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# Bibliometrics, text mining, and visualization analyses to support verification and specification of PICO

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## ABSTRACT

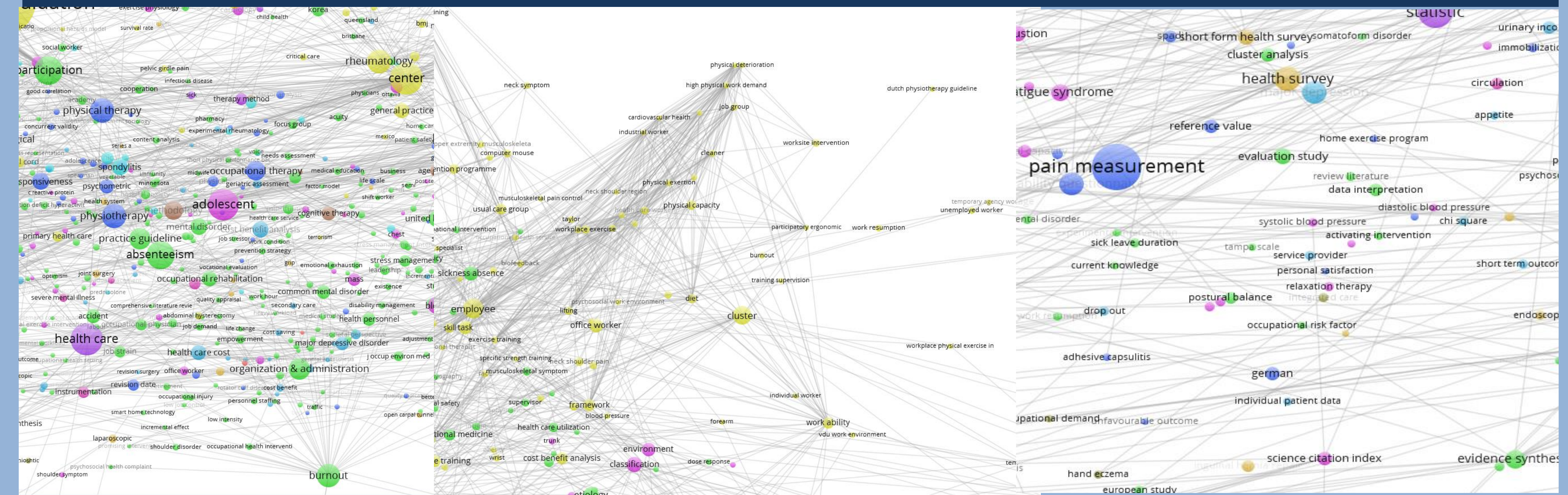
**Objectives:** We aim to obtain a fast overview of the HTA question and to refine-specify the PICO for information retrieval, using bibliometrics, text mining, and visualization tools.

The PICO question is a well-established format within the HTA process (1). Depending on the HTA question the PICO can be difficult to verify and limit. To support the HTA-project groups and the information specialists to establish the best PICO, we use bibliometrics, text mining, and visualization analyses to present a fast, predictable and more objective view of the information landscape. We used this approach for refining the PICO for a broad HTA question “Right sick leave for the right patient”. Stress is the most common reason for sick leave in Sweden. At the end of 2014, there were over 71 000 ongoing cases of illness in psychiatric diagnoses. The corresponding figure in 2012 was 48,000 - an increase of 48 percent (2). The HTA question “Right sick leave to the right patient” aims to provide scientific evidence for future recommendations for mastering the increasing sick leave statistics in Sweden.

