



**NATIONAL INSTITUTE FOR  
OCCUPATIONAL HEALTH**

Division of the National Health Laboratory Service

**REPORT NO.: IM15/18-19**

**2017**

# **ANNUAL SURVEILLANCE REPORT**

# **OCCUPATIONAL SKIN ALLERGIES**

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## Glossary

<b>Allergens</b>	A substance capable of triggering a response that starts in the human immune system and results in sensitisation or an allergic reaction
<b>Atopic patients</b>	Patients that tested positive to three or more tests in the aeroallergens panel and/or have a family history of atopy and/or had childhood eczema
<b>ESS</b>	European Standard Series
<b>IgE</b>	Immunoglobulin E
<b>Industry</b>	The industry where the patients came from were grouped into categories according the Standard Industrial Classification of all economic activities (7th Edition)
<b>Job</b>	The activity that the patient does while on duty
<b>NIOH</b>	National Institute for Occupational Health
<b>Occupational allergy</b>	Occupational allergies such as asthma, rhinitis, conjunctivitis, urticaria and contact dermatitis is the result of exposure to allergens or chemicals while “on the job”
<b>Patch test</b>	A patch test is a method used to determine whether a specific substance causes allergic inflammation of a patient's skin.
<b>Panel</b>	A set of allergens used to test for skin allergies in specific exposure situations. The European standard series is a set of the most common allergens that are associated with allergic contact dermatitis. Other exposure-specific series include: hairdressing, cosmetic, metalworking oil series, shoe, rubber, epoxy resin, dental series
<b>Patient</b>	All workers or persons referred internal or external to the NIOH for allergy testing and diagnosis of an OSD
<b>Irritants</b>	Irritants are substances (e.g. soaps, wood dust, solvents, acids) that may cause injuries to the skin, the eyes or airways after a single exposure or with exposure over a period of time (cumulative insult injury)
<b>Occupational skin disease</b>	Occupational skin disease is a skin disease that is caused or made worse by a work-related exposure

## Executive Summary

In 2017, 82 patients from various industries, and private dermatologists visited the occupational skin diseases clinic at the NIOH. Among these, the skin diseases most often seen were: contact dermatitis, both allergic (18%) and irritant (33%), with 20% of patients having both allergic contact dermatitis (ACD) and irritant contact dermatitis (ICD). Contact urticaria occurred in nearly 2.5% of cases. Other diseases included fungal infections, nummular eczema, atopic dermatitis, etc.

Patch tests were used to test for possible allergies. Testing was conducted for a battery of common allergens as well as exposure-specific batteries. Data was obtained from patient records and entered into an Access database. Post cleaning and removal of duplicates, data was imported into STATA SE version 15 for analyses. Summary measures have been presented in the report.

Of the occupational cases, the majority of patients were in the 31-40 and 41-50 age group although the majority of the private patients were older than 51. Fifty nine percent of workers referred to the clinic were male while the private patients were predominately female (84%).

The majority of patients were from the manufacturing sector, particularly metal manufacturing. The highest proportion of tests requested was the European Standards Series (ESS) (29%), followed by Cosmetic Series (20%) and oils (11%). Approximately 51% of patients tested positive for ESS series. The top three ESS allergens were nickel sulphate (18 positive of all tested), MCI/MI & MI (9 positives) and potassium dichromate, cobalt chloride, paraphenylenediamine [PPD] and formaldehyde (4 positives each). Forty three percent (43%) of patients reported atopy. They were predominately female with a mean age of 40.8 years. Atopic patients worked mostly in Health (20%), followed by mining (18%) and manufacture of metal products (16%).

## Background

Occupational skin diseases (OSD) are among the most common type of occupational diseases which occur in the workplace. Worldwide it is recognised that these conditions are under-recognised, under-diagnosed, under-reported and under-compensated. Early diagnosis of OSD is crucial, as prolonged exposure is more likely to lead to intractable dermatitis which persists after removal from exposure. Therefore, a need for an OSD diagnostic service in South Africa was identified and an occupational skin disease clinic was initiated at the Immunology and Microbiology Section, NIOH.

