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Incidence of occupational skin conditions in a food manufacturing company: results of a health surveillance programme

T. A. Smith

Background	The food industry has been associated with a high risk of work-related skin problems.
Aim	To examine the incidence of work-related skin conditions and the likely causative agents in a single large food company.
Methods	Analysis of a health surveillance programme, conducted over a 7 year period, in a food company with 21 000 employees working in diverse manufacturing processes.
Results	The mean incidence of skin conditions, taking all of the different food manufacturing operations together, was 1310 per million employees per annum. The mean incidence was greatest in the manufacturing sector whose operations involved chilled or frozen product (3180 per million employees per annum). Most of the cases reported (184/192 = 96%) were due to primary irritant dermatitis. The two commonest suspected causes of the dermatitis were contact with ingredients and hand washing. Taken together, these factors accounted for 58% of all cases. Although the wearing of gloves is often considered necessary to prevent dermatitis from exposure to ingredients and to lessen the need for hand washing, this factor itself was responsible for 9% of all cases.
Conclusion	Analysis of a company health surveillance scheme showed the average incidence of work-related skin problems to be lower than previously reported in the food industry.
Key words	Dermatitis; food industry; occupational skin conditions.
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Introduction

Work in the food industry is generally thought to carry a higher than average risk of contact dermatitis [1]. The excess risk stems from potential exposure to three hazards:

- Contact with irritant ingredient materials (e.g. vegetable oils, spices, garlic, preservatives)
- Frequent hand washing for hygiene reasons
- The use of impervious gloves

Correspondence to: Dr T. A. Smith, RHM Limited, King Edward House, 27/30 King Edward Court, Windsor, Berkshire SL4 1TJ, UK.
e-mail: tsmith@rhms.co.uk

As with other hazard exposure, it is possible to limit the risk by instituting specific control measures. However, where food manufacture is concerned, it is rarely possible to eliminate the risk entirely, since there will always be a need for employees to handle ingredients or product and to wash their hands.

Anecdotally, the view within large food manufacturing companies is that the incidence of work-related skin conditions is actually quite small. A previous questionnaire survey of skin conditions in a selective sample of the UK food industry, covering companies who employ occupational physicians, estimated the mean incidence of skin conditions in food manufacturing operations as 2103 per million employees per annum [2]. In contrast, the

study presented here reports the findings of an in-house health surveillance programme in a single food company and uses the data to quantify the level of risk of skin problems in different sectors within its different food manufacturing operations.

Method

The health surveillance group

The health surveillance programme was conducted in a large food company with 70 manufacturing sites in the UK and whose operations include:

- Flour milling
- Bread baking
- Cake baking
- Production of jams and other preserves (wet processes)
- Production of dry food mixes (e.g. gravy salts, stuffing, curry powders, savoury and sweet mixes, food coatings)
- Chilled and frozen meals production

For the purposes of analysis, the six different manufacturing sectors listed above have been used. Table 1 gives the mean number employed in each of the manufacturing sectors over the seven years of the surveillance. The figures include all personnel, whether involved directly in manufacture or in the support functions such as engineering, technical, distribution, sales and office administration. Certain of the manufacturing sectors have considerable seasonal variation in numbers, particularly cake baking. The seasonal change has been taken into account in determining the mean numbers employed.

Recording of cases

Reporting from the surveillance programme covers the period from the beginning of 1996 to the end of 2002. During that period, site occupational health nursing and medical advisers reported any cases of skin disease which may have been either caused or aggravated by work. Individual cases were identified either by self referral, referral by the employee's manager or from follow up of medical certificates. Cases were categorized according to the most likely causative agent, based on the history. Assignment of an allergic causative mechanism was based on additional external dermatological opinion, usually involving patch testing. The basic information on the cases was held electronically in spreadsheet format, to facilitate analysis.

Table 1. Mean incidence rates of occupational skin conditions over 7 years in each manufacturing sector

Sector	Average number employed	Number of cases reported	Incidence (per million employees per year)
Flour milling	700	10	2040
Bread baking	7500	89	1700
Cake baking	5000	27	770
Chilled/frozen products	2200	49	3180
Wet processes	600	8	1900
Other dry products	5000	9	260
Overall			1310

Table 2. Summary of likely causation for cases of dermatitis (irritant and allergic)

Likely cause	Number of cases	Percentage of dermatitis cases
Food ingredients	70	36
Handwashing/hand cleansers	43	22
Gloves	17	9
Detergents/solvents	28	15
Citrus fruit	5	3
Metabisulphite	5	3
Other/unknown	20	12

Results

Over the 7 year period, 192 cases of work-related skin conditions were reported. By far the most common condition was primary irritant dermatitis (184/192 = 96%). Allergic dermatitis was relatively rare (4/192 = 2%). There were also four single cases each of urticaria, bites from mites, exacerbation of a fungal infection and exacerbation of psoriasis. A summary of the likely causes of the 188 cases of dermatitis (irritant and allergic) is shown in Table 2.

The number of cases arising in each of the seven years is documented in Figure 1. The annual number of cases is quite small and varies considerably, ranging from 16 to 45. The absolute numbers equate to overall annual incidence rates of between 760 and 2140 per million employees per year.

The incidence rates for the different manufacturing sectors are shown in Table 1. The highest rate is in the chilled/frozen sector (3180 per million employees per annum). This sector has an incidence rate more than twice the average (1310 per million employees per annum).

