

# Unmet Needs and Spatiotemporal Variation in Vitiligo: A Retrospective Longitudinal Web Search Analysis

Stefanie Ziehfreund<sup>1</sup>, Michael Hindelang<sup>1</sup>, Christine Gasteiger<sup>1</sup>, Alexander Zink<sup>1,2</sup>

<sup>1</sup>Technical University of Munich, TUM School of Medicine and Health, Department of Dermatology and Allergy, Munich, Germany, <sup>2</sup>Division of Dermatology and Venereology, Department of Medicine Solna, Karolinska Institutet, Stockholm, Sweden

## INTRODUCTION

- Vitiligo is a condition characterized by the loss of skin pigmentation in patches, affecting approximately 1% of the global population.
- The need for vitiligo within the population remains unknown.

## OBJECTIVE

This study aims to investigate unmet needs and spatiotemporal patterns of public interest in vitiligo in Germany.

## METHODS

### Data

- Google Ads Keyword Planner was used to generate web search data for terms related to “vitiligo”.
- Database: monthly search volume (SV, monthly number of search queries)
- Google Ads Keyword Planner settings:
  - Language: the six most frequently spoken languages in Germany (Arabic, English, German, Turkish, Polish, and Russian),
  - Region: Germany’s 16 federal states
  - Period: 10/2019 to 05/2023

### Qualitative analysis

Keywords were classified into the following seven categories and subcategories using a deductive and inductive approach:

- “experts” (e.g., dermatologist vitiligo),
- “general” (e.g., vitiligo disease),
- “localization” (e.g., vitiligo face),
  - “head”
  - “upper extremity”
  - “genital area”
  - “lower extremity”
- “other” (e.g., Michael Jackson),
- “psychological aspects” (e.g., vitiligo due to stress),
- “treatment” (e.g., vitiligo treatment),
- and “symptoms” (e.g., vitiligo spots).

### Spatiotemporal analysis

- Monthly SV per 100,000 inhabitants was calculated for spatiotemporal comparison.
- Differences between regions were tested with the Kruskal-Wallis test (level of significance  $\alpha = .05$ ).

## CONCLUSION

- The analysis highlights a significant demand for comprehensive treatment information and therapeutic provisions for vitiligo.
- Cultural backgrounds should be considered for other unmet needs.
- Temporal variations show heightened interest during summer also in the area of visible localizations but a more consistent interest for information in the genital area.
- It is essential to increase patient awareness that vitiligo is not merely a condition that worsens in summer and that continuous, year-round treatment is essential for achieving therapeutic success.
- Spatial variations were identified between the federal states.
- Real-time internet data should be analyzed in greater detail to address needs related to vitiligo, especially with emerging therapeutic options.

## FUNDING

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## RESULTS

### Search volume

- Overall: 7,764,080
- Languages: German 3,162,260, English 2,428,440, Turkish 1,667,580, Arabian 367,460, Russian 126,810, and Polish 11,530

### Qualitative categorization

- “General” was the largest category, comprising 66.4-95.7% of the SVs, except for Arabic, where “treatment” was the largest (Figure 1).
- In other languages, “treatment” was the second-largest category, accounting for 3.2-14.3% of the SVs.
- The other categories varied between languages; e.g., psychological aspects were significant in Polish but negligible in others.

