because of hand eczema' and with different explanatory variables

Explanatory variables	Adjusted OR*	95% CI
Severity of hand eczema		
Only once and for less than 2 weeks	1 (reference)	
Only once but for 2 weeks or more	1.04	0.26–4.19
Several times	4.42	1.71–11.42
(Almost) all the time	50.12	18.34–136.95
Prevalence of hand eczema		
More than 12 months ago	1 (reference)	
Now (point prevalence)	2.63	1.57–4.41
Within the past 3 months	2.51	1.58–3.98
Between 3 and 12 months ago	2.12	1.34–3.36
Atopic dermatitis	1.59	1.16–2.19

CI, confidence interval; OR, odds ratio.

Bold type indicates significant associations.

*Mutually adjusted for variables shown in the table, sex, and debut age of hand eczema.

Performed in 1009 ex-hairdressers with hand eczema. The model is adjusted for sex and debut age of hand eczema. An interaction variable between atopic dermatitis and severity of hand eczema was included in the model but was insignificant.

reason for leaving the trade, 33.9% gave musculoskeletal pain, and 27.1% gave MCS.

A logistic regression analysis with 'I left the trade because of hand eczema' as the dependent variable was carried out (Table 4). We found that leaving the trade because of hand eczema was associated with increased severity of hand eczema: thus, having had hand eczema several times (OR 4.42; 95% CI 1.71–11.42) and having hand eczema (almost) all the time (OR 50.12; 95% CI 18.34–136.95) were predictors for leaving the trade as compared with only having had hand eczema once, for less than 2 weeks. Having had hand eczema within the past 12 months was also positively associated with leaving the trade because of hand eczema, as compared with having had hand eczema more than 12 months ago (Table 4). Finally, a positive correlation between having atopic dermatitis and leaving the trade because of hand eczema was found (OR 1.59; 95% CI 1.16–2.19). No association with sex and onset age for hand eczema was found, and neither was an association with the interaction variable between atopic dermatitis and hand eczema severity found.

Discussion

Our study showed a high frequency of career change among hairdressers trained between 1985 and 2007; 44.3% no longer worked in the trade, and the

ex-hairdressers had typically worked for 8.4 years in the profession before leaving it.

Few studies on the reasons for career change among hairdressers have been performed. We wanted to assess whether different health complaints, in particular hand eczema, led hairdressers to leave the trade. Among all ex-hairdressers, musculoskeletal pain and hand eczema were the most frequent health complaints leading to career change (Table 3). Among all ex-hairdressers who had ever had hand eczema, hand eczema was the predominant reason for leaving the trade. The risk of abandoning the profession because of hand eczema increased significantly with severity of hand eczema, but recent outbreaks of hand eczema and atopic dermatitis were also of relevance (Table 4).

Although the literature on hand eczema in hairdressers is abundant, only a few studies have been published on hand eczema and its career consequences for hairdressers (7, 13–16). In their study, Leino et al. showed that the risk of leaving the profession because of hand eczema was 3.5 times as large for hairdressers than for a control group of commercial workers, and that 73% of the hairdressers had left the profession because of work-related diseases (14). Similarly, Meding et al. reported hairdressing to be the occupation that was most frequently abandoned because of hand eczema, with an 18% rate of career change in a study of hand eczema patients from different occupational groups (13). Laing et al. concluded that 66% of hairdressers with positive reactions to the hairdressing series ceased hairdressing because of hand eczema (16). In addition, Holm found that 21% of young hairdressers had left the trade because of health complaints; 6.5% because of hand eczema.

Apart from the study undertaken by Leino et al. (14), the above-mentioned studies were all performed on fairly small populations of hairdressers (range 21–124), some with selected groups of either hand eczema patients or allergic hairdressers. The small sample sizes may explain the variation in the results. Our study comprises the health reasons for leaving the trade for 2321 ex-hairdressers, 1074 of whom had ever had hand eczema, and thus gives a sample of considerable size. Accordingly, it may give a more realistic description.