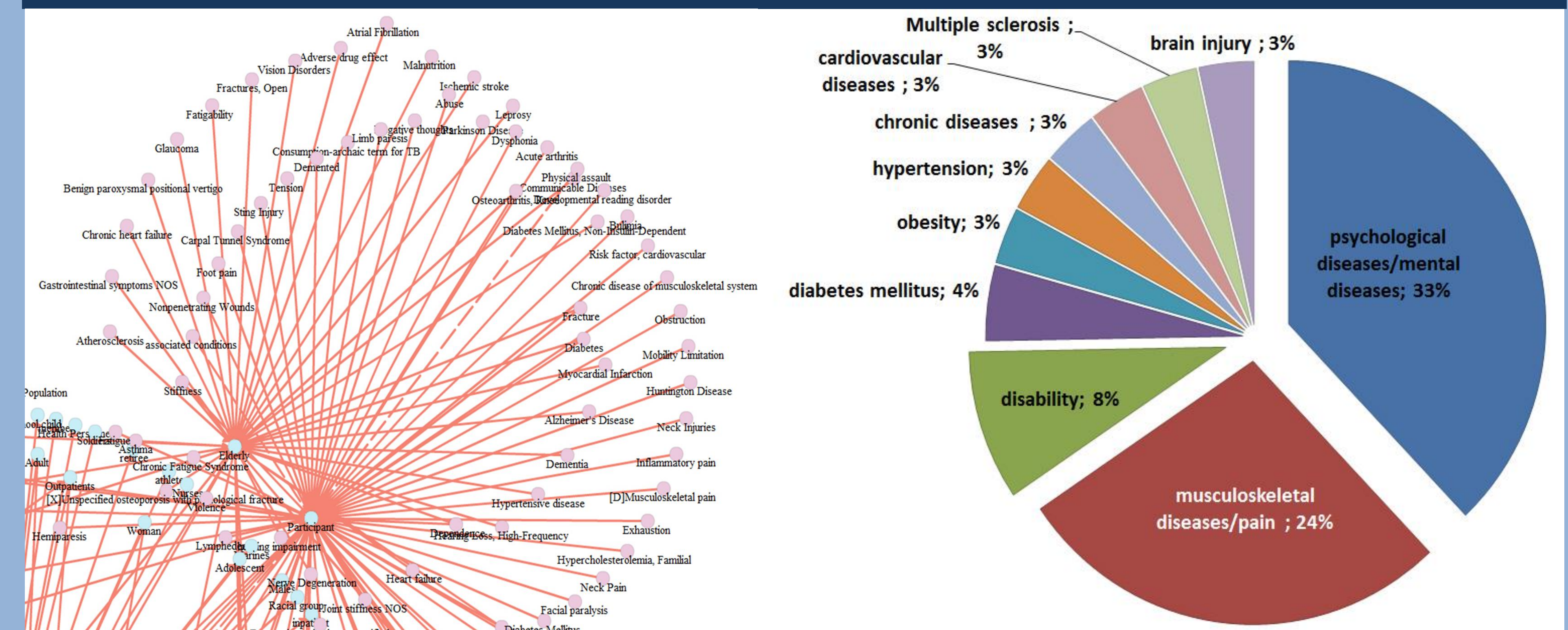
## METHODS

- For search term optimization/identification of related words to “sick leave” PubReminer and GoPubMed, were used addition to MESH and Emtree indexing. For further optimization and expanding of related words to “sick leave”, bibliographic data from PubMed, EmBase, Cochrane Libraries, PsychInfo, Cinahl, Scopus, Web of Science Core Collection and AMED were downloaded into the reference management program Endnote. The bibliographic data were then loaded into the visualization programs VosViewer/Gephi to find co-occurring terms and possible relevance.
- To search for the largest related disease areas to “sick leave” the bibliographic data, based on the same approach as above was used to explore the biggest disease areas related to the search string. In addition, Semantic Medline and Facta-Visualizer and visualization /text mining was used to explore the disease areas as well as Embase filtered disease data were analyzed using Excel or Openheatmap.
- Basic bibliometric analysis related to “sick leave” search string were carried out in Scopus and Web of Science Core Collection for overview of the bibliographic landscape. The data was then analyzed in Excel.
- Luxid Navigator BioPharma database was used to visualize the clinical studies/study types/phases/Interventions/conditions related to our search string. Chemical Abstracts in combination with the text mining tool Anavista were used to visualize related clustering concepts/authors/technology and maps of the research activity.

