

# Occupational contact dermatitis in the UK: a surveillance report from EPIDERM and OPRA

J. D. Meyer\*, Y. Chen\*, D. L. Holt\*, M. H. Beck† and N. M. Cherry\*

\**Centre for Occupational and Environmental Health, University of Manchester, UK; and †Contact Dermatitis Investigation Unit, The Dermatology Centre, University of Manchester, Hope Hospital, Salford M6 8HD, UK*

Since February 1993 the EPIDERM surveillance scheme has collected data on occupational skin disease from consultant dermatologists in the UK. Reporting by occupational physicians to the scheme began in May 1994 and was superseded in January 1996 by the Occupational Physicians Reporting Activity (OPRA). The schemes currently receive reports on incident cases from 244 dermatologists and 790 occupational physicians. An estimated total of 9937 cases of contact dermatitis reported by dermatologists was calculated from surveillance data; 8129 contact dermatitis cases were estimated from reports by occupational physicians. The annual incidence of occupational contact dermatitis from dermatologist reports was 6.4 cases per 100,000 workers and 6.5 per 100,000 from reports by occupational physicians, an overall rate of 12.9 cases per 100,000 workers. Manufacturing industries account for the greatest number of cases seen by both sets of reporting physicians, with health care employment second. Reports from dermatologists also indicate high rates of dermatitis in the personal service industries (mainly hairdressers and barbers) and in agriculture. With the exception of an increase in cases seen in nurses in both schemes, the numbers and proportions of cases of contact dermatitis within occupations have remained fairly constant over the 6-year reporting period. Agents accounting for the highest number of allergic contact dermatitis cases were rubber (23.4% of allergic cases reported by dermatologists), nickel (18.2), epoxies and other resins (15.6), aromatic amines (8.6), chromium and chromates (8.1), fragrances and cosmetics (8.0), and preservatives (7.3). Soaps (22.0% of cases), wet work (19.8), petroleum products (8.7), solvents (8.0), and cutting oils and coolants (7.8) were the most frequently cited agents in cases of irritant dermatitis. The national scope of the data, together with the parallel structure by which both dermatologists and occupational physicians report incident cases, is useful in determining the extent of skin hazards in UK industry and may help in better targeting efforts to reduce the burden of skin disease at work.

**Key words:** Epidemiology; occupational contact dermatitis; occupational skin disease; surveillance.

Occup. Med. Vol. 50, 265–273, 2000

Received 10 January 2000; accepted in final form 15 March 2000.

## INTRODUCTION

Work-related skin diseases are common; they are second only to musculo-skeletal disorders as a cause of occupational morbidity. Overall incidence and prevalence data on occupational skin disease may be drawn from

mandatory reporting schemes, as in Finland,<sup>1</sup> from compensation registers,<sup>2</sup> or from industry and worker surveys.<sup>3,4</sup> The major sources of data on occupational hazards and agents responsible for dermatitis are case series from referral centres or specialized clinics,<sup>5,6</sup> or repeated cross-sectional measures of prevalence.<sup>7</sup> Referral patterns to specialist clinics, with a bias toward allergic contact dermatitis, and high representation of particular industries within a region, limits usefulness of these studies in occupational surveillance for skin hazards in the workplace.

Correspondence to: Dr John D. Meyer, Centre for Occupational and Environmental Health, University of Manchester, Stopford Building, Oxford Road, Manchester M13 9PT, UK. Tel: (+44) 0161 275 5689; fax: (+44) 0161 275 5506; e-mail: john.meyer@man.ac.uk

Information from population-based studies is more useful in accurately estimating the incidence of dermatoses in industry and the contribution of specific agents, but such studies are few. A survey in Bavaria used systematic recording of new cases over a 3-year period to determine the incidence and relative risk of dermatitis in bakers, confectioners and cooks.<sup>8</sup> Similar surveillance efforts on a national scale may produce more accurate estimates of the contribution of occupations and agents to the overall burden of work-related dermatoses. The EPIDERM and OPRA surveillance schemes<sup>9</sup> are programmes of national reporting from dermatologists and occupational physicians on the occurrence of occupational skin disease across the United Kingdom. The schemes have the advantage of systematic reporting from two sets of specialists, and thus capture cases across a broad range of industries and occupations. This present paper analyses data from the EPIDERM and OPRA schemes concerning occupational determinants of contact dermatitis within the UK.

