

The Socioeconomic Value of Adult Respiratory Immunization Programs in Spain: how much can we gain from expanding prevention efforts?

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M. NAPIER¹, A. LÓPEZ², S. YEN¹, E. TUNNICLIFFE¹, C. THEAKSTON¹, S. BRASSEL¹, T. HU³, J. VIETRI⁴, D. MENDES⁵, J. YANG³, Y. MORENO², F. MESA² and L. STEUTEN¹

¹Office of Health Economics, London, UK ²Pfizer, Madrid, Spain ³Pfizer, New York, NY, USA ⁴Pfizer, Collegeville, PA, USA ⁵Pfizer, Tadworth, UK

INTRODUCTION

- Respiratory illness due to seasonal influenza (flu), respiratory syncytial virus (RSV), pneumococcal disease (PD) and COVID-19 represents a substantial socio-economic and health system burden in Spain (Gil-Prieto et al., 2025; Martínón-Torres et al., 2024; Sanz-Muñoz et al., 2025; Llorca et al., 2025).
- The burden generally increases with age across the respiratory illnesses, with higher hospitalization rates (Jimeno Ruiz et al., 2024) and mortality risk (Peláez et al., 2025) for elderly patients.
- Although vaccines are available for all these diseases in Spain, vaccine uptake across all the disease areas (Table 1) remain below recommended level by WHO and other European stakeholders (75%) (WHO, 2020; EHMA, 2025; Vaccines Europe, 2024;) and the National Immunization Program (NIP) has yet to include RSV.
- This study quantifies the socioeconomic benefits of Spain's current NIP for older adults.**
- In addition, we estimate the potential benefits of expanding the NIP to include RSV, the inclusion of younger at-risk populations, and improving uptake of adult respiratory immunization.**

METHODS

- We conducted a Benefit-Cost Analysis (BCA) from a societal perspective, based on an established framework (Robinson et al., 2019). We developed four static, multi-cohort, deterministic disease models, one for each respiratory illness, to estimate the societal value of vaccination programs, compared to no vaccination.
- Morbidity risk reduction of survivors was monetized using a cost-of-illness approach from a health system perspective. The corresponding productivity losses were quantified from a societal perspective.
- Mortality risk reduction, was monetized using societal willingness to pay in two distinct ways. (1) Age-agnostic by multiplying the deaths averted by the value of a statistical life (VSL). (2) Age-dependent using the value of a statistical life year (VSLY) multiplied by the life years saved.
- A VSL value of €2 million was used in our analysis (Directorate-General for Traffic, 2025). To derive the VSLY, we identified the age at which the average individual has lived half of their expected lifespan at birth and calculated the remaining discounted life years at that age using Spain life tables. The VSL was divided by the remaining discounted life years.