The findings suggest a healthy-worker effect in the hairdressing trade, as ex-hairdressers had a significantly higher lifetime prevalence of hand eczema than current hairdressers. Furthermore, ex-hairdressers reported chronic hand eczema to a higher extent than did current hairdressers (Table 2). In contrast, the 1-year prevalence of hand eczema was 22.3% in current hairdressers,

and was thus significantly higher than among the ex-hairdressers (18.6%) (Table 2). These findings suggest that individuals with hand eczema of lesser severity, and who tolerate the occupational exposures, continue to work in the profession.

The 1-year prevalence of hand eczema found in this study is comparable to findings in other studies of hand eczema in hairdressers, with a 1-year prevalence varying from 13.8% to 20.2% (2, 3, 20). Nothing suggests that hairdressers overestimate the occurrence of hand eczema. On the other hand, Leino et al. concluded that that hairdressers evidently underrate hand eczema and consider it to be a natural part of their occupation (20). A new validation study of Bregnhøj et al. showed a high degree of consistency between the clinical diagnosis and self-reported hand eczema in hairdresser apprentices (21).

As seen in Table 3, 10.4% of the ex-hairdressers gave MCS as a reason for leaving the trade (see Appendix for question asked). MCS is not a clearly defined medical disorder, but rather a combination of symptoms; it is not commonly recognized by those who have not had particular experience with it. As MCS may be of importance for the morbidity of hairdressers, it was included in the questionnaire, although it may be difficult for respondents to distinguish MCS from asthma and allergy. The reason for this is that, in Danish, 'multiple chemical sensitivity' translates into 'Duft- og kemikalie overfølsomhed', which can be misinterpreted as 'allergy towards fragrances and chemicals'. This may lead to an overlap between these disorders, and might explain the rather high frequency of MCS found in this study. Both MCS and allergy will be the subjects of separate papers.

As this is a questionnaire study, a possible shortcoming might be that hand eczema and other health complaints are self-reported and not clinically diagnosed. This may lead to recall bias. Furthermore, in the question regarding the reasons for career change, multiple answers were possible. Thus, it was impossible to conclude what the primary reason for leaving the trade was, unless the respondent had only a single health complaint. In addition, it would have been desirable for some of the health complaints, for example 'allergy', to have been defined by providing examples of the types of allergy typical for the hairdressing trade.

The relatively high response rate of 67.9% makes it possible for us to assume that the results can be extrapolated to the entire population of hairdressers and ex-hairdressers in Denmark. However; it is possible that we lost valuable information about the ex-hairdressers among the non-respondents: according to the ATP data, 73.2% of the non-respondents no longer worked in the trade, and

this could suggest selection bias, as it is possible that they would be more reluctant to answer a questionnaire regarding something that may no longer be of relevance to them.

Eczema, and irritant eczema in particular, is the most commonly recognized and compensated occupational disease in Denmark (22), and the annual costs of this disease are estimated to be approximately DKK 800 million. Hand eczema occurs most frequently in hairdressers, health-care and dental care workers, machinists, and those engaged in food-related occupations (7, 13). Our study showed that almost 70% of all hairdressers with hand eczema experienced onset during their apprenticeship, and that hand eczema was the predominant reason for leaving the trade among hairdressers who had ever had hand eczema. Thus, as previous studies have shown (23, 24), it is important to implement preventive measures to reduce both the incidence and the prevalence of hand eczema among hairdressers and other high-risk occupational groups. This will include relevant legislation and reduction of exposure to irritant and allergenic hairdressing products, as well as information for and training of both hairdressers and hairdresser apprentices to raise awareness of their occupational exposures and to promote the correct use of suitable gloves and proper skin care.

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Appendix

What caused you to leave the trade?

Please check off one box in every line.

	Yes	No	Don't know
Hand eczema	☐	☐	☐
Asthma	☐	☐	☐
Allergy	☐	☐	☐
Pain in muscles and joints	☐	☐	☐
Multiple chemical sensitivity (MCS)	☐	☐	☐
Other disease	☐	☐	☐
Pregnancy, physical problems	☐	☐	☐
Pregnancy, chemical influence	☐	☐	☐

If 'other disease' caused you to leave the trade, then please state which one: _____

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