## METHODS

Reporting methods were described in an earlier paper.<sup>9</sup> Briefly, new cases of occupational skin disease have been reported to EPIDERM since January 1993 by consultant dermatologists throughout the UK. From May 1994 occupational physicians were invited to join the scheme. Both groups of reporters completed simple reporting cards at 3-month intervals. In January 1996 the scheme was redesigned. Occupational physicians, many of whom had also been reporting occupational respiratory disease to SWORD, were asked to complete one card only, but to report all new cases of occupational disease in one randomly assigned month each year. This reporting group now numbers 772. Medical inspectors for the Health and Safety Executive (currently 18) also report each month to OPRA. EPIDERM continues with 244 consultant dermatologists taking part currently. In 1995 a core group of physicians who see a large number of work-related cases or who have a special interest in occupational skin disease was designated. This EPIDERM core group at present comprises 24 dermatologists, who are assigned to report to the scheme monthly throughout the year. The remaining specialists are randomly assigned to report on cases seen during one of 12 monthly samples. Reporters are asked to return cards even if they have not seen a case of occupationally related illness during the month. In order to assure a high level of participation, reminders are made by telephone and fax to reporters not returning cards promptly.

Consultant dermatologists are asked to specify the type of skin disease for each case reported from among seven broad categories: contact dermatitis, contact urticaria, folliculitis or acne, infective skin disease, mechanical or traumatic injury, conditions of the nails, and neoplasia. Occupational physicians reporting to OPRA are simply asked to record the diagnosis, which is then coded using the International Classification of Diseases, 10th Revision (ICD-10). Details on each case,

including date of birth, gender, abbreviated postcode, occupation, and suspected agents are requested on the reverse side of each card. Reporting on industry was added in 1996. Physicians are asked to report any skin condition that was caused or made seriously worse by the patient's work, and for their opinion as to the agents causing the condition. They are not asked to carry out tests over and above those judged necessary for clinical management.

Reported occupation is coded to three digits and industry to two digits using classifications developed by the Office of Population Censuses and Surveys and the Central Statistical Office (now jointly the Office of National Statistics).<sup>10,11</sup> Substance coding is based on a scheme developed for internal use by the Health and Safety Executive and is performed independently by two research assistants. Duplicate reports are identified and eliminated by searching the database for initials, date of birth and postcode.

Incidence of occupational skin diseases was calculated separately for dermatologists and occupational physicians by weighting individual reports by an appropriate multiplier (1 throughout for those reporting all cases seen over each 3-month period to December 1995 and each month thereafter; 12 thereafter for those who have reported only 1 month a year since that date). Denominators were obtained from the Labour Force Survey,<sup>12</sup> which gives estimates by age, gender and region of those working in the UK, in each occupation and each industry. Employment data from winter 1996–1997 were used as denominator values. Because of the start date in February (rather than January) 1993, all surveillance dates shown by calendar year (e.g. 1993) cover the 12 months from 1 February in that year to 31 January in the following year.

## RESULTS

Reporting to the EPIDERM and OPRA schemes is high, with 89% average monthly participation in 1997 and 1998 for each group of specialist physicians. From 1993 to January 1999, a total of 12,574 new cases of occupational skin disease was estimated from reports by consultant dermatologists. Data from occupational physicians yields an estimate of 10,136 new cases from May 1994 to January 1999. Duplicate cases, reported by both an occupational physician and a dermatologist, accounted for 0.7% of all reported cases. An estimated total of 9937 cases of contact dermatitis (79% of total cases) reported by dermatologists was calculated from surveillance data; 8129 contact dermatitis cases, or 80.2% of skin cases were estimated from reports by occupational physicians. The annual incidence of occupational contact dermatitis was 6.4 cases per 100,000 employed for dermatologist reports and 6.5 per 100,000 for occupational physicians, an overall rate of 12.9 cases per 100,000 workers.

Rates of occupational contact dermatitis by industry group for the 3-year period from February 1996, when both schemes began collecting industry-specific data, to

January 1999 are shown in Figure 1. Manufacturing industries account for the greatest number of cases seen by both sets of reporting physicians, with healthcare employment second. The high rate of dermatitis in the social and personal services industries reflects the large number of hairdressers and barbers seen by dermatologists (453 estimated cases over this 3-year period). Agriculture and construction also show higher rates in reports from dermatologists.

Tables 1 and 2 show rates of contact dermatitis for occupations with annual incidence rates above the mean rate across all occupations. The percentage of cases attributable to various agents (those responsible for 5% or more of cases) within each occupation is also shown. As more than one agent may be identified by the reporting physician, the sum of the figures shown may be greater than 100%. In occupations having large numbers of reports in both schemes, such as nursing, chemical work, metalwork, and cleaning, similarities in reported causative agents are seen, although the proportions to which specific agents are responsible for dermatitis varies somewhat between the two schemes. Profiles of agents responsible for dermatitis are also similar for closely related occupations, such as nurses, assistant nurses, and medical practitioners. Differences between the two schemes are notable in the extent to which agents such as nickel, fragrances, and preservatives were reported by dermatologists when these figures are compared with reports from occupational physicians.

Trends in contact dermatitis for the most frequently reported occupations are shown in Figure 2. Numbers and proportions of cases within occupations have remained fairly constant over reporting periods, with the notable exception of an increase in cases seen in nurses in both schemes.