As approximately 80-90% of OSD is contact dermatitis (CD), which can be either ICD or allergic (ACD) in nature, patch testing is done to differentiate between the two forms. This is important since ICD and ACD have different management requirements. Patch tests with commercially available allergen series, either the European standard series (general most common allergens that cause allergic contact dermatitis) or different exposure-specific series (e.g. cosmetic, dental, hairdressing, nail series etc.) enhance the detection of sensitisation to specific allergens. The Immunology and Microbiology Section hold an extensive allergen bank and a list of the allergens can be made available on request. From the clinic, permission is obtained from the patients to capture their information into a comprehensive database in order to look at trends in OSD in the 'referral area' that includes Johannesburg and the surrounding areas as well as Mpumalanga, Limpopo, Free State and North West. This is an important process since little is known about the extent and type of OSD which occur in South Africa and the industries in which these occur.

The OSD clinic database which was donated by the British Contact Dermatitis group was started in 2005 and there are 898 patient records captured in the data base. The database was created in Access and has many linked tables which record the patients' demographics, the occupation and industry in which they work; their atopic status; the part of the body which is affected and the type of skin disease. Tables for the various patch test series allow for comprehensive recording of the patch test results. The data can be exported into several statistical programs for analysis.

The data presented in this report summarises the data obtained in 2017, of patients presenting with suspected occupational skin allergies at the occupational skin clinic. This report can be accessed at:

[www.nioh.ac.za](http://www.nioh.ac.za)

## Methods

The data presented here were obtained from patients referred to the Occupational Skin Disease Clinic (OSD clinic). Patients were referred by occupational health practitioners, dermatologists, company health and safety representatives and wellness programs and from public hospital clinics. The 2017 prevalence data is presented in this report. Patients were referred to the NIOH from areas in and around Gauteng as well as North West, Mpumalanga, Limpopo and the Free State. This included patients who came for follow-up, for further testing or for requests from insurance, or for completion of documents for the Compensation Commission.

Although contact dermatitis can occasionally be classified as allergic or irritant by physical examination, this is not always the case, often an irritant dermatitis is identified by negative patch testing. Patch testing is important as identification of a causative allergen will necessitate avoidance of that substance without resulting in work loss.

The consultant dermatologist saw referrals from the companies and staff at the Immunology and Microbiology section, who are deemed competent to perform the patch test, conducted the tests. A patch test is conducted by placing the allergens and negative control (petrolatum) on a patch test unit having 10 chambers. These strips are placed on the patients back for 3 days. They are then required to return to the clinic for reading of the patches. The most common patch test series that was tested in 2017 at the OSD clinic was the European standard series. This is a good starting point as it includes the most common allergens, which cause contact dermatitis. However, several other series were also applied to more specifically test for allergens associated with different occupational exposures. The cosmetic series is important not only for testing for reactions to self-care products but also for testing beauticians that work with cosmetics all the time. The rubber series is critical for healthcare workers who commonly wear rubber gloves but also for factory workers or miners who wear rubber gloves as well as other rubber items at times e.g. rubber boots.

Data from clinic files were entered into an Access database, which was then imported into STATA SE version 15 for data analysis. Summary measures consisting of means, medians and interquartile ranges for all continuous or discrete study variables were documented. Frequencies (numbers and percentages) were produced for categorical data. Atopic patients were defined as those who had a history of childhood eczema and/or had a family history of atopy and/or tested positive to three or more tests in the aeroallergens panel.

## Results

In total, 82 patients attended the OSD clinic at the NIOH. They ranged in age from 13-70 years. Two-thirds (61%) were referred as occupational cases. The mean age of patients, attending the skin clinic was 42 years, while the majority of occupational referrals were between the ages of 30 and 50. Approximately 60% of the occupational patients were male, while 80% of the private patients were female (figure 1).

