

# Estimating the Burden of Vaccine-Preventable Respiratory Diseases Without Vaccination Alternatives in Europe: What's going on in Spain and Germany?

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## OBJECTIVES

## METHODOLOGY

EPH103

- The global burden of respiratory infectious diseases decreased by 51% from 1990 to 2019, in part due to the emergence of effective vaccines to prevent from influenza and invasive pneumococcal disease<sup>1</sup>.
- The emergence of the new SARS-CoV-2 respiratory virus in 2019 lead to a devastating global pandemic but also to the development of highly effective vaccination programmes and highlighted again the importance of immunization against respiratory viruses<sup>2</sup>.
- Our objective is to analyse the in-hospital burden of potentially vaccine-preventable diseases caused by respiratory viruses with on-going clinical developments and no effective immunization alternatives such as Human Parainfluenza Virus type 3 (PIV3) and human metapneumovirus (hMPV).
- Firstly, we reviewed ClinicalTrials.gov<sup>3</sup> to identify respiratory 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)<sup>4</sup> and the Institute for the Hospital Remuneration System (InEK)<sup>8</sup> in Germany, that were publicly available.
- The following ICD-10 codes were used: J12.2 and J20.4 for PIV3 and J12.3, J21.1 and B97.8 for hMPV.
- Due to availability of public data and 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 Bundesbasisfallwerte<sup>5</sup>.
- For Spain, data from 2016 to 2021 was available; but for Germany we only had access to data from 2019 to 2022.

## RESULTS

- Despite several attempts to developing an effective PIV3 vaccine, including a bivalent mRNA one (*mRNA-1653*, *PIV3+hMPV*), at present there is no on-going clinical trial. The hMPV pipeline focuses on bivalent vaccines (RSV [respiratory syncytial virus]+hMPV) and phase II results are expected by 2024.

PIV3

hMPV

Phase I

Phase II

Phase III

mRNA-1653 (Completed)