Discussion

The mean incidence of skin conditions described in this study is lower (1310 per million employees per annum)

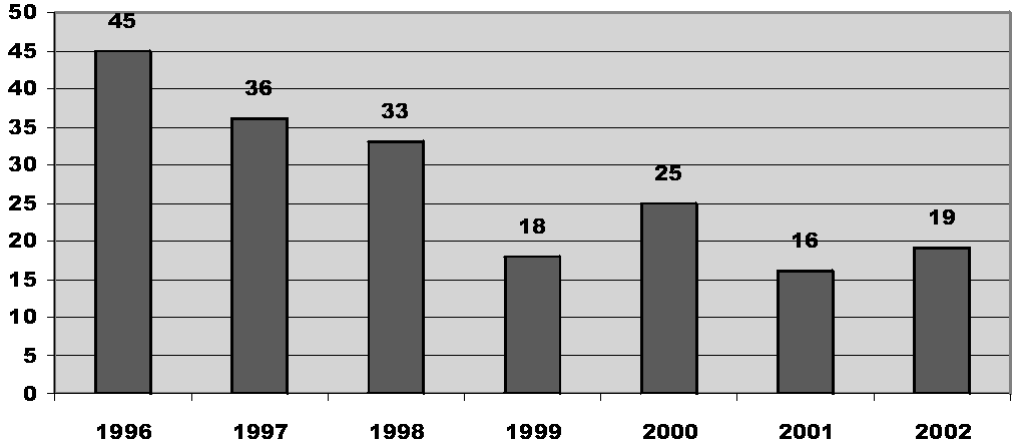

Figure 1. Annual number of work-related skin cases.

than that previously reported in the study conducted by occupational physicians of the Food Industry Medical Association [2] (i.e. 2103 per million employees per annum for manufacturing operations and 1414 per million employees per annum for retail/catering). It is perhaps easier to understand the magnitude of risk by expressing the incidence of 1310 per million employees per year as an annual risk for an individual employee of 0.13%.

With any study of this type, it is worth questioning the validity of the data. In terms of both the numerator and denominator figures used to calculate incidence rates, a surveillance scheme operating in a single company should be reasonably accurate. The denominator is simply the total number of employees and can easily be obtained from personnel records. The accuracy of the numerator is dependent upon the ability to capture all cases which arise. An in-house reporting system is largely dependent on employees presenting to occupational health staff for case identification. Within the food industry, the pick-up rate of skin conditions is likely to be greater than for other industries since intact skin on exposed surfaces is a prerequisite for working in a food-handling capacity. In view of the food safety implications, it is likely that most employees with significant skin problems will either self-refer or be referred by their manager to the site nurse for advice about their problem.

The ability of in-house schemes to identify numerator and denominator data, for calculating incidence rates, contrasts with problems in obtaining both of these parameters for national reporting surveillance schemes, such as EPIDERM [3]. National schemes have to depend on sampling and estimation techniques to establish numerator figures and global employment figures to approximate denominators. The EPIDERM estimate [3] is substantially lower (only 60/80 per million employees per annum) than the incidence presented here. Although the national incidence of skin conditions in food handlers may truly be lower than in the organization reported here, it seems more likely that the difference will be explained by an underestimation by EPIDERM, because of incomplete case capture or overestimation of the exposed population numbers, or some combination of these factors.

In this study, the fact that primary irritant dermatitis makes up the majority of cases is perhaps unsurprising, given the principal risk factors. Analysis of suspected causation identified exposure to ingredients as the most common factor. The majority of food ingredients are of relatively low irritant potential, e.g. vegetable oils, garlic, powdered bread improvers, although exposure to them can be both frequent and prolonged. Repeated hand washing is also one of the common causes of dermatitis. Hand washing is essential for food hygiene reasons and therefore cannot be avoided. The wearing of gloves might seem to be a simplistic solution to both ingredient exposure and frequent hand washing. Unfortunately, even the wearing of gloves itself is not without risk. Again, this risk is primarily due to irritancy because of a tendency for the hands to sweat inside the gloves rather than allergy. Most of the gloves worn in this organization are now vinyl and not latex, because of the risk of sensitization associated with latex. Apart from the skin irritancy issue, an additional problem with the wearing of gloves is that the outer surface can become contaminated with consequent risk of food safety problems. In view of all of these issues, the general rule within the food manufacturing industry is that, wherever practicable, clean hands are preferable to gloves.

An important measure to limit the risk of dermatitis is employee selection. The selection process within this company is similar to that generally adopted within the food industry in that individuals with certain skin conditions are excluded from food-handler roles [4]. Although this measure has the prime purpose of reducing risk of foodborne disease, it will also contribute to a

reduction in the incidence of skin problems by selecting out individuals with increased susceptibility.

References

1. Health & Safety Executive. *A Recipe for Safety*. London: HSE Books, 1999; 22–24.
2. Smith T. Occupational skin conditions in the food industry. *Occup Med (Lond)* 2000;**50:**597–598.
3. Occupational skin surveillance quarterly report: December 1998. Manchester: EPIDERM, University of Manchester Centre for Occupational Health, 1998.
4. Harker C. Pre-employment health assessments for food handlers: a survey of occupational physicians in the food industry. *Occup Med (Lond)* 2001;**51:**332–335.