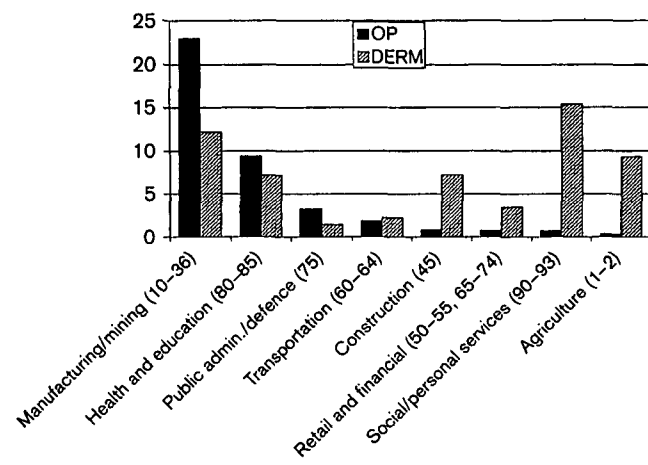
Beginning in May 1994, dermatologists were asked to further categorize contact dermatitis into allergic, irritant, mixed, or unspecified; occupational physicians also reported on this until the start of OPRA in January 1996. The distribution of cases between irritant and

allergic contact dermatitis is shown in Figure 3. Over half the cases reported by dermatologists were thought to have a definite allergic component, but less than one in three of those reported by occupational physicians. Agents accounting for the highest number of allergic contact dermatitis cases were rubber (23.4% of allergic cases reported by dermatologists), nickel (18.2), epoxies and other resins (15.6), aromatic amines (8.6), chromium and chromates (8.1), fragrances and cosmetics (8.0), and preservatives (7.3). Soaps (22.0% of cases), wet work (19.8), petroleum products (8.7), solvents (8.0), and cutting oils and coolants (7.8) were the most frequently cited agents in cases of irritant dermatitis.

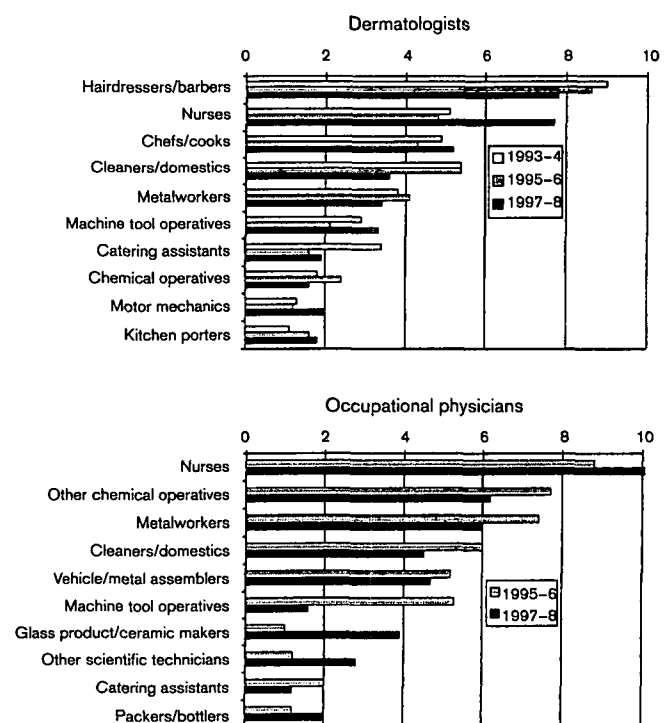
## DISCUSSION

Skin diseases remain a common cause of work-related morbidity, accounting for a fifth or more of all occupational disease in many surveillance schemes, including the overall ODIN scheme.<sup>1,13</sup> Although most individuals affected will remain in work, over half will change jobs and a substantial number will lose a month or more from work,<sup>3,14</sup> and persistence or relapse of dermatitis may occur in the absence of further occupational exposure.<sup>5,14,15</sup> Data that can inform preventive strategies is therefore crucial. Although testing of affected individuals presenting to dermatological clinics for evaluation and treatment provides information on high risk occupations and the hazards of handling particular substances,<sup>5,6,16</sup> case-series reports may be subject to referral bias because of the specialized nature

**Figure 1.** Contact dermatitis by industrial sector (SIC Codes) February 1996–January 1999. Reports by occupational physicians (OP) (5685 estimated cases) and dermatologists (DERM) (5727). Annual rates per 100,000 employed.



**Figure 2.** Trends in reporting of contact dermatitis by occupation by dermatologists and by occupational physicians for the commonly reported occupations. Cases as a percentage of all estimated contact dermatitis cases.