### 1. Sociodemographic characteristics

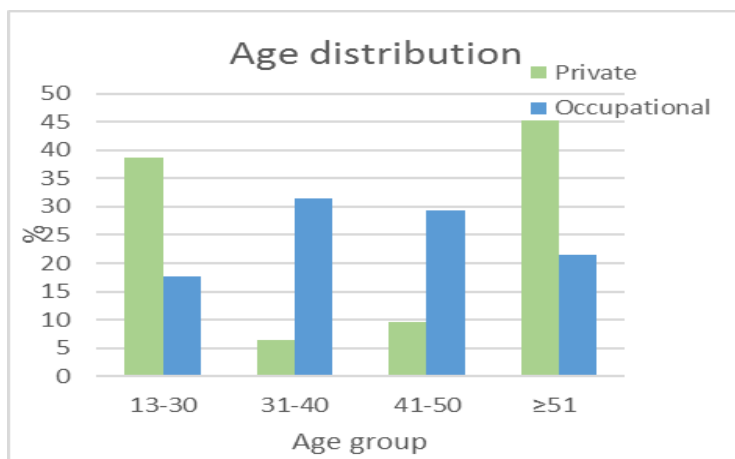


Figure 1. Age distribution of the clinic attendees

The majority of occupational patients seen at the clinic were Black (76%). The private patients were predominantly white (84%).

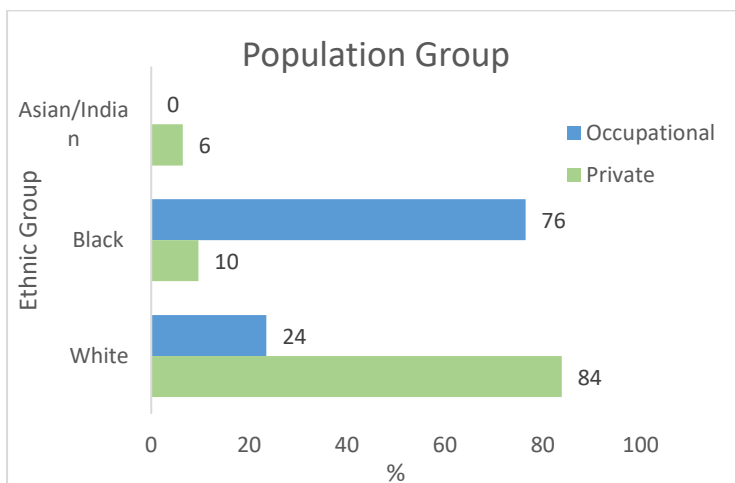


Figure 2. Sociodemographic characteristics of the clinic attendees

The main industries that referred patients were the manufacturing industry (37.3%) and the mining industry (21%), followed by health (21.6%), electricity, and water (9.6%) (Figure 3).

