



**NATIONAL INSTITUTE FOR
OCCUPATIONAL HEALTH**

Division of the National Health Laboratory Service

REPORT NO.: IM14/18-19

2017

ANNUAL SURVEILLANCE REPORT

OCCUPATIONAL RESPIRATORY ALLERGY

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Glossary and Abbreviations

Allergens	A substance capable of triggering a response that starts in the human immune system and results in sensitisation or an allergic reaction
Atopic patients	Patients that tested positive to three or more tests in the aeroallergens panel
IgE	Immunoglobulin E
Industry	The industry where the patients came from were grouped into categories according the Standard Industrial Classification of all economic activities (7th Edition)
Job	The activity that the patient does while on duty
NIOH	National Institute for Occupational Health
Occupational allergy	Occupational allergies such as asthma, rhinitis, conjunctivitis, urticaria and contact dermatitis is the result of exposure to allergens or chemicals while “on the job”
ORA	Occupational respiratory allergy
OAU	Occupational Allergy Unit
Patient	All workers or persons referred internal or external to the NIOH for respiratory allergy testing
SPT	A skin prick test, also called a scratch test, checks for immediate allergic reactions to allergens and is usually done on the forearm
Type of sample	Blood, serum or bulk sample (samples from the workplace that is suspected as the causative agent)

Executive summary

In 2017, 160 patients from various industries were tested for occupational respiratory allergies at the NIOH. There were two types of patients seen at the clinic. Fifty eight percent (58%) were seen for routine industry medical surveillance (worker group) and thus did not have symptoms. The remaining 42% were patients (referral group) with symptoms referred from the NIOH occupational medicine clinic or from private occupational health practitioners. Skin prick tests (SPT) were used to test for possible respiratory allergies. Testing was conducted for a battery of common aeroallergens as well as non-commercial allergens. Data was obtained from patient records and entered into excel. Post cleaning and removal of duplicates, data was imported into STATA SE version 15 for analyses. Summary measures have been presented in the report.

The majority of patients were in the 31-40 year age group. However there were a higher proportion of >51 year old patients in the referral group compared to the worker group. The sex distribution was similar among workers and referrals- 60% males and 40% female in the total sample. The majority of patients were from the mining and quarrying sector. All workers that attended the clinic were from this industry. Referral patients included 49% from mining and quarrying and 25% from the manufacturing sector. The highest proportion of tests requested was the platinum and nickel test (37%), followed by aeroallergens (25%) and platinum (21%). Approximately 63% of patients tested positive for aeroallergens, 22% for chrome, 4% for platinum and 2% for nickel. The top three aeroallergens were house dust mites (48% positive of all tested), Cockroaches (41%) and zea maize (31%). Forty one percent (41%) of patients were considered atopic. They were predominately male with a mean age of 42 years. Atopic patients worked mostly in mining and quarrying (38%), followed by manufacturing (26%) and industries related to generation of electricity (15%).

Although there are limitations to the data such as the lack of generalisability, it should be noted that even for the referral patients, the mining and quarrying industry followed by the manufacturing sector had the highest proportion of patients with symptoms and positive allergy tests. Further investigation is required to assess the working environment and provide appropriate preventive controls.

Background

Industrialisation in general has caused a significant increase in occupational allergies. Occupational allergies can lead to serious health problems and hence are compensable under the South African Compensation for Occupational Injuries and Disease Act, of 1993 (Act 130, 1993). In certain industries where allergens are prominent, pre-employment screening is essential in preventing allergies, resulting from workplace exposure. This pre-employment screening is particularly important for atopic individuals, who have a genetic predisposition to developing allergies. Numerous studies have described the strong association between atopic individuals and their likelihood to develop allergies as a result of exposure at work.

Occupational allergens are substances used or handled in the work environment that are capable of triggering an immune response, which subsequently results in sensitisation or an allergic reaction. These agents are diverse and in many instances are complex and as such, proving causation of disease can be challenging. In addition, only a few occupational allergens are commercially available; and biological allergens may differ by species and region and may not be relevant to South Africa or specific provinces.

