

# Differential associations of psoriasis subtypes with autoimmune disorders in United States children and adults: A cross-sectional study

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## Relevant Financial Disclosure(s)

- I have nothing to disclose

# Psoriasis is an autoimmune inflammatory skin disease with heterogeneous multiple subtypes



Psoriasis  
Vulgaris (PV)



Guttate  
Psoriasis (GP)



Generalized  
Pustular  
Psoriasis (GPP)



Palmoplantar  
Pustular  
Psoriasis (PPP)



## Little is known about the association of different psoriasis subtypes with autoimmune disease

- Previous studies have shown greater frequency of autoimmune diseases among patients with psoriasis
- Patients with psoriasis may experience higher risk of other types of autoimmune disorders such as inflammatory bowel disease in smaller sample cohorts or case reports.
- However, stronger evidence is needed and little studies have examined the association in the emergency room setting.

# Our lab has been a pioneer in utilizing "big data" in epidemiology research for rare skin disorders



Volume 176, Issue 1  
1 January 2017

## JOURNAL ARTICLE

### Hospitalization, inpatient burden and comorbidities associated with bullous pemphigoid in the U.S.A.

Z. Ren, D.Y. Hsu, J. Brieva, N.B. Silverberg, S.M. Langan, J.I. Silverberg ✉

*British Journal of Dermatology*, Volume 176, Issue 1, 1 January 2017, Pages 87–99,

<https://doi.org/10.1111/bjd.14821>

**Published:** 01 January 2017



Journal of the American Academy of Dermatology

Volume 84, Issue 5, May 2021, Pages 1496-1503



Consultative dermatology

### Burden, risk factors, and infectious complications of cellulitis and erysipelas in US adults and children in the emergency department setting

Ziyou Ren PHD,<sup>a</sup> Jonathan I. Silverberg MD, PHD, MPH<sup>b</sup> ✉

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JOURNAL OF  
THE EUROPEAN  
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DERMATOLOGY &  
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### Association of serious infections with pemphigus and pemphigoid: analysis of the Nationwide Inpatient Sample

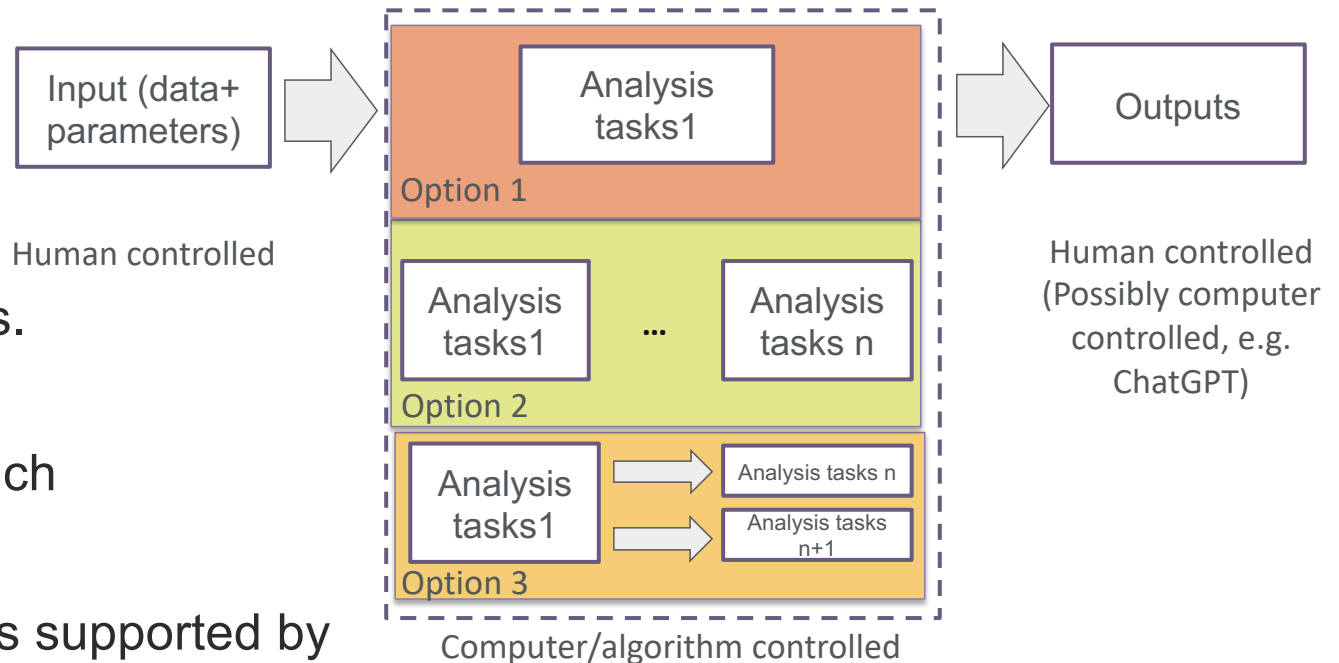
Z. Ren, S. Narla, D.Y. Hsu, J.I. Silverberg ✉