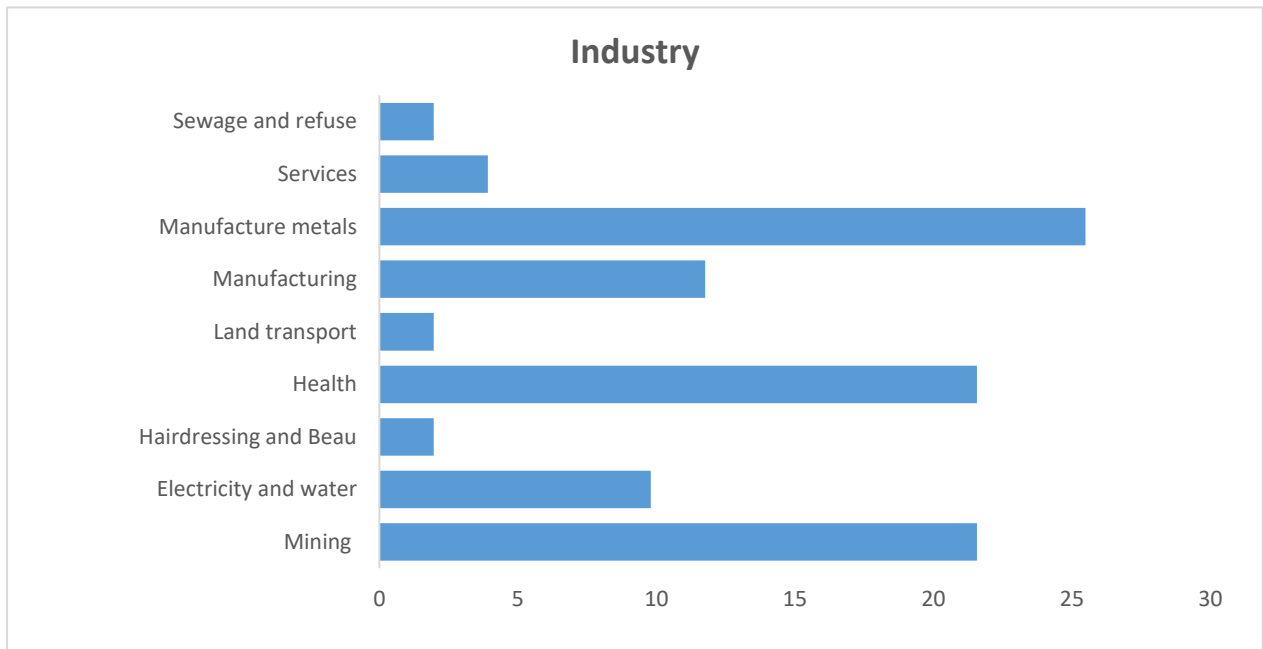


Figure 3. Industries for clinic referrals

## 2. Allergy screening diagnosis

The patients that attend the OSD clinic are seen by a dermatologist who diagnosis the type of OSD and if patients are diagnosed with contact dermatitis (the most common OSD) they are screened for allergic contact dermatitis by patch testing (irritant contact dermatitis is often diagnosed by absence of any reactions on patch testing) (Figure 4).

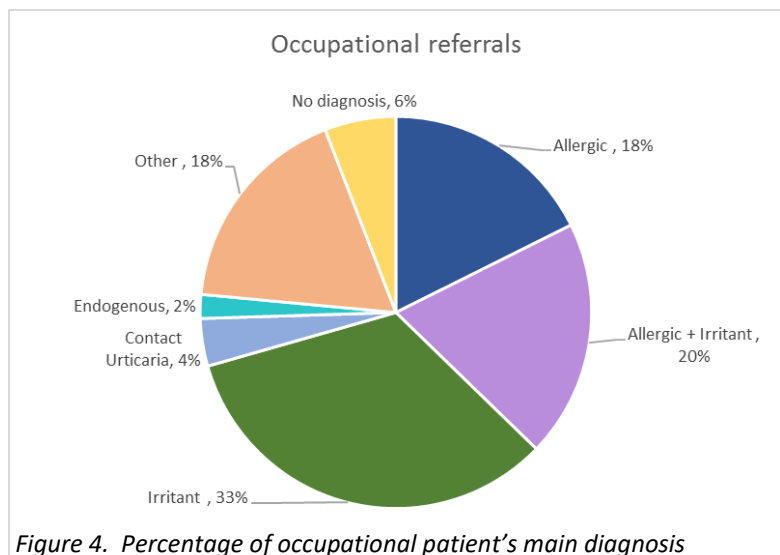


Figure 4. Percentage of occupational patient's main diagnosis



The series with the highest number of tests requested was the European Standard Series, Cosmetic series and thirdly the Rubber series (Figure 5).