The Occupational Allergy Unit (OAU) of the Immunology & Microbiology Section at the National Institute for Occupational Health (NIOH) conducts occupational respiratory allergy testing. The OAU has been maintaining a database of occupational allergies since 2005. The information in this database is paramount for our understanding of occupational allergy tests and surveillance of occupational allergies in South Africa. Through the database specific allergens and industries are identified which can inform preventative measures to reduce exposure in the workplace. Furthermore, the data in the database is an important resource for research purposes.

The data presented in this report summarises the occupational allergy test data obtained in 2017, of patients presenting with suspecting occupational respiratory allergies. The report does not include data on testing done for research. This report can be accessed at: www.nioh.ac.za

Methods

Skin prick tests (SPT) were used to test for respiratory allergies. The SPT involves applying allergen solutions onto the patient's skin, and introducing them into the skin by pricking the patient's skin. The SPT is desirable since results are available within 15 minutes. In patients with potentially life-threatening anaphylactic shock reactions, and those on medication which cannot be stopped, SPT is not recommended. For such cases, the ImmunoCAP specific IgE test is considered for identification of the specific IgE against the suspected allergen. IgE test results are not presented in this surveillance report.

The OAU specialises in testing non-commercial allergens. This function is valuable since some allergens are specific to certain occupational sectors, which are found in few countries or regions (e.g. certain metal allergies such as potassium dichromate). Laboratory preparation of allergens ensures that the cause of rare or less common allergies can be identified. The laboratory maintains an extensive occupational allergen bank and a list of allergens can be made available upon request.

Respiratory allergy test data were obtained from patients referred to the Occupational Respiratory Allergy Laboratory. Patients are referred by private health practitioners or from the Occupational Medicine Clinic of the NIOH. The OAU also screens healthy workers as part of the medical screening service provided to industry.

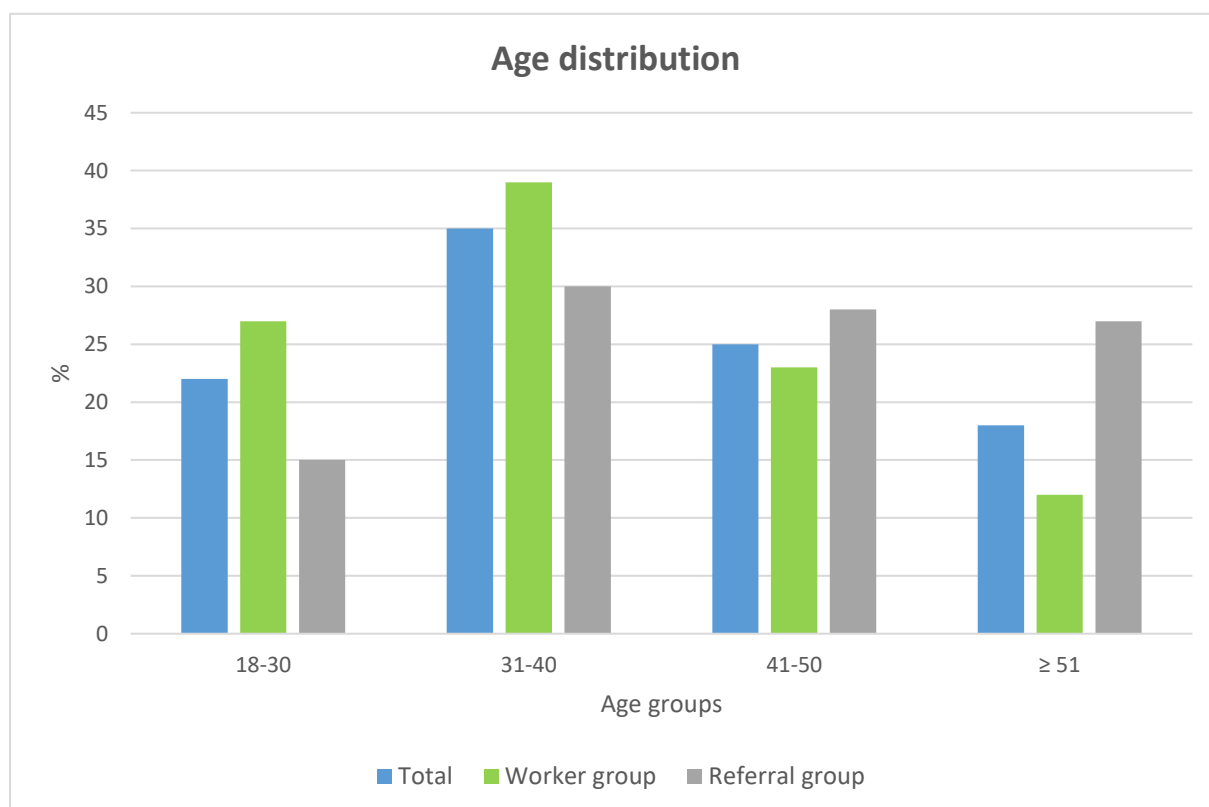
Data from patient files were entered into an excel spreadsheet, which was then imported into STATA SE version 15 for data analysis. Summary measures consisting of means, medians and interquartile ranges for all continuous or discrete study variables were documented. Frequencies (numbers and percentages) were produced for categorical data.