**Table 1.** Contact dermatitis attributable to specific agents for occupations at increased risk: reports from dermatologists February 1993–January 1999

<i>Occupation (SOC)</i>	<i>Total cases</i>	<i>Rate/100,000 workers</i>	<i>Agents causing contact dermatitis (% of total cases)</i>	
Hairdressers and barbers (660)	836	116.3	Hairdressing chemicals (49.8) Aromatic amines (38.3) Nickel (20.5) Soaps (17.9)	Wet work (13.6) Preservatives (8.4) Fragrances and cosmetics (6.6)
Printers (561)	91	85.8	Solvents (24.2) Soaps (9.9) Petroleum products (7.7)	Epoxies and resins (7.7) Aldehydes (6.6) Wet work (5.5)
Beauticians (661)	101	76.8	Fragrances and cosmetics (53.5) Rubber (19.8) Other biological substances (18.8) Solvents (14.9) Nickel (14.9)	Soaps (13.9) Epoxies and resins (13.9) Bleach (12.9) Drugs (12.9)
Other chemical operatives (820)	189	69.1	Solvents (21.6) Epoxies and resins (10.6) Foods and flour (10.1) Drugs (9.5)	Nickel (9.0) Rubber (8.5) Preservatives (7.5) Cobalt (6.5)
Window dressers, floral arrangers (791)	62	68.1	Other biological substances (85.5) Wet work (8.1)	Nickel (6.5)
Machine tool operatives (840)	280	54.0	Cutting oils and coolants (54.1) Petroleum products (22.8) Preservatives (11.2)	Solvents (7.5) Fragrances and cosmetics (6.5) Epoxies and resins (5.4)
Routine laboratory testers (864)	52	46.1	Rubber (36.5) Soaps (32.7) Solvents (5.8)	Wet work (5.8) Nickel (5.8)
Dental practitioners (223)	60	38.6	Rubber (61.7) Glues and paints (20.0)	Wet work (6.7)
Other machine setters and operators (519)	85	34.0	Cutting oils and coolants (71.8) Soaps (16.5) Petroleum products (14.1)	Colophony (9.4) Epoxies and resins (5.9)
Bakers (580)	67	31.9	Foods and flour (50.7) Wet work (20.9)	Nickel (6.0)
Coach painters and other spray painters (596)	67	31.8	Epoxies and resins (37.3) Glues and paints (26.9) Solvents (20.9)	Rubber (7.5) Cobalt (6.0)
Chefs and cooks (620)	470	30.5	Foods and flour (52.1) Wet work (24.7) Soaps (19.5)	Nickel (13.2) Rubber (8.6)
Dental nurses (643)	52	27.6	Rubber (26.9) Aldehydes (19.2) Nickel (19.2) Epoxies and resins (7.7)	Soaps (5.8) Bleach (5.8) Solvents (5.8) Cobalt (5.8)
Glass product and ceramic makers (590)	50	23.7	Rubber (30.0) Epoxies and resins (18.0) Petroleum products (14.0) Wet work (10.0)	Cement (8.0) Acids and caustics (8.0) Solvents (6.0)
Vehicle & metal assemblers (851)	94	20.1	Rubber (28.7) Epoxies and resins (22.3) Chrome (17.0) Petroleum products (14.9) Soaps (9.6)	Cutting oils and coolants (9.6) Nickel (8.5) Glues and paints (7.4) Aromatic amines (6.4)

continued

Table 1. Continued

<i>Occupation (SOC)</i>	<i>Total cases</i>	<i>Rate/100,000 workers</i>	<i>Agents causing contact dermatitis (% of total cases)</i>	
Nurses (340)	601	19.2	Rubber (31.9) Wet work (24.1) Soaps (11.3) Bleaches and sterilants (9.8)	Nickel (7.3) Fragrances and cosmetics (7.0) Aldehydes (5.9) Drugs (5.3)
Catering assistants (953)	227	17.5	Foods and flour (33.0) Wet work (25.8) Soaps (21.9)	Rubber (17.6) Nickel (13.7) Friction (5.2)
Kitchen porters (952)	150	16.5	Soaps (52.8) Rubber (21.7) Wet work (12.8)	Foods and flour (8.3) Nickel (7.8) Other biological substances (6.7)
Metalworkers (516)	371	16.4	Petroleum products (32.7) Epoxies and resins (18.0) Soaps (15.0) Solvents (11.2) Nickel (9.9)	Bleaches and sterilants (7.9) Cutting oils and coolants (6.1) Preservatives (5.3) Wet work (5.3)
Bricklayers and masons (500)	89	16.1	Chrome (66.3) Cement (34.8) Rubber (16.9)	Friction (14.6) Cobalt (10.1)
Plastic operatives (825)	64	13.6	Solvents (23.4) Cutting oils and coolants (18.8)	Epoxies and resins (17.2) Metals (6.3)
Builders (504)	106	13.5	Chrome (44.3) Cement (31.1) Cobalt (17.0)	Rubber (9.4) Epoxies and resins (5.7)
Other food processors (809)	96	13.4	Foods and flour (51.0) Chrome (13.5) Soaps (10.4)	Wet work (9.4) Rubber (7.3) Fragrances and cosmetics (5.2)
Laboratory technicians (300)	78	13.4	Rubber (32.1) Epoxies and resins (21.8) Wet work (12.8) Solvents (11.5)	Nickel (7.7) Soaps (6.4) Aldehydes (6.4)
Motor mechanics (540)	152	12.7	Petroleum products (35.6) Rubber (31.3)	Soaps (17.5) Solvents (10.0)
Gardeners (594)	87	12.7	Other biological substances (58.6) Petroleum products (13.8)	Rubber (6.9) Friction (5.7)
Medical practitioners (220)	102	11.6	Rubber (59.8) Wet work (10.8)	Bleach (8.8)
Electronic goods assemblers (850)	72	10.4	Epoxies and resins (22.2) Chrome (18.1) Colophony (16.7) Rubber (12.5)	Nickel (12.5) Solvents (9.7) Petroleum products (6.9)
Cleaners and domestics (958)	466	10.3	Soaps (41.3) Wet work (20.6) Rubber (20.2)	Nickel (17.5) Fragrances and cosmetics (9.7)
Bar staff (622)	113	10.2	Wet work (44.4) Nickel (44.4)	Soaps (30.8)
Welding trades (537)	59	9.7	Solvents (25.4) Nickel (15.3) Colophony (15.3)	Temperature/Humidity (8.5) Epoxies and resins (8.5)