First published: 25 March 2018 | <https://doi.org/10.1111/jdv.14961> | Citations: 22

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# We developed a highly efficient pipeline with machine learning models using a super-computer to handle the data analysis

- Parallel computing and analyzing data in large volume.
- Avoiding human error in intermediate analysis steps.
- High reproducibility using version control software such as Nextflow.
- Super computing resources supported by Northwestern University Quest High-Performance Computing Cluster



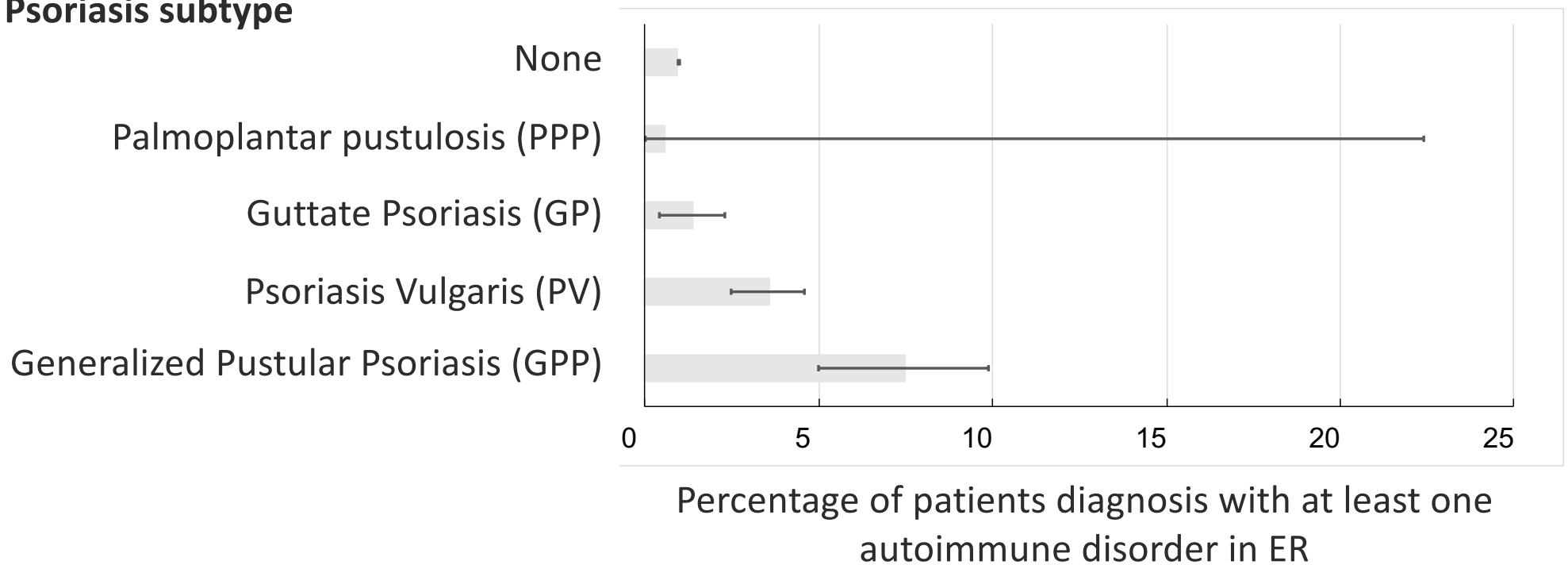


## Study design

- Data were analyzed from the 2015-2019 Nationwide Emergency Department (ED) Sample, including a ~20% sample of all U.S. emergency department visits (n=142,715,425).
- ICD-10 codes were used to identify four subtypes of psoriasis (PV, GP, GPP, PPP) and nine autoimmune diseases.
- Complete data analysis was performed (i.e. patients with missing data were excluded).
- Statistical significance was determined based on a 2-sided  $P \leq 0.05$ .