Results

In total, 160 patients attended the respiratory allergy clinic at the NIOH in 2017. There were 93 (58%) workers for medical screening and 67 (42%) patients that were referred to the clinic because of their symptoms.

1. Sociodemographic characteristics

The mean age of patients, attending the respiratory clinic were 40 years, ranging from 21 to 67 years. There was a larger proportion of patients in the 31-40 year age group presenting for ORA testing. Approximately 60% of patients were male. The patients were predominantly Black African (82%) followed by White patients (12%). The main industries that referred patients were the mining and quarrying industry (79%), followed by manufacturing (11%) and industries related to the generation of electricity (4%). All workers screened were from the mining and quarrying industry. Other category of industries consisted of the following: unemployed patients, private security, scientific research and development, cleaning sector, water treatment, air transportation service and sound recording (Figure 1).



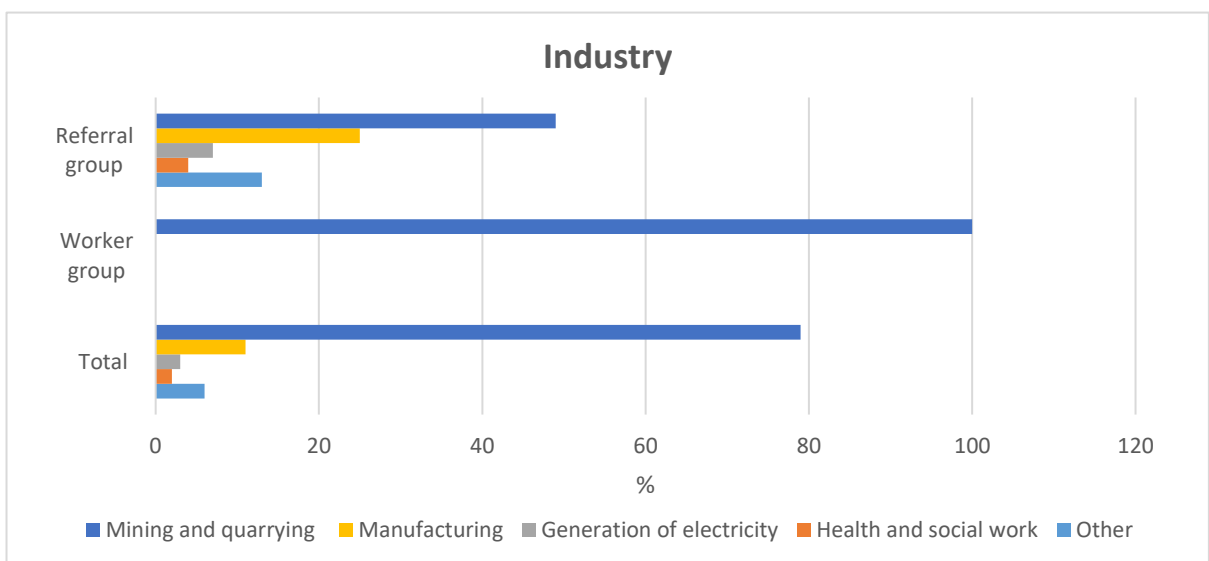
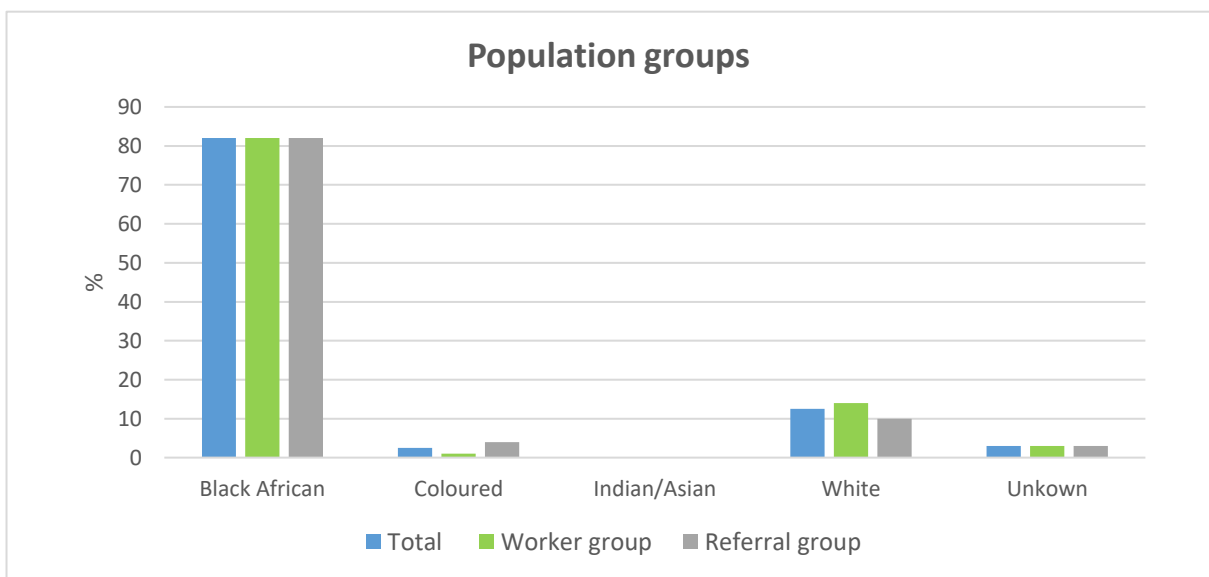


Figure 1: Sociodemographic characteristics of patients and workers seen at the ORA at NIOH

2. Respiratory allergy screening

The highest proportion of tests requested were platinum and nickel (37%), followed by aeroallergens (25%) and platinum (21%) (Figure 2).