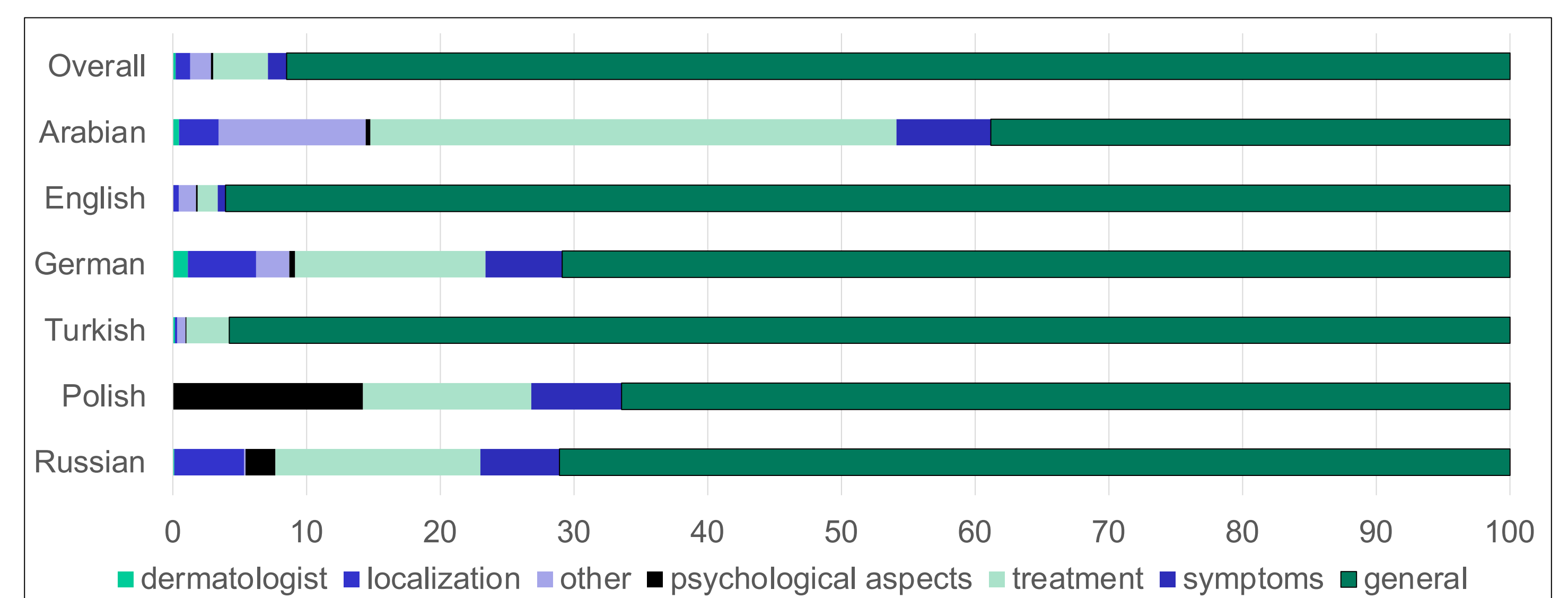


Figure 1 Relative search volume per category, separated for the six most frequently spoken languages in Germany and overall.

### Spatiotemporal variation

- Over time, an increase in the monthly SV was noted.
- Overall, the seasonal trends showed peaks in June and lows in December and January (Figure 2), with lower seasonal trends for the genital area-related localizations compared to the visible localizations of the head and upper extremities (Figure 3).