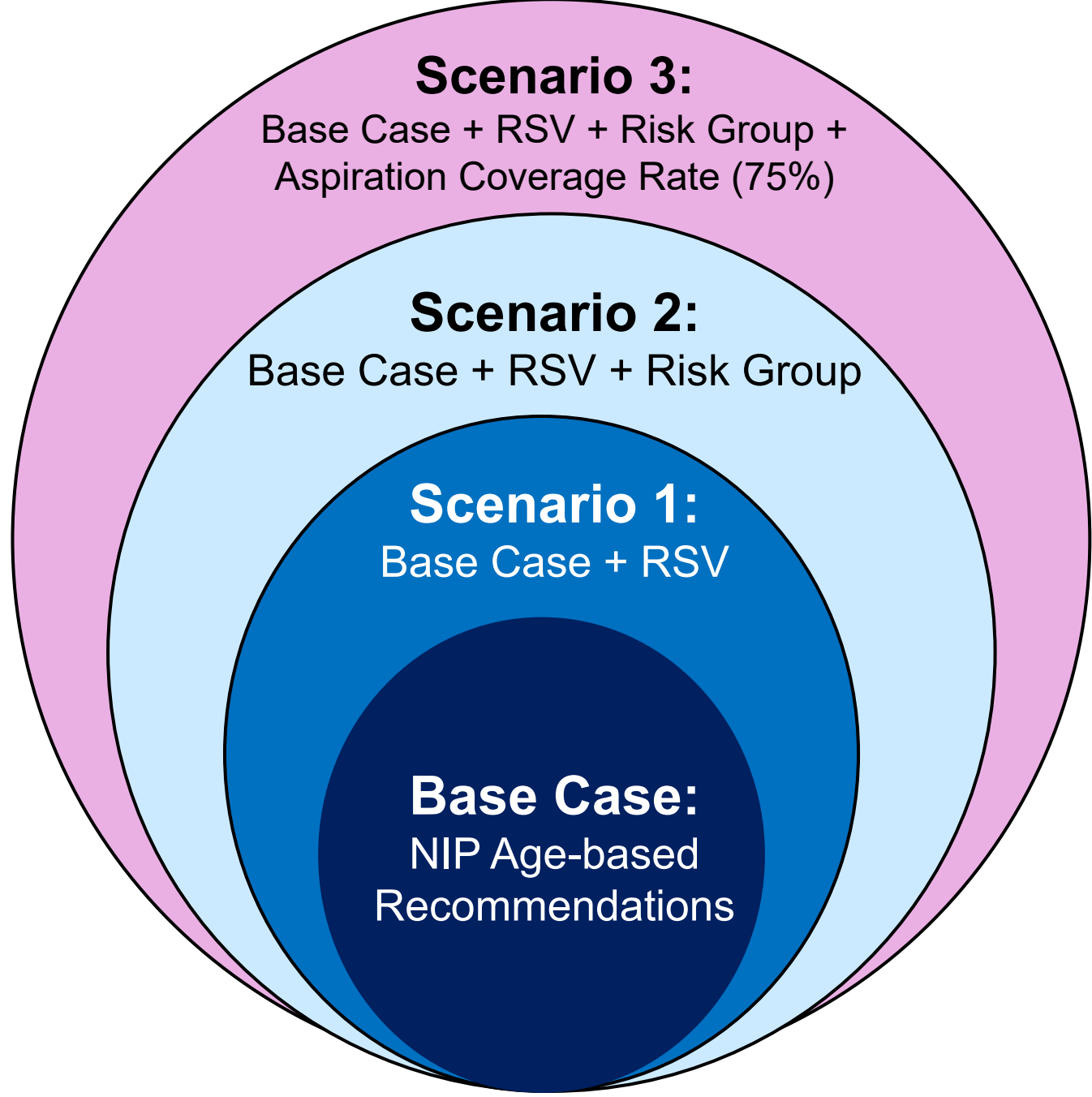



FIGURE 1: SUMMARY OF THE SCENARIOS

TABLE 1: PROGRAM ELIGIBILITY AND COVERAGE

	Age-based		At-risk	
	Eligibility	Coverage	Eligibility	Coverage
PD	65-year-olds	38.0%	18-64	7.3%
RSV*	60+	50.3%	18-59	17.2%
Flu	60+	50.3%	18-59	17.2%
COVID-19	60+	60-64: 33.14% 65-74: 53.15% 75+: 60.47%	18-59	6.6%

*RSV is excluded from the base case, with hypothetical coverage rates based on Flu

- Benefit-Cost Ratios (BCRs) and net benefits (NBs) were calculated across all vaccination programs over four-time horizons: 1-, 5-, 10-year, and the lifetime time horizon. The lifetime horizon represents the costs and benefits realized in the full model run time of each cohort. For example, in the base case, this is 40 years while the youngest risk group is followed for up to 82 years. Costs and benefits were discounted at 3.0% p.a. (López-Bastida et al., 2010).
- A visualization of scenarios included in the analysis is in Figure 1. The base case represents the current NIP age-based recommendations. Scenario 1 expands the base case to include RSV, and Scenario 2 includes RSV and younger at-risk adults. Scenario 3 consists of all programs and populations of Scenario 2 and assumes aspirational uptakes of 75% in all programs.
- The reduction in hospitalizations, deaths, outpatient visits, and overall medical costs associated with vaccine recommendations were also estimated for each scenario.
- A full summary of eligibility and coverage rates can be seen in Table 1.

RESULTS

- Within the first year, the current age-based recommendations across the three programs return societal value of €4.2 per €1 invested (VSL), corresponding to €2.56 billion in NBs (Figure 2). Over the lifetime, representing the full model runtime of each cohort, the return grows to €5.5 per €1 invested (VSL), with NBs of €46.9 billion. The results are robust when using the VSLY approach.
- The inclusion of RSV vaccination, recommendations for at-risk populations, and aspirational coverage rates improve the impact of the programs incrementally, which grow over time, highlighted in Figure 3.
- In the short term, the expansion of programs results in returns accruing at a lower rate compared to today's recommendations. However, over time, both the BCRs and NBs grow. In Scenarios 1,2, and 3, NBs increase by 13%, 19%, and 53% versus the base case (VSL), respectively, over the lifetime, visualized in Figure 2.
- Figure 4 spotlights the outcomes that could be achieved over the lifetime in Scenario 3, highlighting the benefits to the health system, the economy, and society.