## RESULTS: Finding related words to “sick leave” and their relevance to PICO by visualization in VosViewer



## Finding related diseases to “sick leave” by visualization in Semantic Medline and by Embase data compiled by Excel



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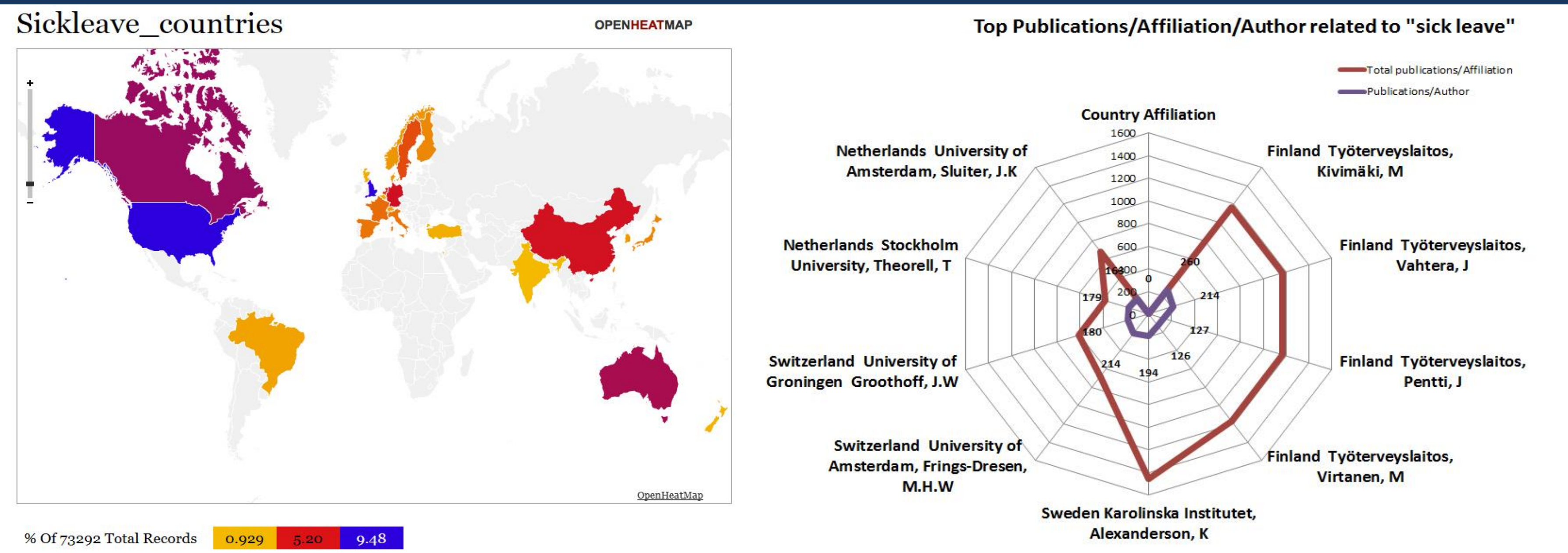
Carola Tilgmann,<sup>1</sup> Matthias Bank<sup>1</sup>, Yvonne Hultman Özek<sup>1</sup>, Ingemar F Petersson<sup>2</sup>

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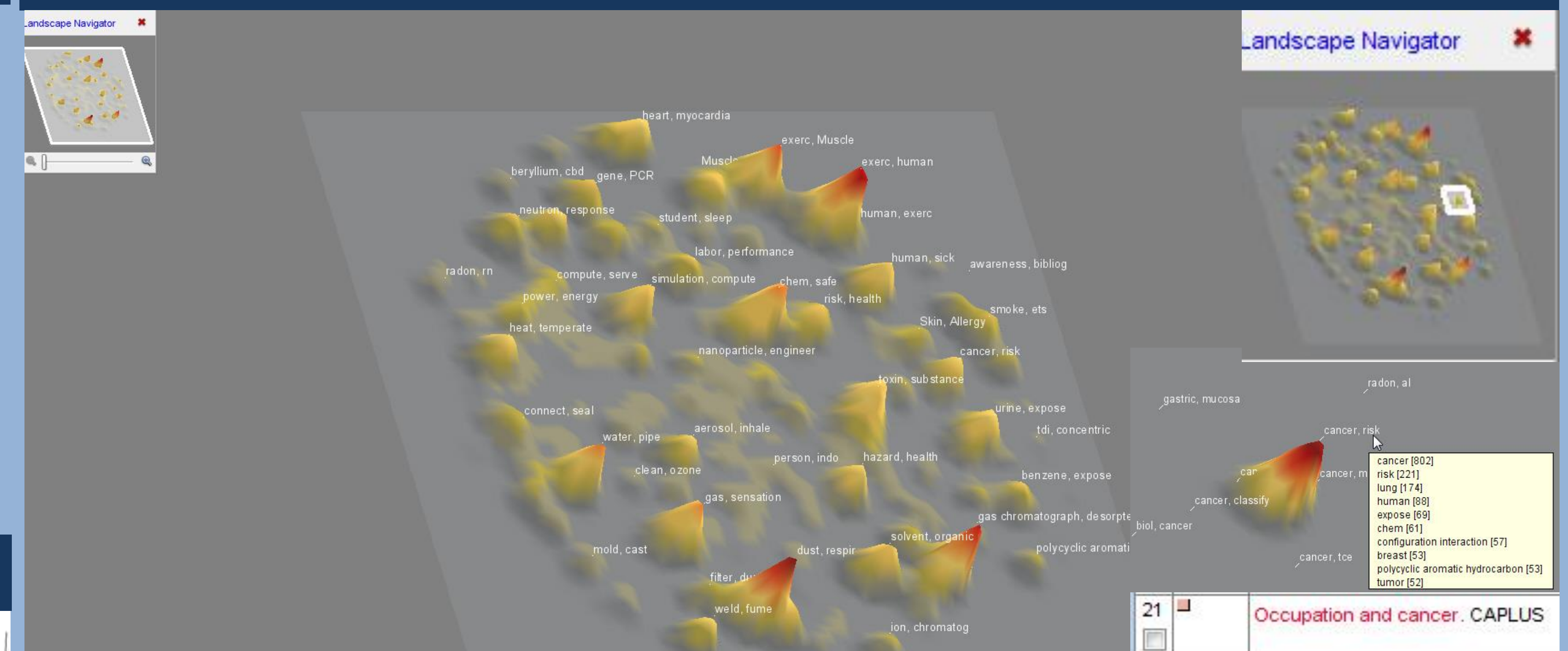


