

Impact of Autoimmune and Atopic Disease Clustering on Medical Readiness: A Population-Scale Analysis of 1.9 Million Adolescents

Amit Rimon^{1,2}, Yair Maayan^{1,2}, Noam Hadar¹, Omer Itzkovitch¹, Avishai M. Tsur^{2,3,4,5}, Jacob Megreli^{1,2}, Doron Yaya-Stupp^{1,2}, Aya Bardugo^{1,6,7}, Meir Schechter^{1,6,7}, Zivan Aviad Beer^{2,3}

¹ Medical Data Research Institute, IDF Medical Corps, Ramat Gan, Israel; ² Department of Military Medicine & “Tzameret”, Faculty of Medicine, Hebrew University of Jerusalem, Israel; ³ IDF Medical Corps, Ramat Gan, Israel; ⁴ Department of Medicine, Sheba Medical Center, Tel-Hashomer, Israel; ⁵ Gray Faculty of Medical & Health Sciences, Tel Aviv University, Israel; ⁶ Dina Recanati School of Medicine, Reichman University, Herzliya, Israel; ⁷ Gertner Institute for Epidemiology & Health Policy Research, Sheba Medical Center, Ramat Gan, Israel



1.9M
Adolescents screened (2000–2024)

17
Autoimmune & atopic conditions analyzed

25 yrs
Clustering stable across two decades

Figure 1. Pairwise co-occurrence odds ratios (95% CI) among 17 autoimmune and atopic conditions across 2000–2024

Introduction

- Atopic disorders affect up to one-third of the adult population, while autoimmune disorders affect approximately 4-10% and are increasing in prevalence.
- The trends and prevalence of these conditions among adolescents are less clear and have not been adequately investigated.
- Data regarding the co-occurrence of atopic and autoimmune disorders remain conflicting, particularly among adolescents.

Materials & Methods

- This retrospective, cross-sectional analysis included 1,868,453 adolescents aged 16-21 years between 2000 and .2024
- We examined the prevalence, temporal trends and co-occurrence of 12 autoimmune and 5 atopic disorders.
- Pairwise odds ratios with 95% confidence intervals were calculated to identified high-risk co-occurrence clusters.
- Analyses were stratified by time period (2000–2014 vs. 2015–2024) and sex to assess stability of observed associations.

Conclusions

- The prevalence of atopic disorders weas 10.9% while the prevalence of autoimmune disorders was 2.5%
- Autoimmune disorders showed a slow but consistent increase in prevalence over time, whereas atopic disorders did not demonstrate a significant temporal trend.
- Several positive and negative co-occurrence patterns were observed between atopic and autoimmune disorders.
- Celiac disease, psoriasis, food allergy and atopic dermatitis showed a significant increase in prevalence, while asthma prevalence decreased.

Key Findings

Atopic comorbidity cluster **OR 1.65–9.97**

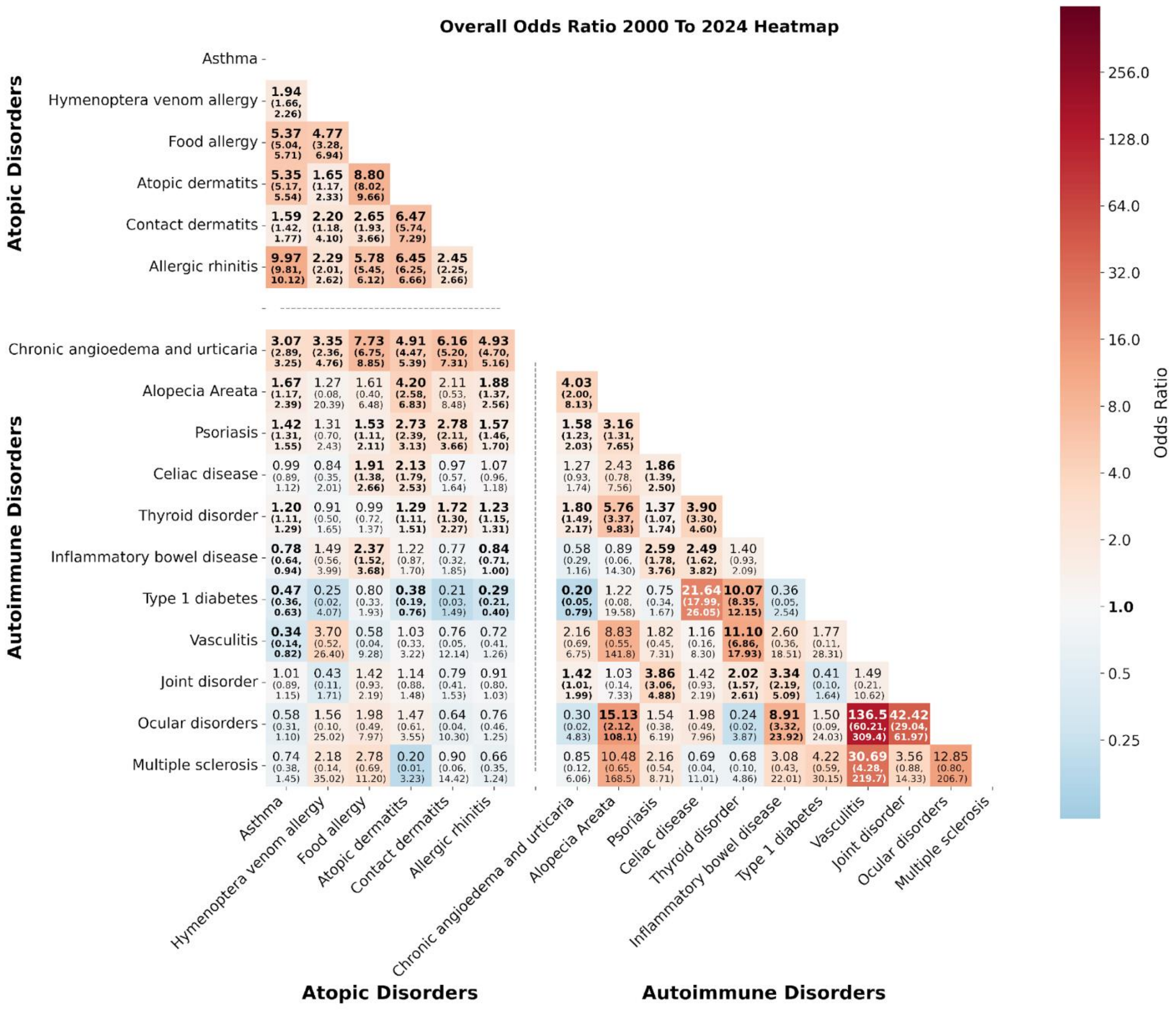
All atopic conditions co-occur strongly. Allergic rhinitis ↔ asthma is the most strong association (OR 9.97).

Autoimmune–atopic crosstalk

Chronic angioedema, alopecia areata, psoriasis, and thyroid disorder are positively associated with multiple atopic conditions.

Inverse association **OR 0.29–0.47**

Type 1 diabetes is inversely associated with asthma atopic dermatitis and allergic rhinitis



Warmer cells = positive co-occurrence (OR > 1). Cooler cells = inverse association (OR < 1). Bold values indicate statistical significance, 95% CI excludes 1.



Disclaimer: The views expressed are those of the authors and do not necessarily reflect the policy or position of the Israel Defense Forces, the U.S. Army, the Department of Defense, or the Israeli or U.S. Governments. The authors have no conflict of interest. IRB-approved by the Medical Corps (approval 2504-2025).



At the moment of truth,
IDF MEDICAL CORPS.