continued

Table 1. Continued

Occupation (SOC)	Total cases	Rate/100,000 workers	Agents causing contact dermatitis (% of total cases)	
Painters and decorators (507)	79	8.8	Epoxies and resins (43.0) Glues and paints (19.0) Solvents (12.7)	Petroleum products (8.9) Soaps (5.1)
Packers and bottlers (862)	94	7.9	Rubber (21.3) Friction (17.0) Epoxies and resins (17.0) Aldehydes (16.0)	Soaps (8.5) Foods and flour (6.4) Glues and paints (6.4) Nickel (6.4)
Carpenters and joiners (570)	108	7.4	Other biological substances (36.1) Epoxies and resins (23.1) Colophony (18.5)	Soaps (12.0) Wet work (11.1) Glues and paints (5.6)
Sewing machinists (553)	56	7.2	Nickel (14.3) Friction (7.1) Aldehydes (7.1)	Petroleum products (5.4) Cobalt (5.4)
OVERALL OCCUPATION	9920	6.4		

Seventeen estimated cases did not include sufficient information on occupation. SOC, standard occupational code.

of the clinics. Repeated prevalence surveys, while useful in determining the extent of dermatoses within occupations, may be influenced by such factors as the healthy worker effect and losses to follow-up of sensitized subjects between phases of the survey.<sup>15,17</sup> Through the use of systematic reporting by both dermatologists and occupational physicians, EPIDERM and OPRA have attempted to overcome these limitations and provide broad-based population estimates of the burden of occupational skin disease across the entire working population of the UK, along with a description of the hazards of particular occupations and industries.

The data presented here are consistent with other studies showing high incidence or prevalence rates of contact dermatitis in manufacturing and processing industries,<sup>3,5,17,18</sup> though results differ with respect to the relative position of some industries. The greatest risks for contact dermatitis were seen in vehicle manufacturing, glass products and ceramics production and chemical manufacturing. Incidence rates in these industries were consistently high in both schemes. The most frequent causative agents in these workers include solvents, resins and paints. Service industries demonstrate high rates of dermatitis in data collected from dermatologists; the occupations most heavily represented include nursing, hairdressing, cleaning, and food service. These rates are consistent with household surveys of occupational illness in the UK, which also show high rates of self-reported skin disorders in hair and beauty workers, nurses, and catering occupations.<sup>4</sup> Dermatologists will see a greater proportion of patients who are self-employed or work for smaller industries than will occupational physicians, whose caseloads originate in organizations of sufficient size and means to support occupational health and safety programmes. High rates of dermatitis reported by dermatologists in hairdressers, chefs and cooks, care assistants, and bar staff, the majority of whom may be self-employed or work for smaller organizations, reflect the differences in referral

patterns. Since hospital-based dermatologists will see workers from a broader range of worksites, the problem of excluding employees in small workplaces and the self-employed is greatly reduced.

Differences in causative agents within occupations are also seen when reports from dermatologists are compared with those from occupational physicians. In particular, a higher incidence of dermatitis is seen for substances such as nickel, fragrances, and preservatives in cases reported by dermatologists. This may indicate a secondary referral pattern, with more severe cases or cases with multiple causative agents being referred to dermatologists. In addition, as shown in Figure 3, individuals referred to a dermatologist more frequently carry a diagnosis of allergic contact dermatitis, and other studies note that they are more likely to be patch tested as part of the evaluation.<sup>5,7</sup> Guidelines for reporting to the scheme indicate that positive patch tests should only be reported if there is evidence that the sensitization occurred at work. Additional data collected by EPIDERM on the prevalence of nickel patch test results exclusive of workplace exposure indicate that over-reporting of occupational aetiologies for allergy to nickel and other patch test allergens appears unlikely.