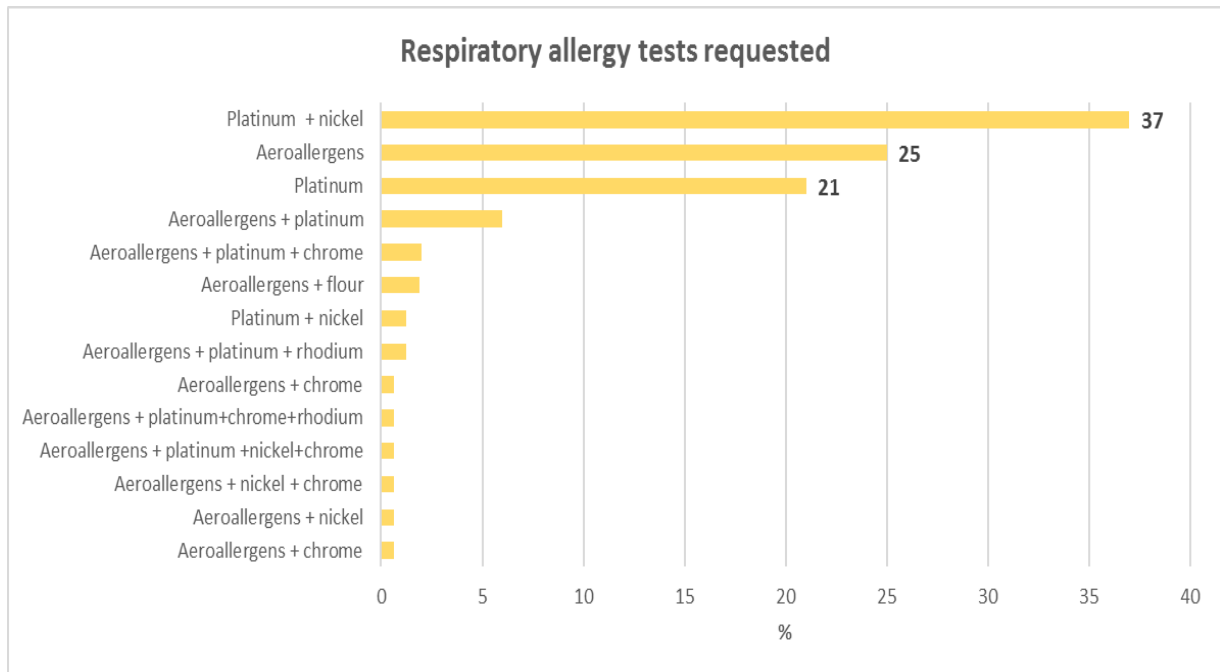


Figure 2: Percentage of respiratory allergy tests requested

Approximately 63% of patients tested positive for aeroallergens (40/64), 22% (2/9) tested positive for chrome, 4% (5/114) tested positive for platinum and 2% (1/65) for nickel. No patients tested positive for flour and rhodium. The top three aeroallergens were house dust mites (48% positive of all tested), cockroaches (41%) and zea maize (31%) (Figure 3 & 4).

