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11th June, 2025

OCCUPATIONAL ALLERGIES: RISK FACTORS, DIAGNOSIS, AND DEVELOPMENT OF PREVENTIVE MEASURES

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Annotation

This analysis reviews the causes, diagnostics, and prevention of occupational allergies. Occupational asthma accounts for 15-20% of adult asthma cases, and dermatitis makes up 90% of work-related skin issues. Improved diagnostic tests and workplace challenges aid accurate identification. Prevention through engineering controls, administrative actions, and protective equipment effectively reduces cases. Emerging molecular diagnostics and personalized risk assessments offer promising future strategies.

Keywords: occupational allergies, workplace allergens, occupational asthma, contact dermatitis, immunoglobulin E, risk assessment, prevention strategies, workplace exposure, allergic sensitization, occupational health

Today's occupational allergies are among the most common work-related health issues worldwide, affecting over 300 million workers according to the World Health Organization. Modern workplaces expose employees to various chemical, biological, and synthetic agents that can trigger allergic reactions. The complexity of industrial processes and growing awareness of occupational risks highlight the need to understand allergenic mechanisms, identify vulnerable groups, and develop effective prevention strategies. Beyond medical costs, occupational allergies cause significant economic losses through reduced productivity and increased compensation claims. For example, occupational asthma leads to over \$1.6 billion in annual healthcare costs, while contact dermatitis causes millions of lost workdays each year. These facts emphasize the urgent need for comprehensive risk management and prevention programs in industries.

Occupational allergies are immune-mediated responses caused by exposure to specific allergens at work. These conditions arise from interactions between environmental factors, genetics, and immune dysfunction. Type I hypersensitivity



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(IgE-mediated) predominates in occupational asthma and urticaria, while Type IV delayed hypersensitivity is typical in contact dermatitis.

High-risk groups include healthcare workers (latex, disinfectants), agricultural workers (plant allergens, pesticides), manufacturing staff (chemicals, metals), and food industry employees (flour, additives). Latex allergy affects up to 17% of surgical staff, and occupational asthma is notably high among bakers.

Diagnosis relies on detailed exposure history, skin prick and patch testing, specific IgE measurement, bronchial provocation tests, and workplace exposure monitoring. Molecular diagnostics and biomarkers like exhaled nitric oxide improve personalized risk assessment and disease monitoring.

Prevention requires multidisciplinary efforts focusing on exposure elimination through engineering controls (ventilation, closed systems), health surveillance, pre-employment screening, and appropriate personal protective equipment tailored to allergen type and exposure. Administrative measures such as work rotation, allergen-free zones, and emergency protocols further reduce risks. Workplace modifications and controlled access enhance protection for sensitized workers.

In conclusion, occupational allergies pose a significant healthcare challenge requiring integrated diagnostics, risk assessment, and prevention strategies. Rising prevalence calls for increased awareness among healthcare providers, employers, and regulators. Effective prevention involves engineering controls, administrative policies, and personal protective equipment. Future research should develop predictive susceptibility models, explore new treatments, and standardize protocols for emerging allergens. Digital health technologies like wearables and AI-based tools offer promising advances for improving occupational allergy management and prevention.

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