

Estimating the Burden of Vaccine-Preventable Infectious Diseases Caused by Herpesviruses beyond Herpes Zoster in Europe: What's going on in Spain and Germany?

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OBJECTIVES

- The human herpesviruses are responsible for a wide range of pathologies and, currently, effective vaccination is available for only one of them, the varicella-zoster virus¹.
- Cytomegalovirus (CMV) infection is usually subclinical in immunocompetent individuals; however, it can have devastating consequences for the when congenital¹. The prevalence of congenital CMV infection is of 0.6-0.7% of live births in industrialized countries¹.
- Epstein–Barr virus (EBV) is believed to cause approximately 1.5% of cancers worldwide and to be associated to the onset multiple sclerosis¹.
- The objective is to analyse the in-hospital burden of potentially vaccine-preventable diseases caused by herpesviruses with on-going clinical developments and no vaccination alternatives such as CMV and EBV.

METHODOLOGY

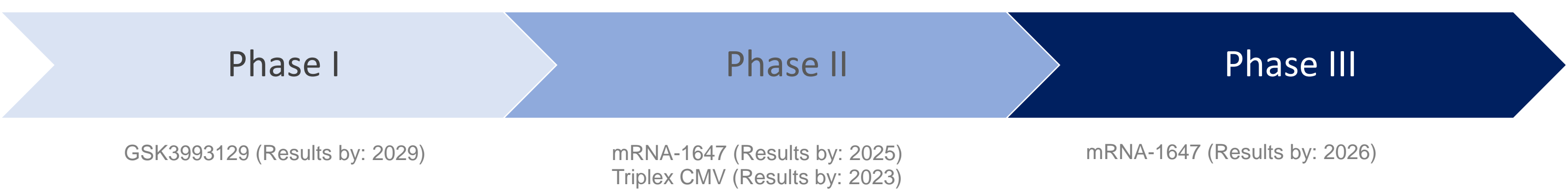
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- Firstly, we reviewed ClinicalTrials.gov² to identify herpesviruses diseases that are experiencing growing clinical research for prevention strategies but without approved vaccine alternatives.
- For the analysis we used aggregated retrospective real-world data from the Spanish National Hospital Discharge Database (RAE-CMBD)³ and the Institute for the Hospital Remuneration System (InEK)⁴ in Germany, that were publicly available.
- The following ICD-10 codes were used: B25.0, B25.1, B25.2, B25.8, B25.9, B27.1, P35.1 for CMV and B27.0 for EBV.
- Due to availability of public data for comparability purposes we extracted the following variables: annual number of hospitalised patients (transformed to annual rate) and mean length of stay (LoS) in hospital ward.
- The mean cost per patient was available in RAE-CMBD, but not in InEK, therefore we approximated it using the associated DRGs, their weights and the Bundesbasisfallwerte⁵.
- For Spain, data from 2016 to 2021 was available; but for Germany we only had access to data from 2019 to 2022.