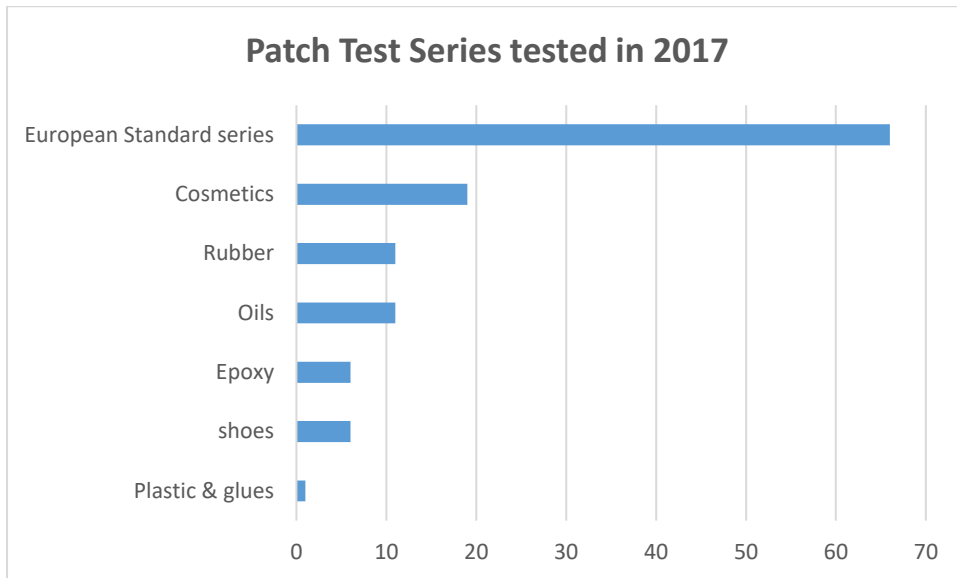


Figure 5. Number of allergy tests requested

### 3. Atopy

More of the private patients reported being atopic (64%) while the industry-referred patients were less likely to report (29%).

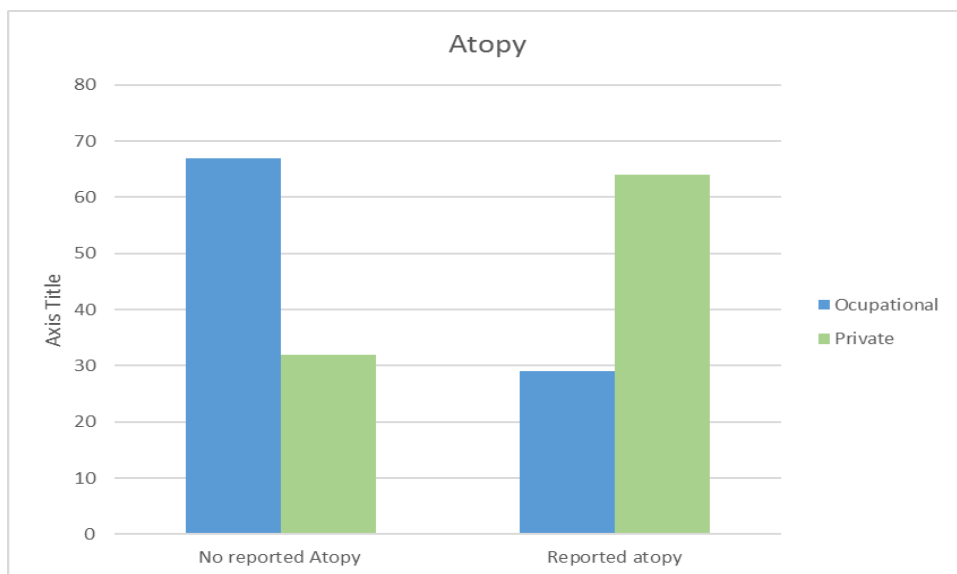
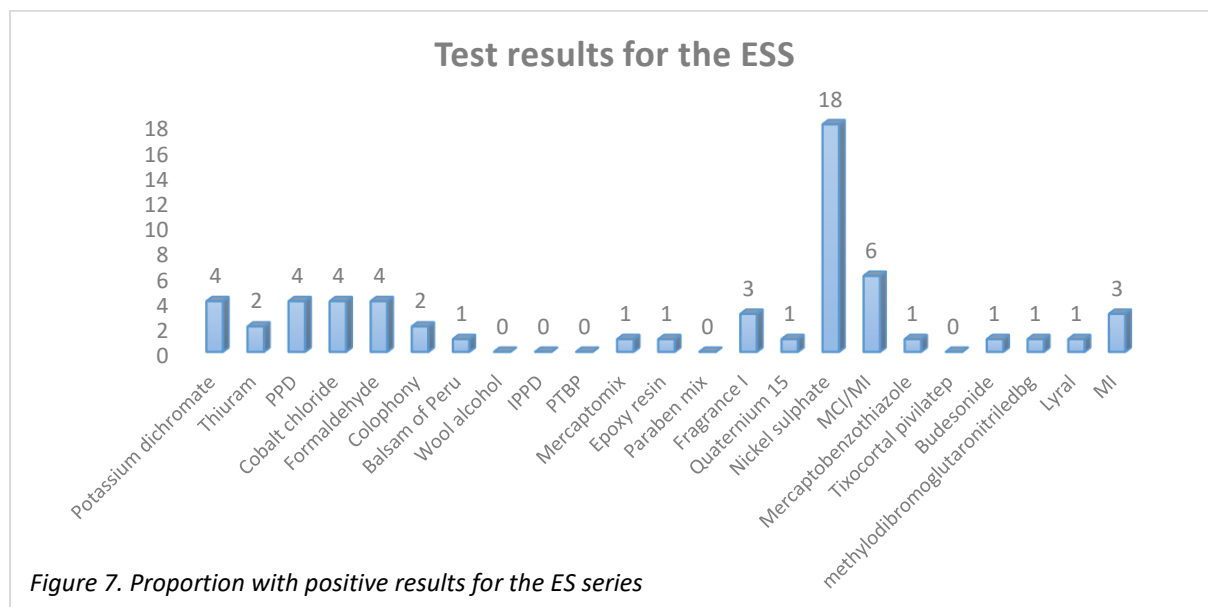