Phase I

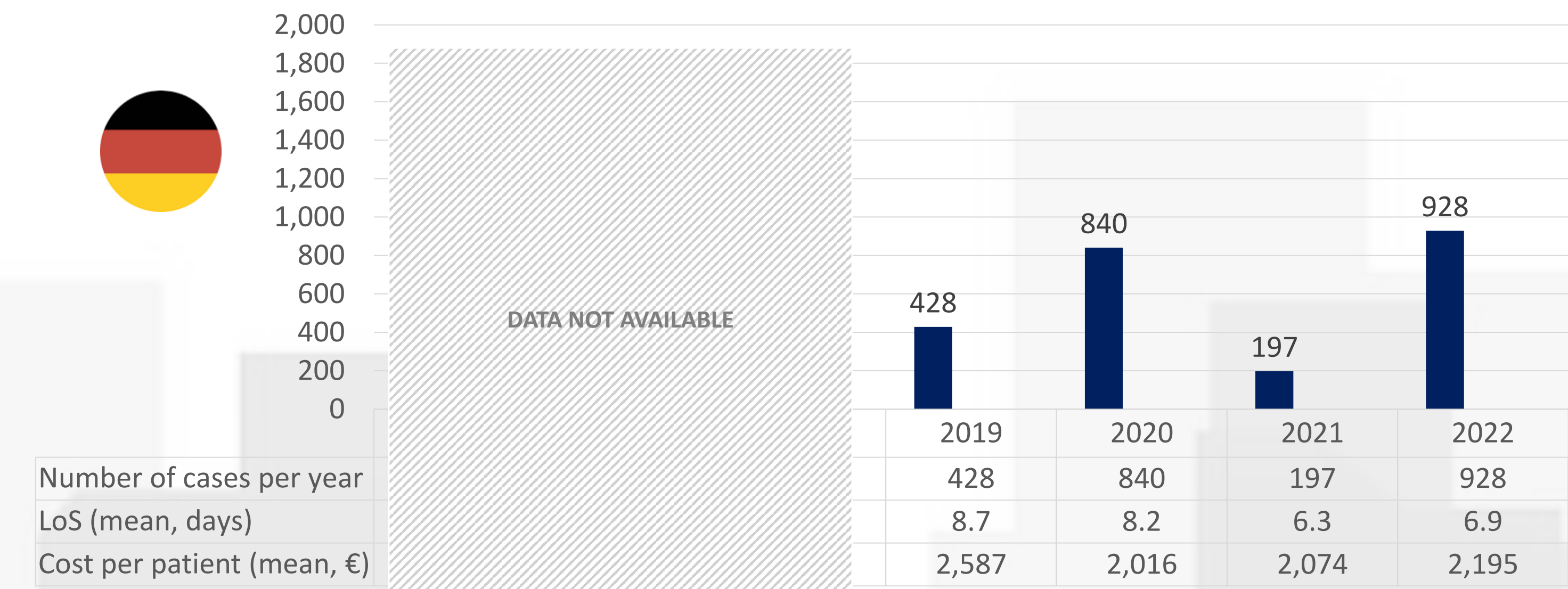
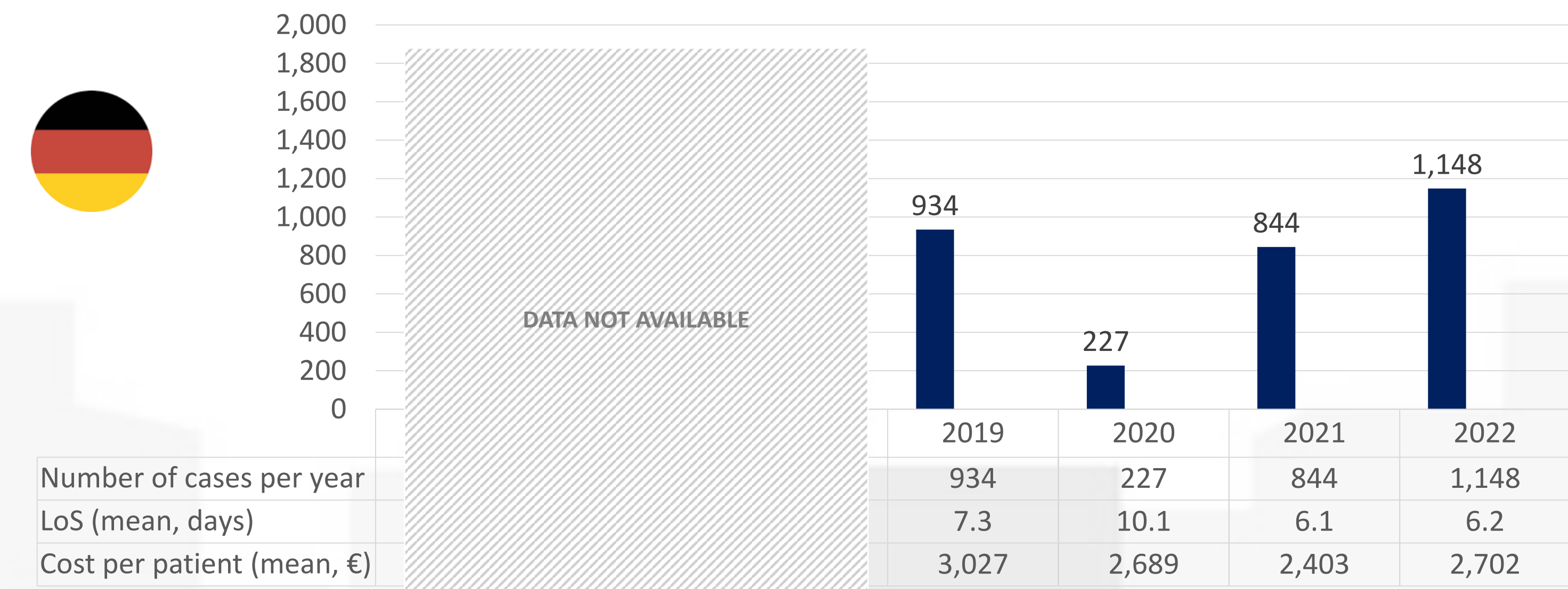