The finding that there is little change in incident cases of contact dermatitis over the period of this reporting is noteworthy. Cases in nursing personnel show an increase, particularly in reports from dermatologists. These workers have long been recognized as being at increased risk for dermatitis,<sup>5,6,17</sup> the increasing incidence seen here may be the result of increased exposure to agents required to reduce infectious disease transmission in the healthcare setting. The most frequent agents causing dermatitis in nurses were rubber, wet work, and soaps, all agents used to prevent occupational and nosocomial infection. Although occupational urticaria in healthcare appears to be declining, probably through the use of non-latex or non-powdered latex gloves,<sup>9</sup> a trend towards an increase in contact dermatitis may

**Table 2.** Contact dermatitis attributable to specific agents for occupations at increased risk: reports from occupational physicians, May 1994–January 1999

<i>Occupation (SOC)</i>	<i>Total cases</i>	<i>Rate/100,000 workers</i>	<i>Agents causing contact dermatitis (% of total cases)</i>	
Other chemical operatives (820)	579	183.8	Solvents (13.1) Drugs (11.9) Acids and caustics (6.2)	Epoxies and resins (5.5) Glues and paints (5.4) Bleaches and sterilants (5.2)
Glass product and ceramic makers (590)	169	101.2	Acids and caustics (38.5) Wet work (32.5) Epoxies and resins (15.4)	Glues and paints (8.9) Cement (7.1)
Vehicle and metal assemblers (851)	351	94.8	Soaps (26.8) Epoxies and resins (15.1) Petroleum products (13.4)	Friction (11.7) Glues and paints (6.8)
Engineering labourers (912)	52	82.4	Friction (23.1) Glues and paints (23.1)	Petrol (23.1)
Machine tool operatives (840)	279	67.9	Petroleum products (26.2) Cutting oils and coolants (25.1)	Soaps (6.5) Epoxies and resins (5.0)
Metal plate workers and riveters (534)	54	62.9	Solvents (24.1)	Epoxies and resins (22.2)
Routine laboratory testers (864)	51	57.1	Rubber (64.7)	Solvents (7.8)
Chemists (200)	90	54.8	Rubber (15.6)	Drugs (13.3)
Domestic housekeepers (670)	51	54.6	Soaps (72.5) Wet work (49.0)	Friction (25.5) Rubber (23.5)
Other scientific technicians (309)	135	47.3	Rubber (19.3) Soaps (11.1) Cutting oils and coolants (10.4) Bleaches and sterilants (8.9)	Petroleum products (8.9) Drugs (8.9) Other biological substances (8.9)
Biological scientists and biochemists (201)	103	39.0	Rubber (28.2) Soaps (24.3)	Bleach (13.6) Wet work (12.6)
Lathe and capstan operators (510)	51	38.8	Cutting oils and coolants (92.2)	
Coach painters and other spray painters (596)	61	36.6	Epoxies and resins (32.8) Rubber (23.0) Soaps (21.3)	Solvents (9.8) Glues and paints (6.6) Chrome (6.6)
Other machine setters and operators (519)	68	34.4	Soaps (36.8) Bleach (36.8) Petrol (25.0)	Cutting oils and coolants (19.1) Solvents (17.6) Epoxies and resins (17.6)
Metal and electrical inspectors (860)	108	32.9	Rubber (66.7) Friction (11.1)	Glues and paints (11.1) Petrol (5.6)
Nurses (340)	693	27.9	Rubber (42.6) Soaps (17.9) Wet work (17.2)	Bleaches and sterilants (16.0) Aldehydes (5.6)
Metalworkers (516)	491	27.3	Petroleum products (25.1) Soaps (15.9) Epoxies and resins (15.3) Glues and paints (14.1)	Cutting oils and coolants (12.8) Solvents (9.2) Friction (5.1)
Plastics operatives (825)	85	22.9	Epoxies and resins (51.8) Rubber (14.1)	Solvents (5.9)
Laboratory technicians (300)	101	22.0	Rubber (29.7)	Other biological substances (5.0)
Welding trades (537)	103	21.3	Colophony (48.5) Solvents (35.9)	Petrol (14.6) Soaps (11.7)