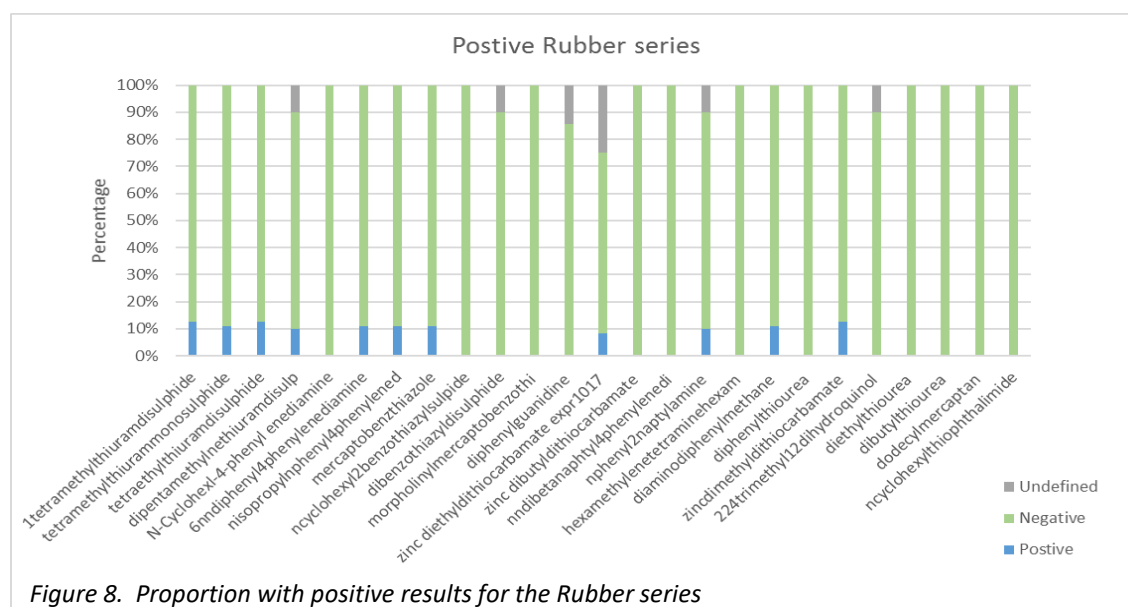
Figure 6. Proportion reporting atopy

#### 4. Skin patch test results

A total of 66 patients were tested with the ESS patch followed by 19 that were tested with the cosmetics series (although only one industry referred patient was tested with this series) 11 with the oils combo series (81% occupational) and 9 with rubber (80% occupational) (figure 7).