# Patients with psoriasis were more likely to be diagnosed with at least one autoimmune disorder

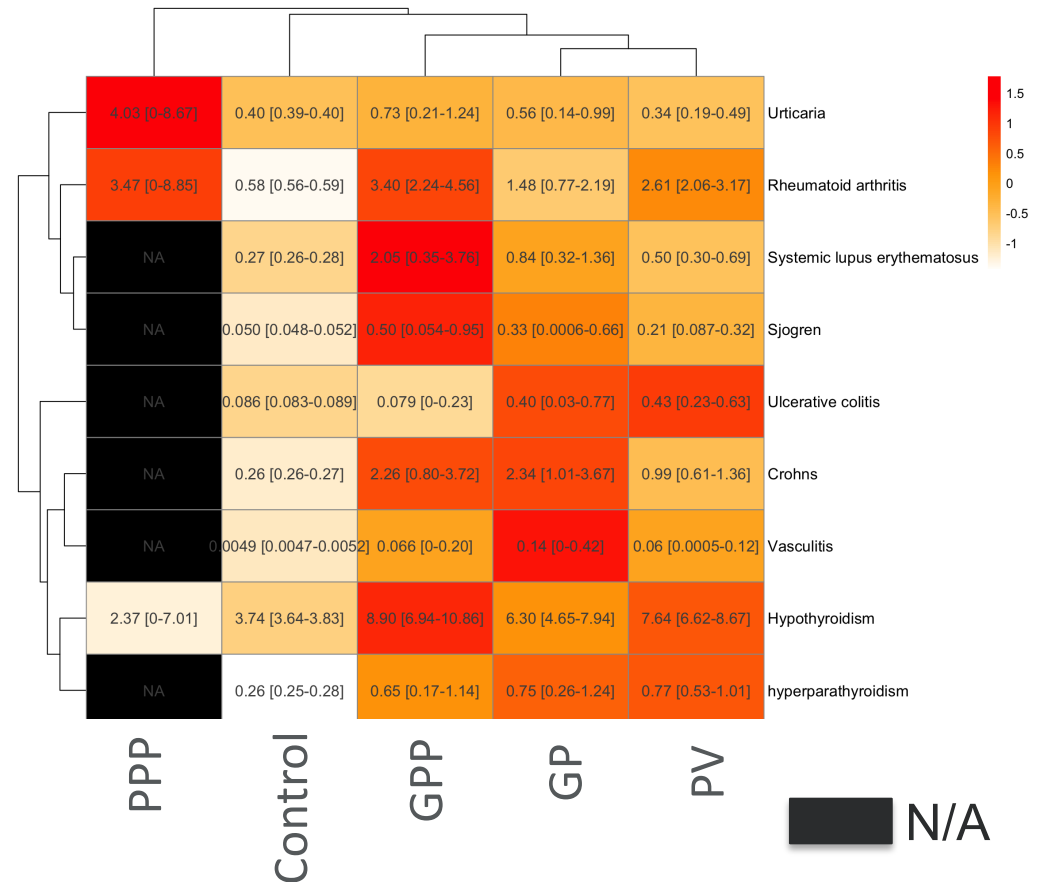
## Psoriasis subtype





# The prevalence of autoimmune disorders varied across psoriasis subtypes

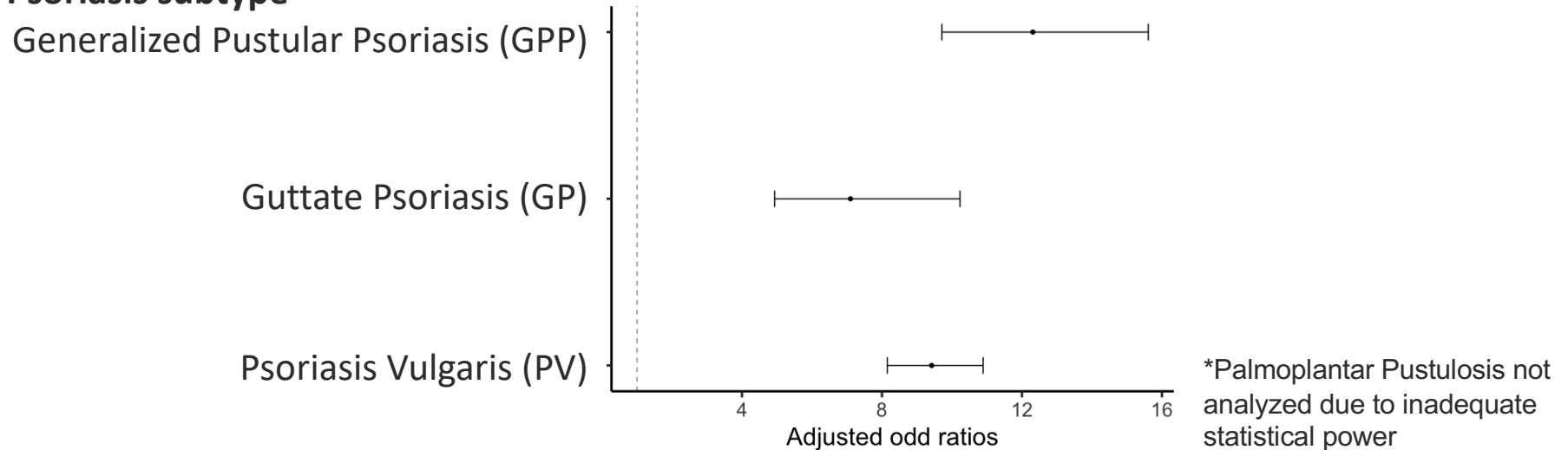
- Heatmap shows the differential association of autoimmune diseases in with psoriasis subtypes.
- Prevalence (95% CI) of each autoimmune disease is presented.



