# Tracking Herb Vaporizer Geographies with Google Trends

C. Tsipa<sup>1</sup>, L. Desprez<sup>2</sup>, V. Langlois<sup>2</sup>, N. Matsouki<sup>1</sup>, Z. Gareiou<sup>1</sup> and E. Zervas<sup>1\*</sup>

<sup>1</sup>Hellenic Open University, Patra, Greece

<sup>2</sup>Ecole Nationale Supérieure de Chimie de Rennes, University of Rennes, France

\*zervas@eap.gr

#### <u>Introduction</u>

The general population and public health stakeholders are more and more concerned about new tobacco products. However, those products emit hazardous gaseous compounds inhaled from the users [1], [2], [3], [4], [5]. Herb Vaping is one of the latest trends. Herb vaporizers are used for both medicinal and recreational purpose. This, along with the perception that vaporizers generate the active compounds of plant material leads to ever-increasing interest.

By just a "click" while browsing the internet, people create data which allow experts to study real-world behaviors in everyday lives and draw conclusions in trends about their preferences. Google's search engine (through Google Trends (GT) dashboard [6]) can be used to monitor these searches.

In this work, GT is used to study searches concerning Herb Vaping. Given the EVALI case, where several deaths occurred from the use of do it yourself products [7], and given the high number of products in the market and the absence of regulations, this work starts to fill the lack of works concerning Herb Vaporizers. The next steps concern the market analysis of herbs used for vaping [8], their emissions and the corresponding health effects.

#### **Method**

To inspect the geography of search, we start by observing the interest origin (i.e. where people search from) for the terms mentioned in Fig 1. The GTI (GT Index, else RSV - Relative Search Volumes) quantifies the interest for these terms in each country in a time window, relative to other countries, which makes possible the comparison between them

# Results

A list of the top five countries where people have searched for "herb vaporizer", "dry herb vaporizer" and "best herb vaporizer" since 2004 is shown in Fig.2. United States is the country with the highest online interest in the examined terms, followed by the rest of the 4 countries in which the examined term is most popular, which are all English speaking countries. There is no change in ranking between dry and best Herb Vaporizer.

# Conclusions

Herb Vaporizers are one of the new trends in tobacco products. GT are used to quantify the countries with the highest number of searches concerning those products.