Fifty-one percent of those tested with the European standard series had positive reactions. Nickel (18) and MCI/MI & MI (9) were the most commonly positive. In the rubber series 33% were positive to at least one allergen. One person was allergic to five different rubber chemicals (figure 8). For the Oils series 33% tested positive. One person was allergic to two chemicals in the series and the others one each. This emphasises the importance of testing with series specific to different exposures (Figure 9).



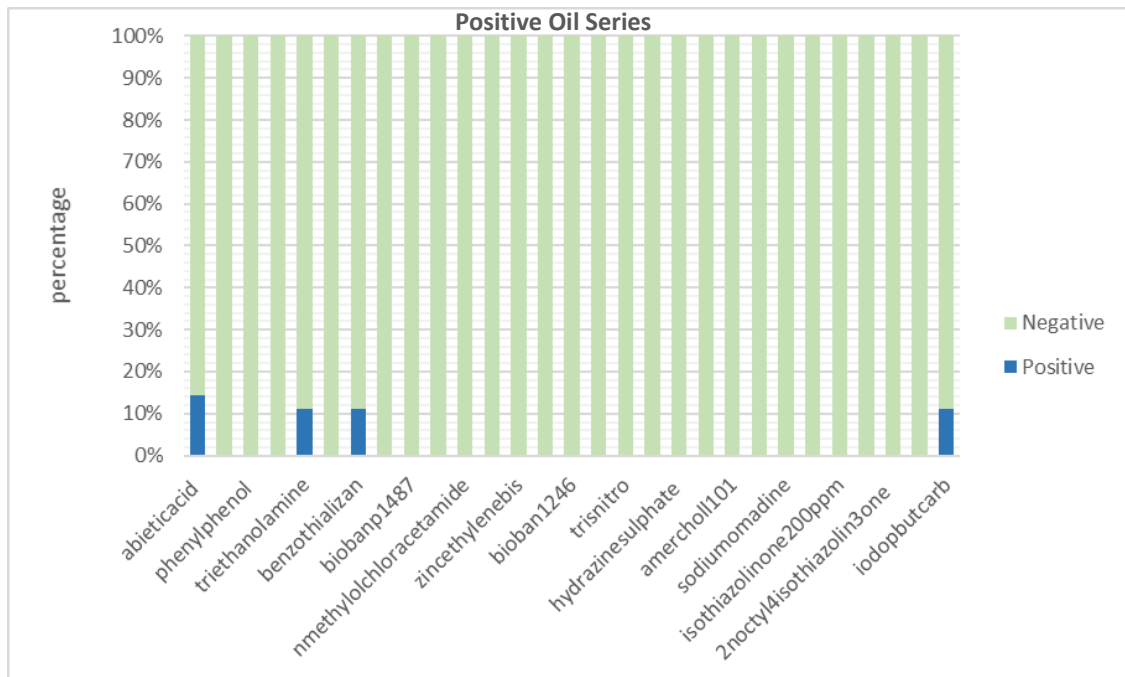


Figure 9. Proportion with positive results for the Oils series

## Conclusions

Occupational skin diseases form an important part of Occupational Health. Surveillance of these diseases is an essential component of an occupational health surveillance programme, which helps with control and planning. Awareness is needed amongst workers and management of the risk of developing OSD.

In 2017, the majority of patients were from the manufacturing particularly metal manufacturing and Health industry along with the mining industry, highlighting the need for more research and implementation of control measures in these industries. Strengthening the allergy surveillance programme in these industries and in South Africa, could provide a comprehensive picture; additional data is needed from other OSD centres throughout the country.

## Limitations

Majority of the patients are from Gauteng due to the location of the clinic in Johannesburg, Gauteng. Thus, these results cannot be generalised. Other centres assessing skin allergies (public and private) need to provide data to develop a comprehensive occupational skin surveillance system.

There is missing data/ information in the current data collection tool. The exact nature of the job within an industry is not known. The province of employment is unavailable. These and other relevant information will be added to the minimum data set for future surveillance.