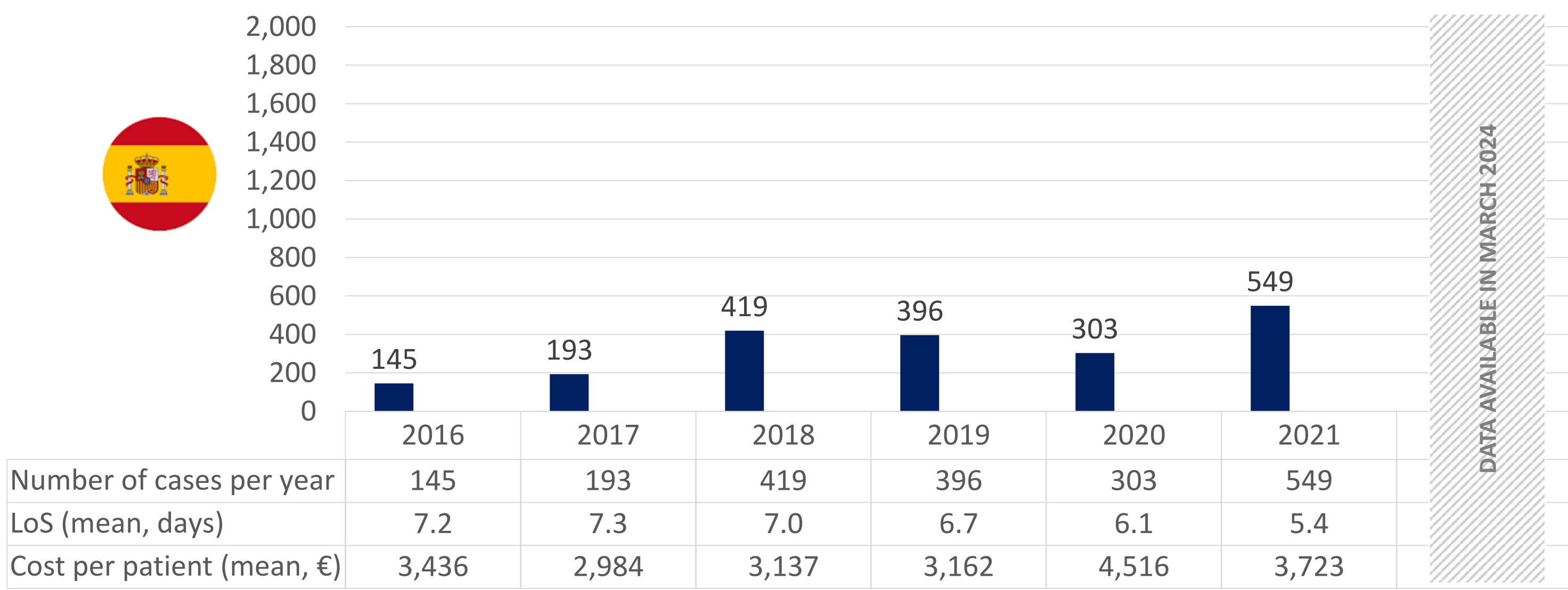
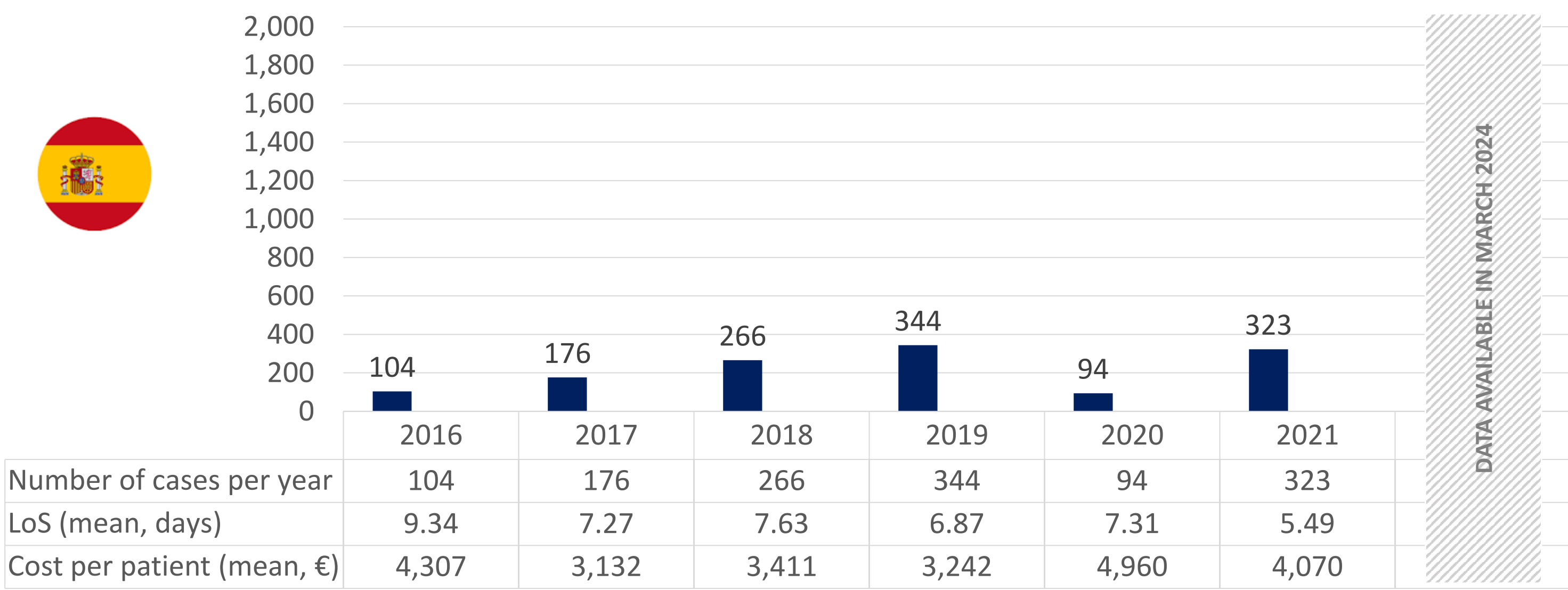
Phase II