FIGURE 2: NBs AND BCRs ACROSS DIFFERENT TIME HORIZONS (VSL)

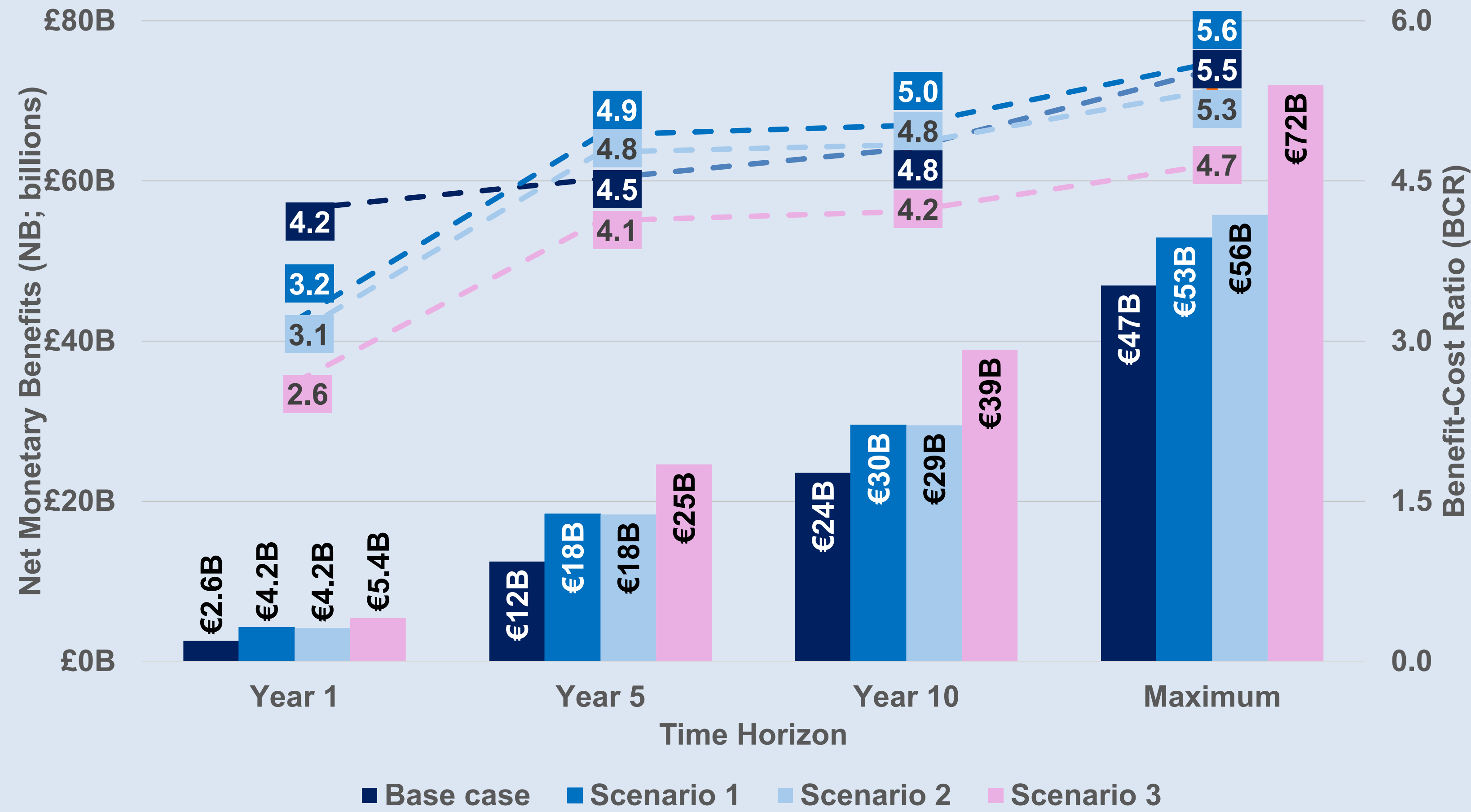


FIGURE 3: CLINICAL AND ECONOMIC IMPACT ACROSS DIFFERENT TIME HORIZONS

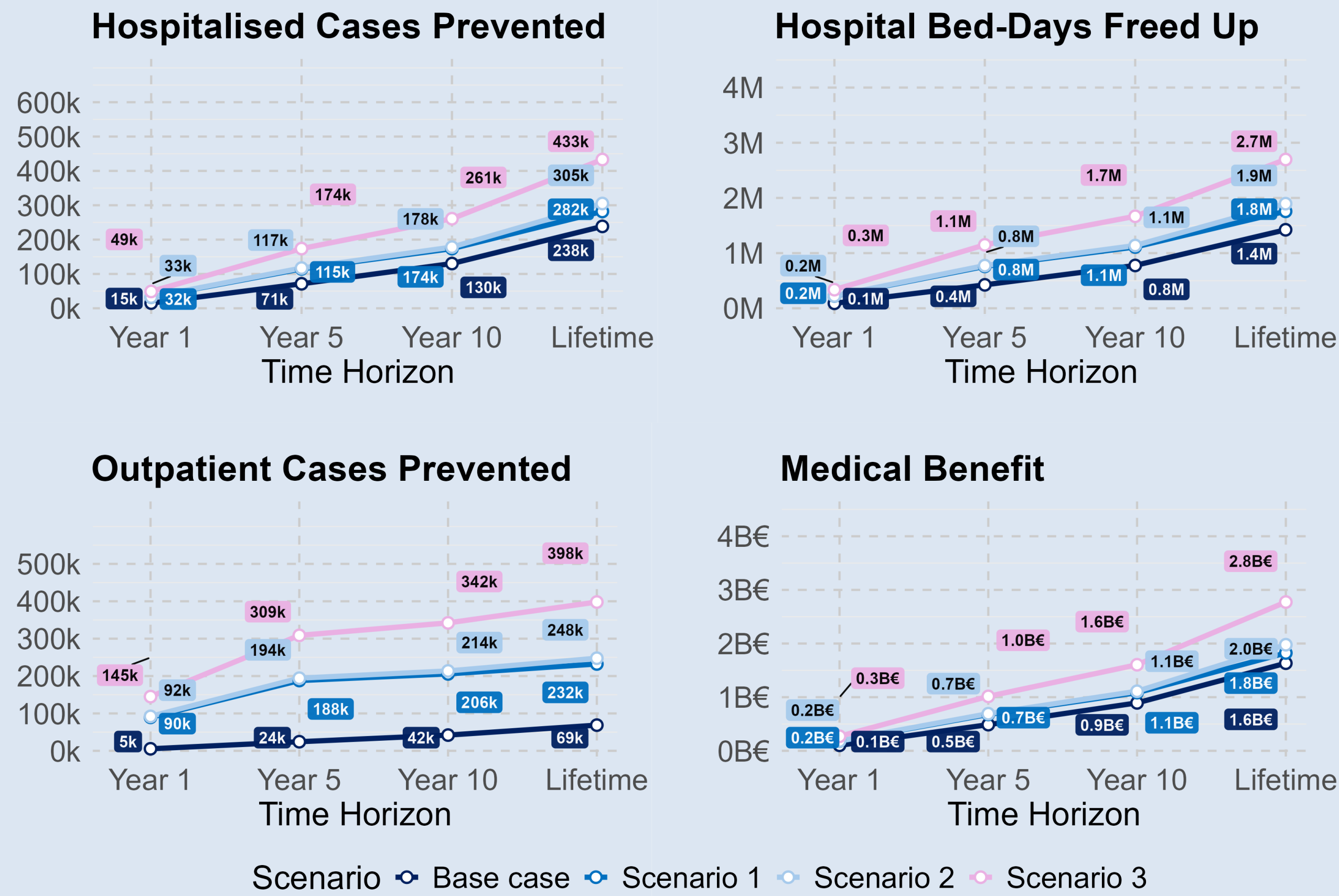
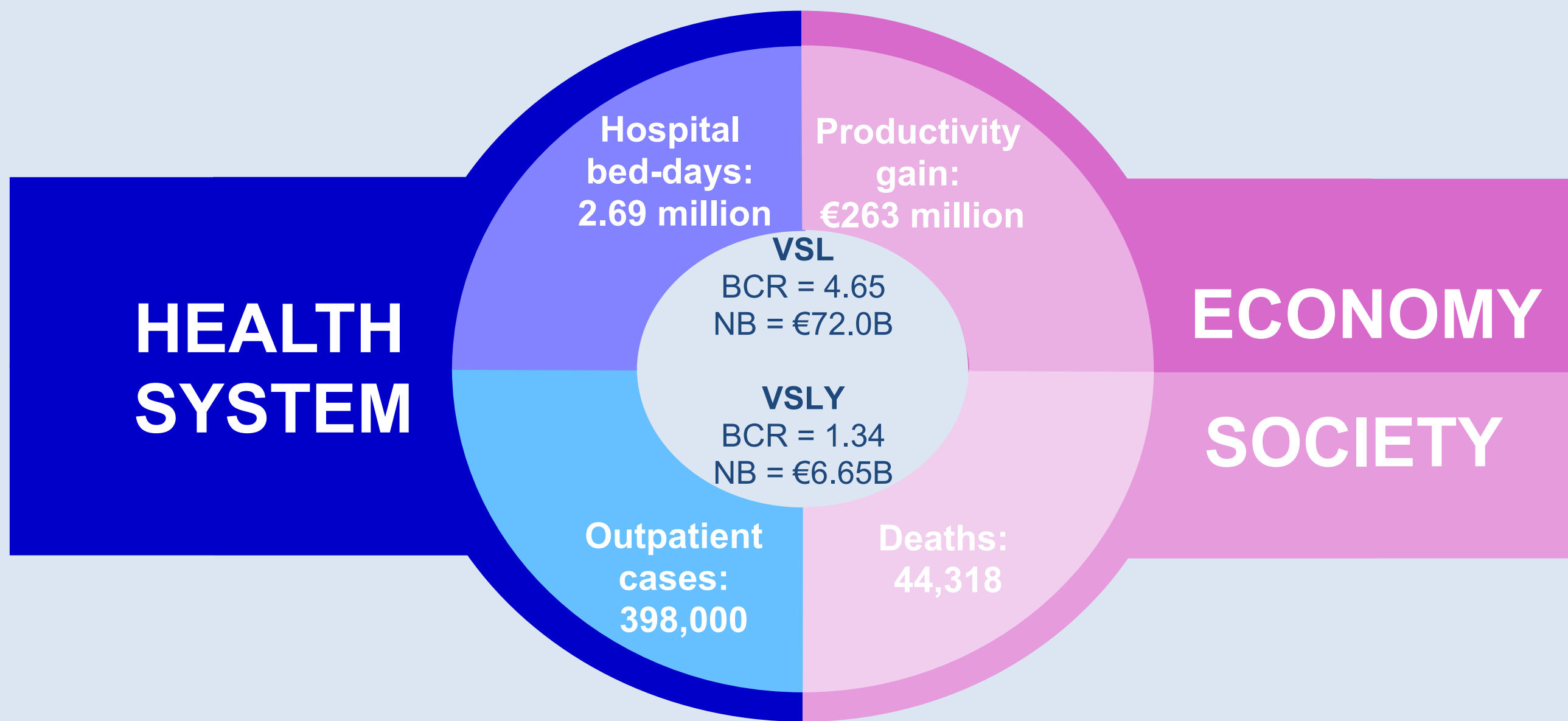


FIGURE 4: LIFETIME OUTCOMES FOR SCENARIO 3 BY DOMAIN



Conclusions

- Adult respiratory immunization delivers substantial socioeconomic benefits relative to its investment, generating net monetary benefits valued by society at up to €5.5 for every €1 spent over the lifetime.
- Incorporating RSV recommendations in the NIP improves both the NBs and the BCR across all time periods, except for the 1-year BCR, representing a greater overall return on investment.
- Although inclusion of younger at-risk adults, as well as improved vaccine uptake, lowered BCRs slightly, the gains in NBs, the reduced burden on the health system, economy, and society are substantial, growing over the remaining lifetime horizon.
- The results highlight the importance of long-term investment in vaccination programs, which can yield and sustain large societal benefits in the short, medium and long-term.
- This study provides evidence for policymakers on the benefits of expanding the NIP to include RSV vaccination and to improve vaccine uptake to unlock significant societal value.**

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DISCLOSURES

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