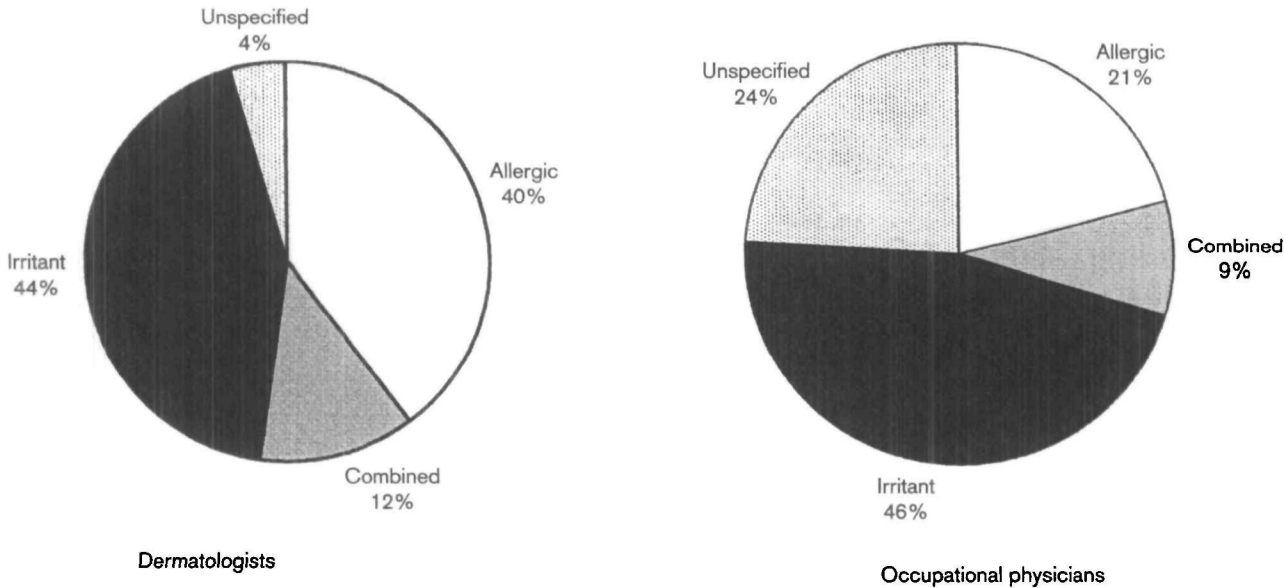
continued

Table 2. Continued

Occupation (SOC)	Total cases	Rate/100,000 workers	Agents causing contact dermatitis (% of total cases)	
Assistant nurses and auxiliaries (640)	116	15.0	Rubber (68.1) Soaps (16.4)	Wet work (12.9)
Packers and bottlers (862)	126	13.4	Drugs (21.4) Soaps (17.5) Rubber (11.1)	Glues and paints (11.1) Petroleum products (10.3) Aldehydes (9.5)
Catering assistants (953)	129	12.6	Soaps (70.5) Wet work (35.7)	Rubber (13.2) Foods and flour (10.9)
Electronic goods assemblers (850)	67	12.2	Epoxies and resins (43.3)	Nickel (35.8)
Gardeners (594)	64	11.8	Other biological substances (73.4)	
Medical practitioners (220)	80	11.3	Rubber (41.3) Wet work (15.0)	Aldehydes (15.0)
Painters and decorators (507)	79	11.1	Soaps (45.6) Bleach (45.6) Solvents (36.7) Glues and paints (24.1)	Petrol (19.0) Friction (15.2) Epoxies and resins (8.9)
Other food processors (809)	62	10.9	Soaps (40.6) Bleach (40.6)	Aldehydes (37.5) Petrol (37.5)
Cleaners and domestics (958)	388	10.8	Soaps (44.3) Rubber (30.9)	Wet work (9.5)
Electricians (521)	114	9.1	Petroleum products (24.6) Soaps (23.7)	Epoxies and resins (11.4)
OVERALL OCCUPATION	8098	6.5		

Thirty-one estimated cases did not include sufficient information on occupation. SOC, standard occupational code.

Figure 3. Occupational contact dermatitis: reports from dermatologists (May 1994–January 1999) and occupational physicians (May 1994–December 1995).



continue because of the necessity for measures such as handwashing and barrier protection.

One notable difference between EPIDERM and other epidemiological studies of occupational skin disorders is in the lower incidence of contact dermatitis in agriculture

and forestry relative to other industries (Figure 1). Data collected in Finland<sup>1</sup> and the United States<sup>3,18</sup> consistently point to agricultural workers as having the highest risk of occupational contact dermatitis. While reports by dermatologists show a higher-than-average incidence in



farming and forestry, these rates are surpassed by the manufacturing and service industries. Too few cases in agriculture were reported by occupational physicians to produce stable estimates of an incidence rate for these occupations; this stems from the lack of occupational health services for the majority of farmers and other agricultural workers. The differences between our results and the high incidence of dermatoses seen in agricultural workers in other surveys may have several explanations. Workers in farming, fishing, and forestry have one of the highest rates of self-reported occupational skin disease in the 1995 UK Household Survey.<sup>4</sup> Differences between self-reported ill-health and surveillance data may reflect patterns of self-referral or medical treatment; given the lack of alternative jobs, farmers may continue to work in spite of skin disease. They may also use general practitioners as their main source of care, in which case the condition would escape detection by EPIDERM. By contrast, reporting to the Finnish Register of Occupational Disease is mandatory for all physicians, and therefore these cases would be captured through a report by the initial treating physician in Finland. Alternatively, differences may exist in the types of contact allergens to which farmers and field workers are exposed. For example, plants elaborating *Rhus* antigens (genus *Toxicodendron*, including poison ivy and poison oak) are widespread in the US,<sup>3</sup> and a frequent cause of severe dermatitis for farmers and foresters, but unknown in the UK.