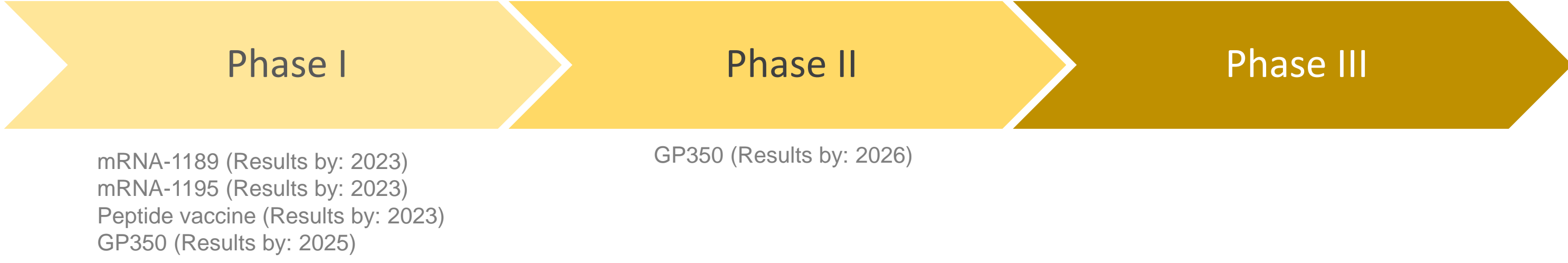
RESULTS

- Currently at least four vaccines to prevent CMV disease are in clinical stage development (phase III results expected by 2026). The EBV pipeline is in early stage clinical with phase I/II study results Glycoprotein GP350 vaccine expected in 2026.