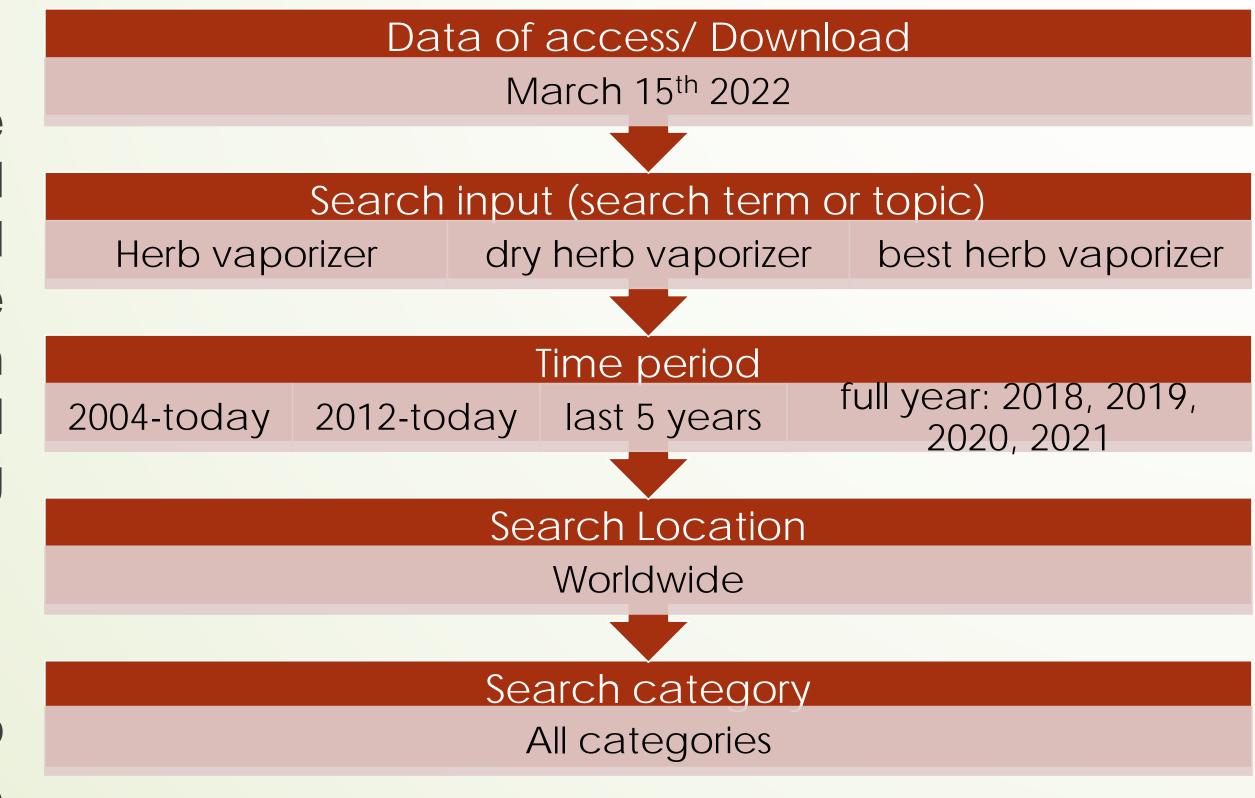


Figure 1. Visual schema of our GT search strategy

Apart from consumerism, regional policies have a strong effect on United States market which make it an emerging market for vaporizers. The legalization of cannabis use in several countries can also have a significant effect in the increased interest in Herb Vaping.