Proportional rates of dermatitis by agent are useful in determining the contribution of workplace factors to the overall extent of contact dermatitis. Similarities can be seen in the profiles of responsible agents amongst occupational groups within an industry. For example, rubber is the major responsible agent for contact dermatitis in many jobs in healthcare, followed by soaps, wet work, and bleaches and sterilants; this pattern is seen, with little variation, for nursing auxiliaries and doctors as well as those in related fields such as biological scientists. Combinations of agents causing contact dermatitis are apparent in some specific jobs, and suggest that the hazards combine to result in dermatitis. Wet work appears to be a contributor to high rates of dermatitis from foods; the dual causative agents of wet work and foods were listed in 25% of dermatitis cases resulting from foods, nearly all cases occurring in chefs, catering assistants and bakers. Several manufacturing occupations show high rates of dermatitis from a combination of petroleum products and soaps. For example, 8.4% of those with dermatitis from oils (primarily machinists and other industrial labourers) also had soaps noted as a causative agent. These combinations of responsible agents are an additional indication that dermatitis arising in many occupations may be increased or accentuated by the need to clean the skin at work.<sup>6</sup>

Through the use of national surveillance data on occupational skin disease, EPIDERM can provide information regarding the incidence within specific industries and occupations, and identify potential work processes and practices which might be susceptible to preventive measures. The national scope of the data,

together with the parallel structure by which both dermatologists and occupational physicians report incident cases, can provide a more comprehensive picture of the extent of skin hazards in industry and help in better targeting efforts to reduce skin disease at work. Manufacturing industries, healthcare and specific service occupations such as cooking and hairdressing, continue to demonstrate a high incidence of dermatitis, and intervention is most warranted within these areas.

## REFERENCES

1. Karjalainen A, Aalto L, Jolanki R, Keskinen H, Savela A. *Occupational Diseases in Finland in 1996. New Cases of Occupational Diseases Reported to the Finnish Register of Occupational Diseases*. Helsinki: Finnish Institute of Occupational Health, 1998.
2. Kaufman JD, Cohen MA, Sama SR, Shields JW, Kalat J. Occupational skin diseases in Washington State, 1989 through 1993: Using workers' compensation data to identify cutaneous hazards. *Am J Public Health* 1998; **88**: 1047-1051.
3. Burnett CA, Lushniak BD, McCarthy W, Kaufman J. Occupational dermatitis causing days away from work in U.S. private industry, 1993. *Am J Ind Med* 1998; **34**: 568-573.
4. Health and Safety Executive. *Self-reported Work Related Illness in 1995*. Norwich: HSE Books, 1998.
5. Fregert S. Occupational dermatitis in a 10-year material. *Contact Dermatitis* 1975; **1**: 96-107.
6. Wall LM, Gebauer KA. Occupational skin disease in Western Australia. *Contact Dermatitis* 1991; **24**: 101-109.
7. Smit H, Coenraads P-J, Emmett E. Dermatoses. In McDonald JC, ed. *Epidemiology of Work-Related Diseases*. London: BMJ Publishing Group, 1995; 143-164.
8. Tacke J, Schmidt A, Fartasch M, Diepgen TL. Occupational contact dermatitis in bakers, confectioners and cooks. A population-based study. *Contact Dermatitis* 1995; **33**: 112-117.
9. Cherry N, Meyer JD, Adisesh A, Brooke R, Owen-Smith V, Swales C, Beck MH. Surveillance of occupational skin disease: EPIDERM and OPRA. *Br J Dermatol*. In press.
10. Central Statistical Office. *Indexes to the Standard Industrial Classification of Economic Activities 1992*. London: HMSO, 1993.
11. Office of Population Censuses and Surveys. *Standard Occupational Classification*. London: HMSO, 1990.
12. Office for National Statistics. *Labour Force Survey, Winter 1996*. London: The Stationery Office Ltd, 1997.
13. Cherry N. Recent advances: occupational disease. *BMJ* 1999; **318**: 1397-1399.
14. Holness DL, Nethercott JR. Work outcome in workers with occupational skin disease. *Am J Ind Med* 1995; **27**: 807-815.
15. Meding B. Epidemiology of hand eczema in an industrial city. *Acta Derm Venereol (Stockholm)* 1990; **153**(Suppl): 1-43.
16. Sun CC, Cheng CS. Frequency and determinants of occupational contact dermatitis in 2793 consecutively-investigated patients. *Contact Dermatitis* 1998; **38**: 230-231.
17. Smit HA, Burdorf A, Coenraads PJ. Prevalence of hand dermatitis in different occupations. *Int J Epidemiol* 1993; **22**: 288-293.
18. Mathias CG, Morrison JH. Occupational skin diseases, United States. Results from the Bureau of Labor Statistics Annual Survey of Occupational Injuries and Illnesses, 1973 through 1984. *Arch Dermatol* 1988; **124**: 1519-1524.