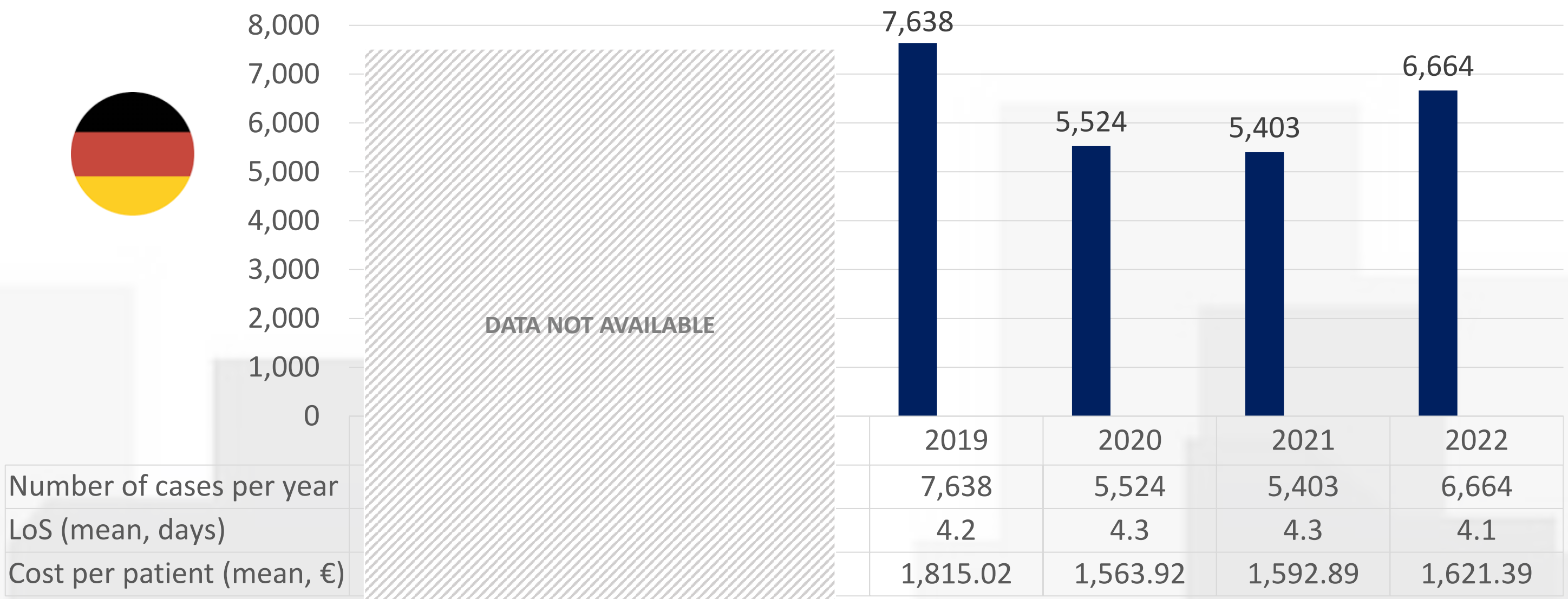
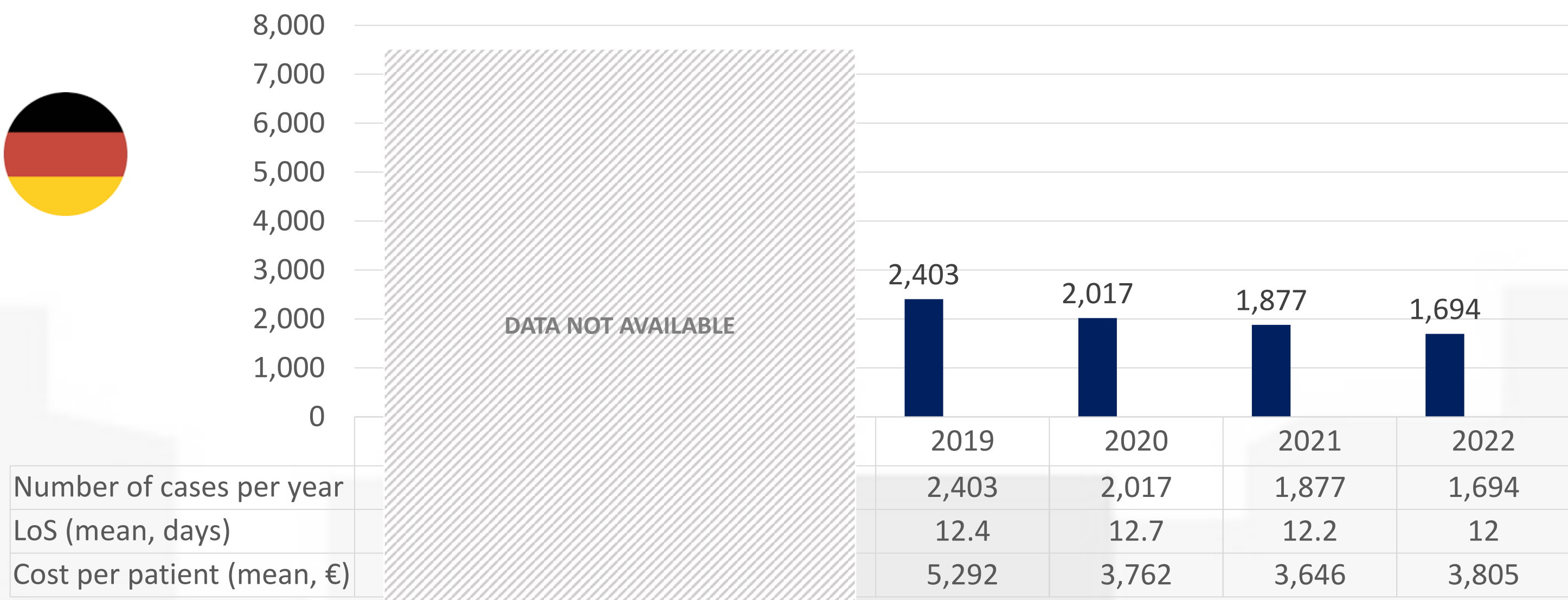