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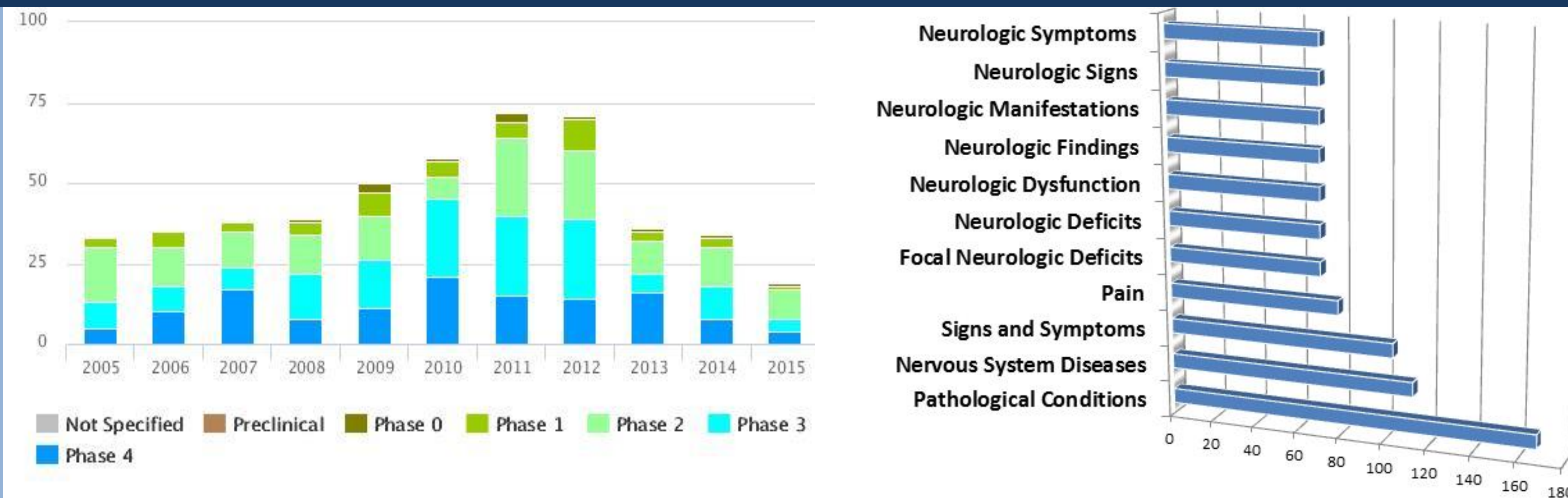
## RESULTS Bibliographic related to "sick leave"



## Research activity related to "sick leave" based on text mining in Anavista



## Clinical studies and their most frequent related conditions + "sick leave"



## CONCLUSIONS

- We use bibliometric analysis, text mining and visualization to learn about the bibliographic data related to the PICO question in a faster and broader way.
- By identifying conditions, MOA, sponsors, Interventions, experts, corresponding keyword correlations to disease areas, treatment of disease, countries, authors, clinical studies, research topics, diagnosis and study types related to our HTA question "Right sick leave for the right patient" we obtained quantitative, visual data of the research area which helped us to verify and specify the PICO fast and with increased objectivity.

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