Phase III

mRNA-1345 (Results by: 2026)  
IVX-A12 (Results by 2023)

IVX-A12 (Results by 2024)

- A total number of 1,307 hospitalised cases of PIV3 were reported between 2016 and 2021 in Spain. The mean LoS/patient was 7.0 days, and the mean cost was €2,675/patient; that led to a total in-hospital spending on PIV3 of €4.8M.
- In Germany, the mean LoS/patient during 2019-2022 was 6.8 days and the mean cost/patient was €2,717/patient. The total number of hospitalized reported during the analysed was period 3,154 leading to a total hospital spending of €8.6M.
- A total of 2,005 hospitalised cases of hMPV were registered between 2016-2021 in Spain. The mean LoS/patient was 6.4 days and the mean cost €3,518/patient; that led to a total spending on hMPV hospitalisations of €7.1M.
- In Germany, the mean LoS/patient during 2019-2022 was 7.6 days with a lower mean cost/patient €2,192/patient. With a total of 2,393 hospitalized cases the total hospital spending was 5.2M in the four analysed years.



LoS: length of stay

## CONCLUSIONS

- Our preliminary analysis showed that in recent years, less known respiratory viruses such as PIV3 and hMPV caused a considerable 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 respiratory viruses 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 on real life outcomes adjusted by age, sex, severity (Charlson-index), hospital type or region.

1. Roser M, Ritchie H, Spooner F. Burden of Disease. OurWorldInData.org [Internet]. 2021 [cited 2023 Oct 24]; Available from: <https://ourworldindata.org/burden-of-disease>. 2. Basu S, Ashok G, Debroy R, Ramaiah S, Livingstone P, Anbarasu A. Impact of the COVID-19 pandemic on routine vaccine landscape: A global perspective. Hum Vaccin Immunother. 2023 Dec 31;19(1):2199656. doi: 10.1080/21645515.2023.2199656. 3. [www.clinicaltrials.org](https://www.clinicaltrials.org). 4. Spanish National Hospital Discharge Database (RAE-CMBD). Available at: Spanish National Hospital Discharge Database (RAE-CMBD). 5. <https://datenbrowser.inek.org/>. 6. <https://reimbursement.institute/glossar/bundesbasisfallwert/>