## Patients with psoriasis were associated with a higher risk ratios with different types of autoimmune disorders.

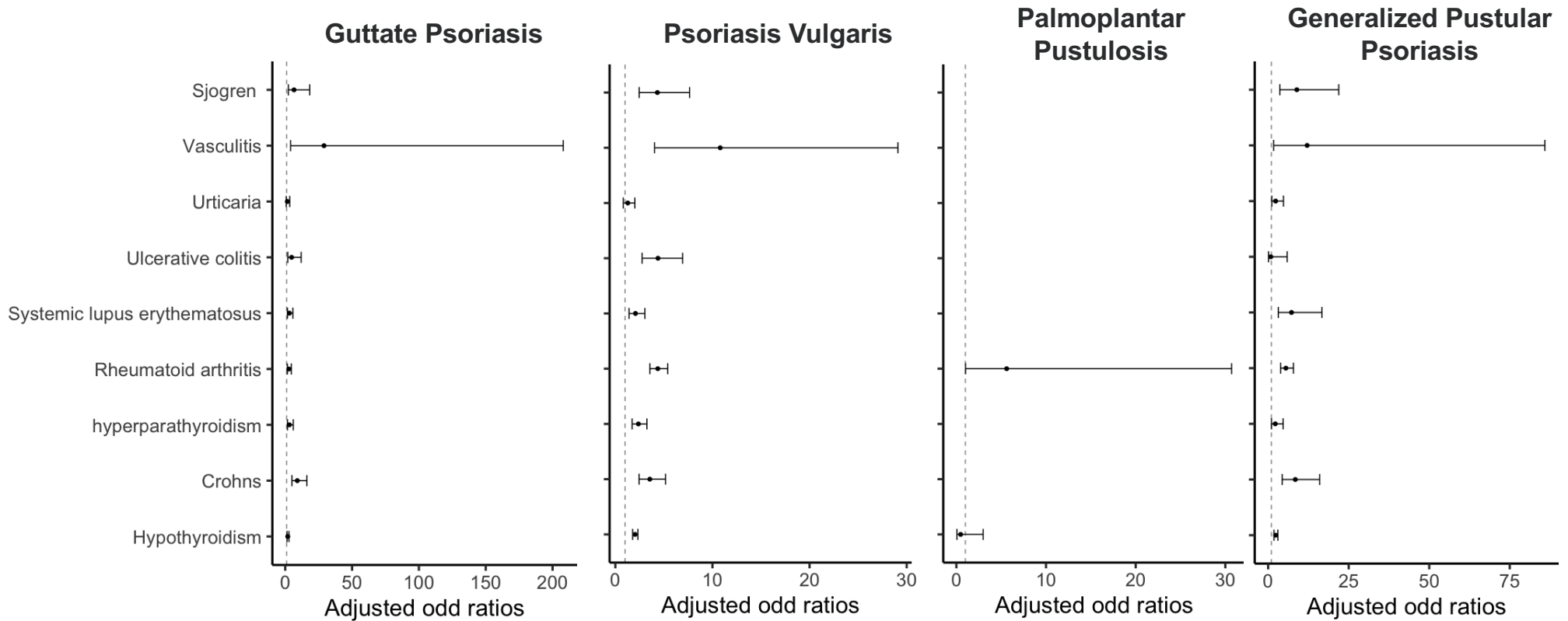
- Adjusted ratio odds were estimated using multivariable logistic regression model adjusting for age, sex and insurance status
- GP, GPP and PV were associated with  $\geq 1$  autoimmune disorder with more than 4 times higher risks compared with ER patients without any psoriasis

### Psoriasis subtype



# Systemic autoimmune disorders have differential higher odds across psoriasis subtypes

- Crohn's diseases, Sjogren's syndrome, vasculitis, and systemic lupus erythematosus had particularly increased odds among GP, PV and GPP.





## Summary

- GPP, PV, GP and PPP were all associated with higher odds of multiple autoimmune diseases, though the profile of autoimmune disorders differed across psoriasis subtypes.
- These results confirm the systemic autoimmune nature of each of these psoriasis subtypes.



## Summary

- Patients with these psoriasis subtypes may benefit from increased screening for autoimmune comorbidities.
- Further research is needed to understand the specific profile of autoimmune disease within each psoriasis subtype.

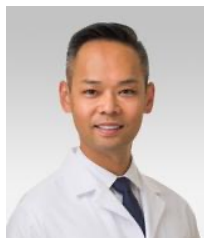
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