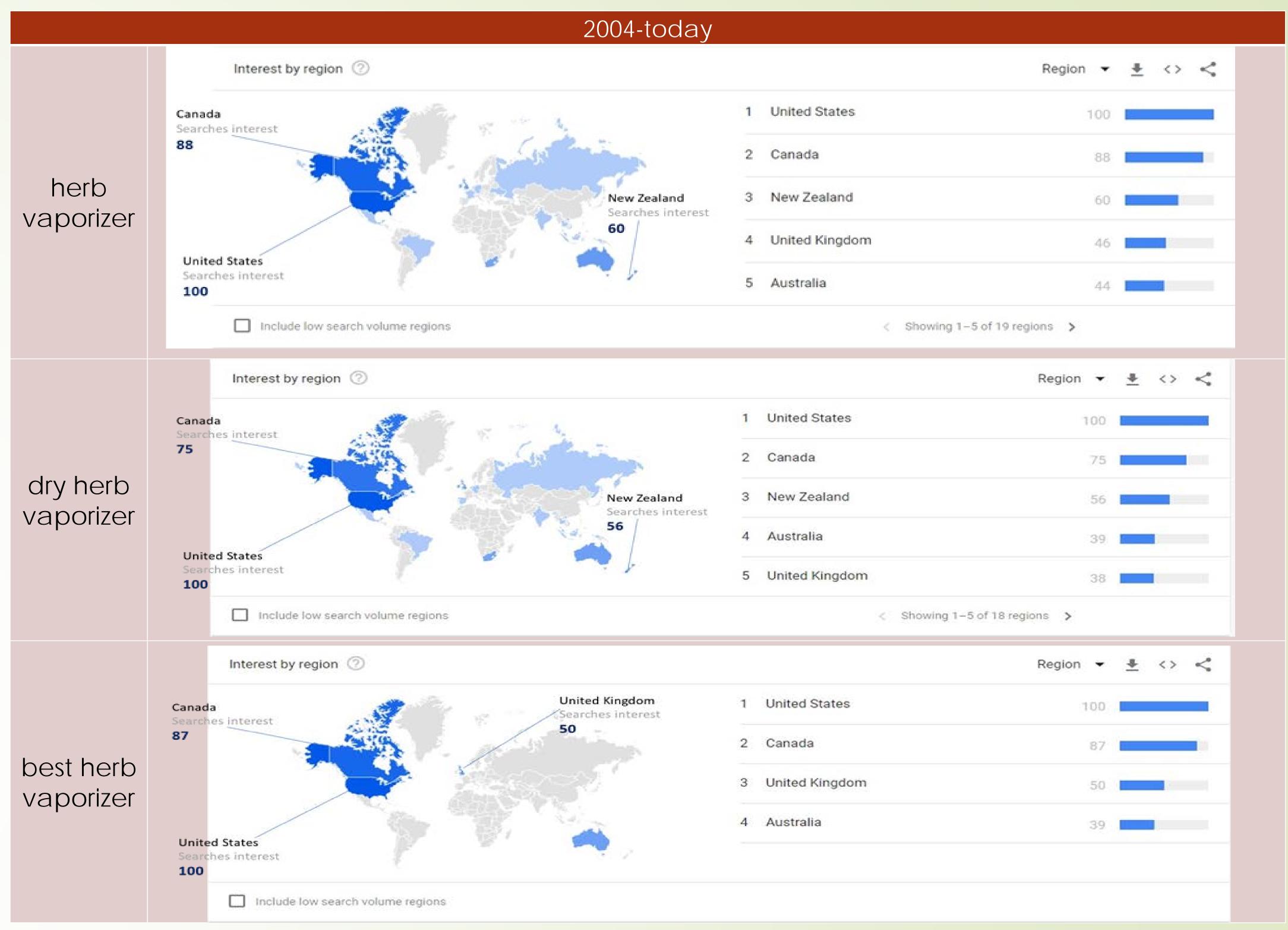


Figure 2: GT interest for terms dry-, best- and Herb Vaporizer by country 2004-today [6]

### References

- [1] E. Zervas, E. Litsiou, K. Konstantopoulos and S. Poulopou, "Physical characterization of the aerosol of an electronic cigarette: impact of refill liquids," Inhalation Toxicology, vol. 30, no. 6, pp. 218-223, 2018.
- [2] E. Zervas, N. Matsouki, G. Kyriakopoulos, S. Poulopoulos, T. Ioannides and P. Katsaounou, "Transfer of metals in the liquids of electronic cigarettes," Inhalation Toxicology, vol. 32, no. 6, pp. 240-248, 2022.
- [3] E. Zervas, "Particle emissions of heated tobacco products," in 7th Conference European Network for Smoking and Tobacco Prevention, Crete, 2022
- [4] A. Havermans, N. Mallock, E. Zervas, S. Caillé-Garnier, T. Mansuy, C. Michel, J. Pennings, T. Schulz, P. E. Schwarze, R. Solimini, J.-P. Tassin, C. Vardavas, M. Merino, C. Pauwels, L. Nierop, C. Lambré and A. Bolling, "Review of industry reports on EU priority tobacco additives part A: Main outcomes and conclusions," Tobacco Prevention & Cessation, vol. 8, p. 27, 2022.
- [5] A. Bolling, N. Mallock, E. Zervas, S. Caillé-Garnier, T. Mansuy, C. Michel, J. Pennings, T. Schulz, P. E. Schwarze, R. Solimini, J.-P. Tassin, C. Vardavas, M. Merino and Pauwel, "Review of industry reports on EU priority tobacco additives part B: Methodological limitations," Tobacco prevention & cessation, p. 28, 2022.
- [6] Google Trends, "Google Trends," 2022. [Online]. Available: https://www.google.com/trends/.
- [7] OSH, Office of Smoking and Health, "Smoking & Tobacco Use," 25 February 2020. [Online]. Available https://www.cdc.gov/tobacco/basic\_information/e-cigarettes/severe-lung-disease.html.
- [8] C. Tsipa, V. Langlois, L. Desprez, N. Matsouki, Z. Gareiou and E. Zervas, "Commercially available herbal products for vaping," in 3d International Conference on Environmental Design (ICED 2022), 22-23 October, 2022, Athens, Greece.