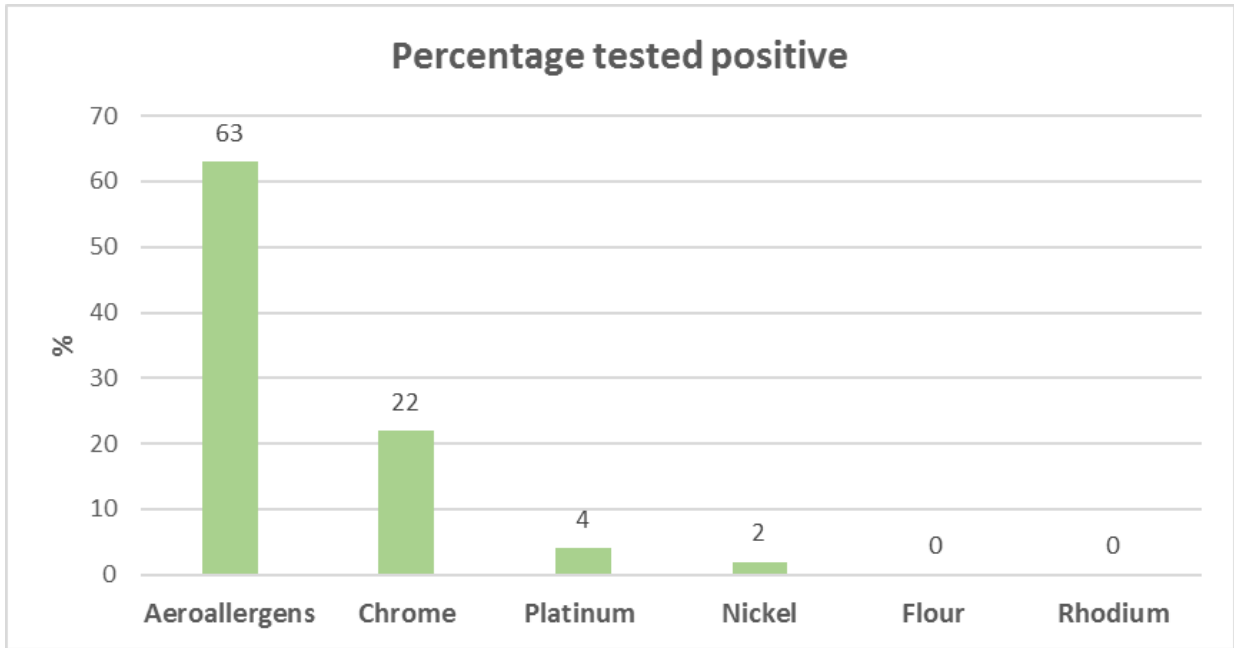


Figure 3: Percentage of positives for the various allergy tests

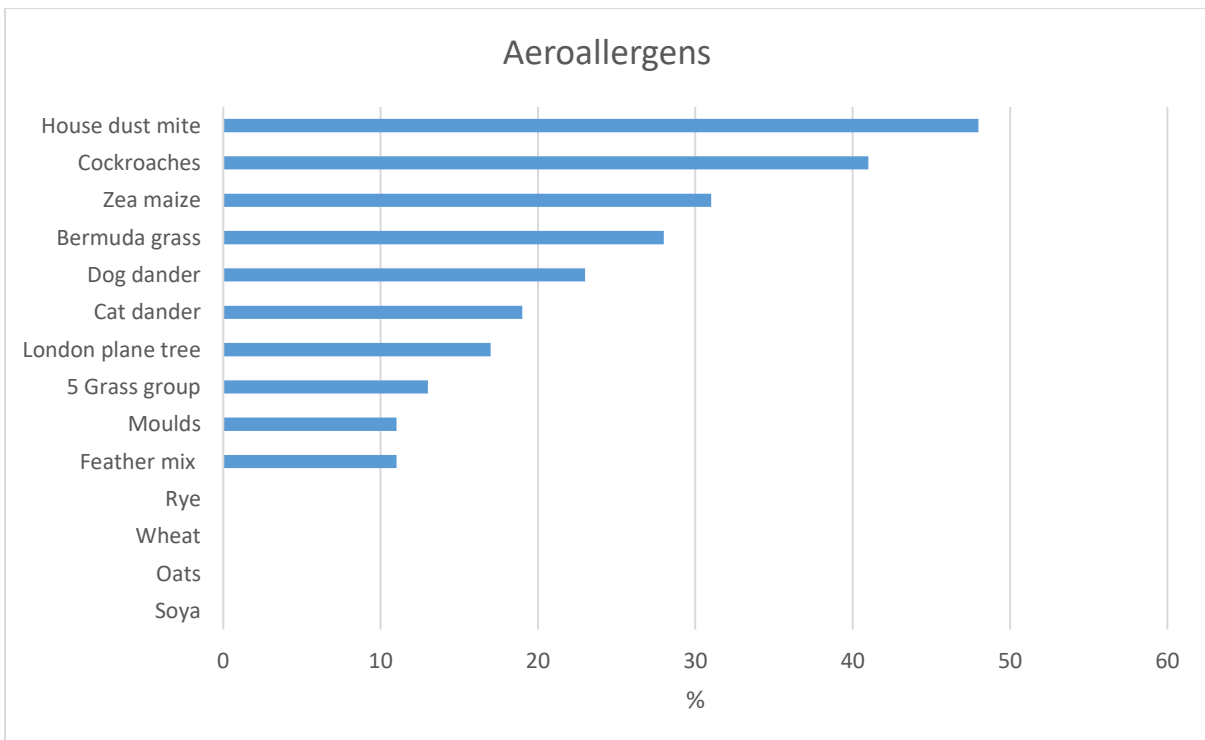


Figure 4: Percentage of positive aeroallergen tests

3. Atopy

Twenty-six (41%) patients were considered atopic (tested positive to three or more aeroallergens). Atopic patients were predominantly male (58%), with a mean age of 42 years. The population group was 81% Black African, followed by 11% White and 8% Coloured. Atopic patients worked mostly in mining and quarrying (38%), followed by manufacturing (26%) and industries related to generation of electricity (15%).

Limitations

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

There is missing data/ information in the current data collection tool, such as 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.

Conclusion

Occupational respiratory allergy surveillance is an essential component of an occupational health surveillance programme. In 2017, the majority of patients were from the mining and quarrying industry and the manufacturing industry, highlighting the need for more research and implementation of control measures in these industries. However, to strengthen the respiratory allergy surveillance programme and provide a comprehensive picture, additional data is needed from other allergy treatment centres throughout the country.