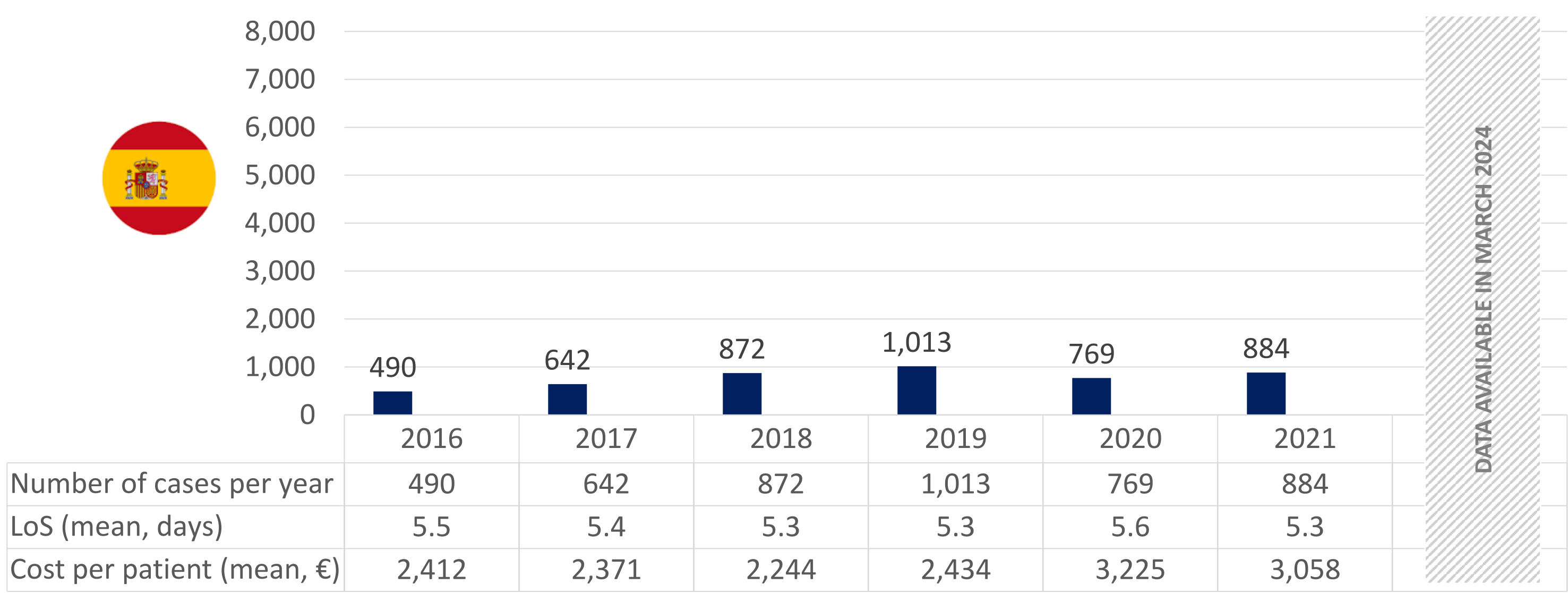
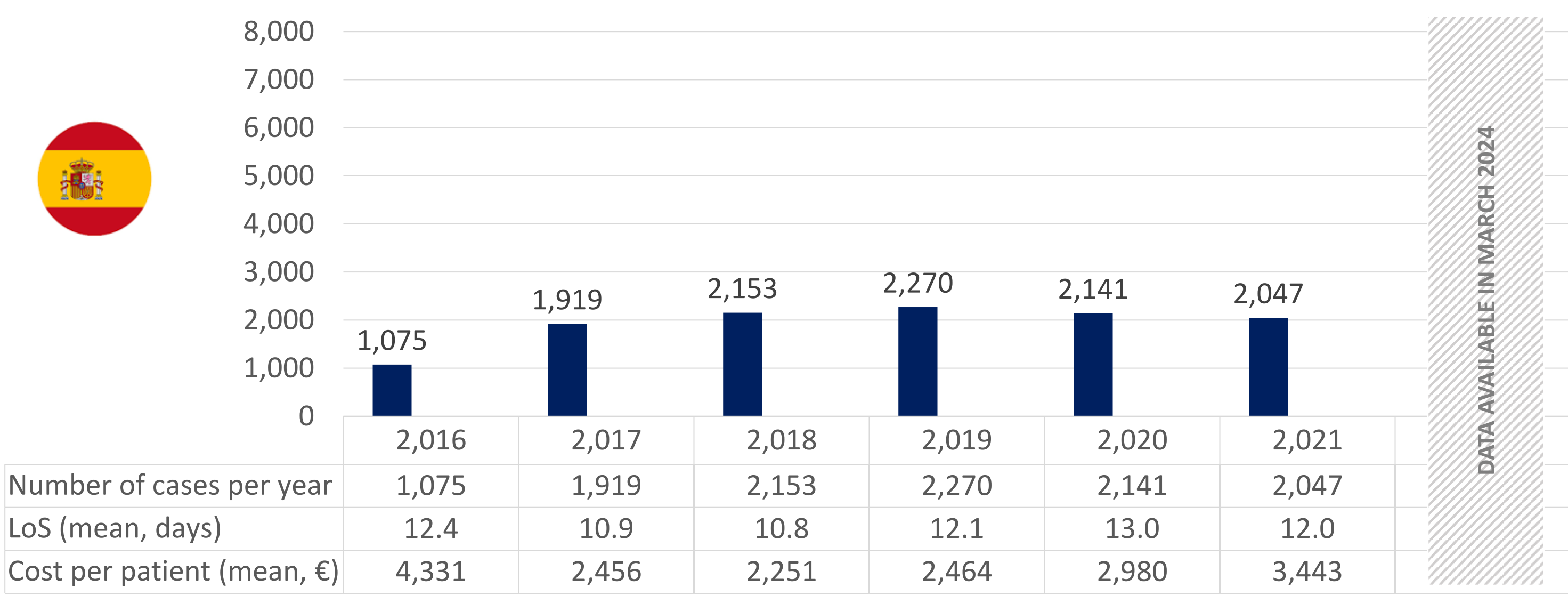
CMV