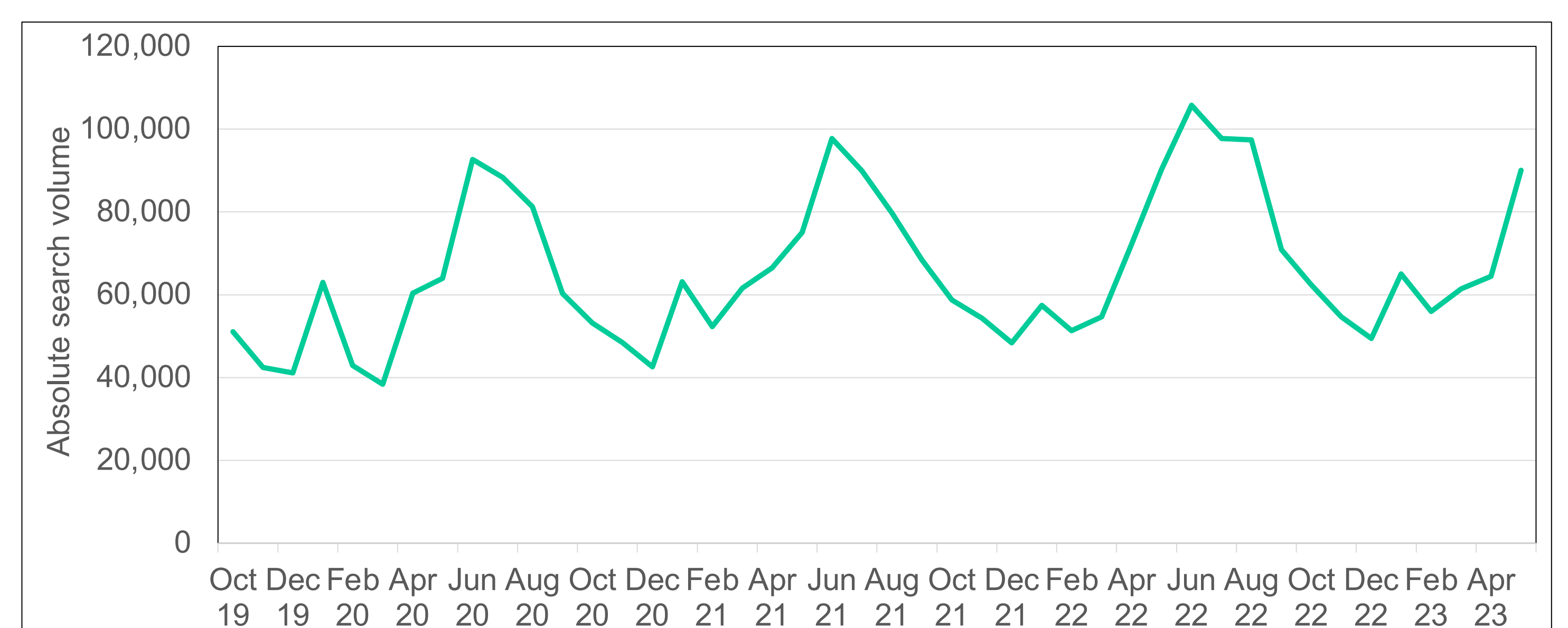


Figure 2 Monthly trend of the search volume for “vitiligo” in Germany’s 16 federal states from 10/2019 to 05/2023.

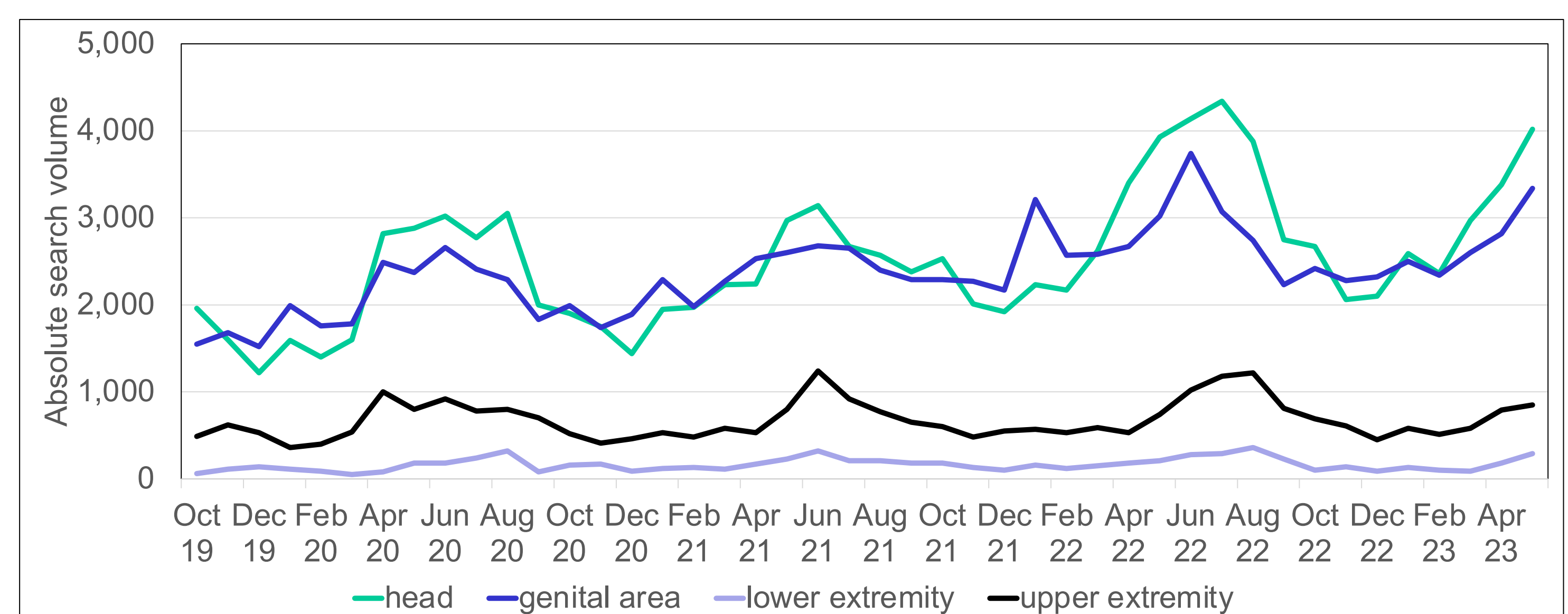


Figure 3 Monthly trend of the search volume for different localizations of vitiligo in Germany’s 16 federal states from 10/2019 to 05/2023.

- Significant differences were observed between federal states ( $p < .001$ ), with Hamburg (16,800/100,000 inhabitants) and Berlin (13,900/100,000) having the highest SVs, while Brandenburg and Thüringen (both 6,400/100,000) had the lowest.