EBV



- A total number of 11,605 hospitalised cases of CMV as main diagnostic were reported between 2016 and 2021 in Spain. The mean LoS/patient was 11.8 days, and the mean cost was €2,864/patient; that led to a total in-hospital spending on CMV of €33.2M.
- In Germany, the mean LoS/patient during 2019-2022 was 12.3 days and the mean cost/patient was €4,204/patient. The total number of hospitalized reported during the analyzed was period 7,991 leading to a total hospital spending of €33.6M.
- A total of 4,670 hospitalised cases of EBV were registered between 2016-2021 in Spain. The mean LoS/patient was 5.4 days and the mean cost €2,636/patient; that led to a total spending on EBV hospitalisations of €12.3M.
- In Germany, the mean LoS/patient during 2019-2022 was lower at 4.2 days with a lower mean cost/patient €1,661/patient. However, with a total of 25,229 hospitalized cases the total hospital spending was €49.1M in the four analysed years.



CONCLUSIONS

- Our preliminary analysis showed that in recent years, herpesviruses such as CMV and EBV caused a substantial burden on hospital resources in at least two European countries presenting different epidemiology but also different healthcare provisioning models. Increased surveillance of diseases induced by herpesviruses and efforts to analyse real-world data have the potential to confirm the trends in this analysis and may inform effective resource allocation for prevention.
- One of the limitations of this preliminary analysis, is that given the aggregated nature of the data we only performed a descriptive analysis. This is a limitation of major public healthcare databases in an effort to protect patient privacy. However, more complex study designs and analysis can be performed working together with health authorities and other interested stakeholders. For example, for research purposes, Spanish RAE-CMBD allows the request of anonymized patient level data to perform analyses based on real life outcomes adjusted by age, sex, severity (Charlson-index), hospital type or region.

1. Maple PAC. Cytomegalovirus and Epstein-Barr Virus Associations with Neurological Diseases and the Need for Vaccine Development. Vaccines (Basel). 2020 Jan 20;8(1):35. doi: 10.3390/vaccines8010035 2. www.clinicaltrials.org. 3. Spanish National Hospital Discharge Database (RAE-CMBD). Available at: Spanish National Hospital Discharge Database (RAE-CMBD). 4. <https://datenbrowser.inek.org/>. 5. <https://reimbursement.institute/glossar/bundesbasisfallwert/>