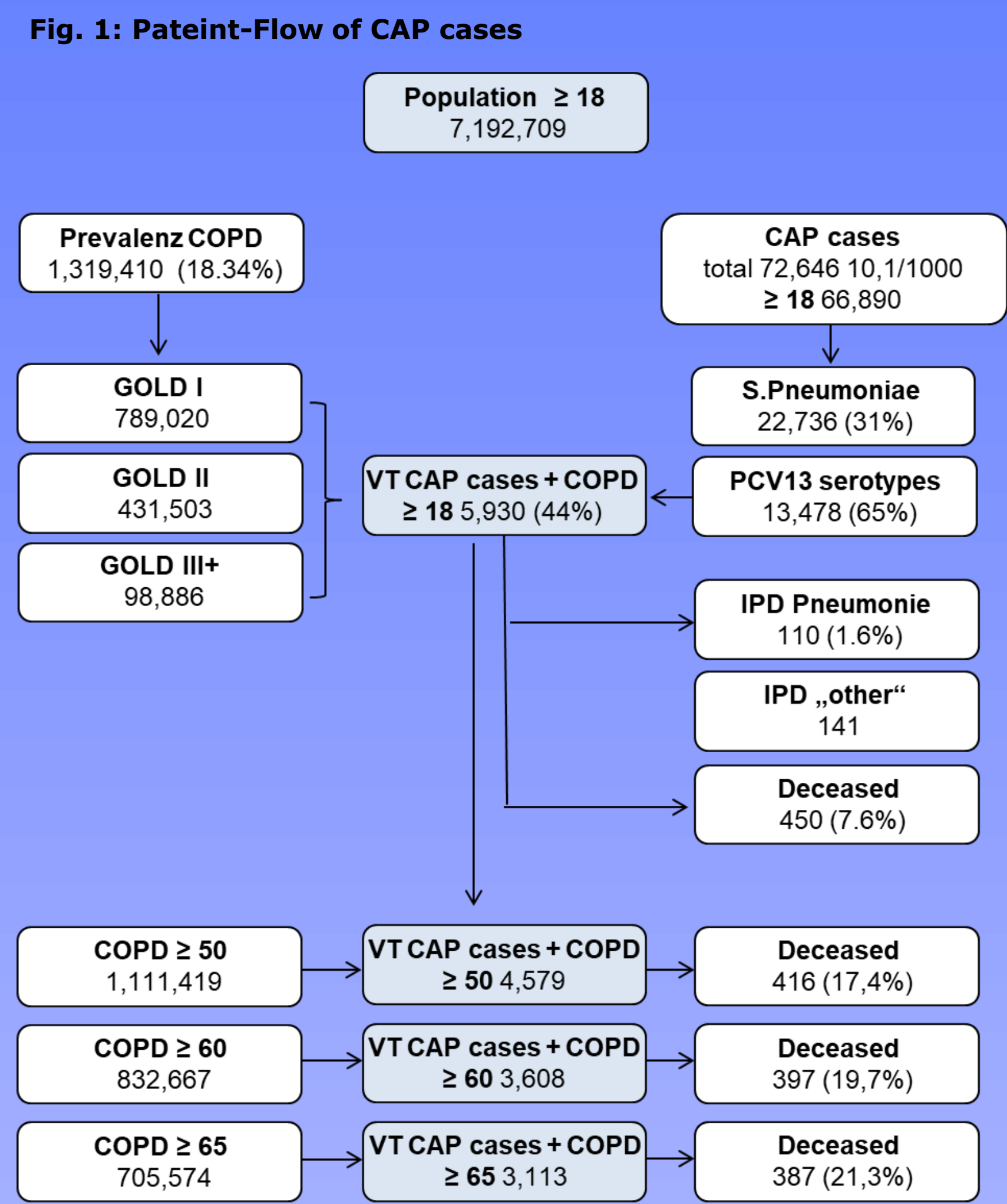


A Budget-Impact Analysis (BIA) of immunizing adults with COPD with the 13-valent vaccine (PCV13) against community- acquired pneumonia and pneumococcal disease

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Objectives

Streptococcus pneumoniae is the leading cause of community-acquired pneumonia (CAP). The incidence of pneumococcal-pneumonia (PP) is greatest at the extremes of age and with comorbidity.

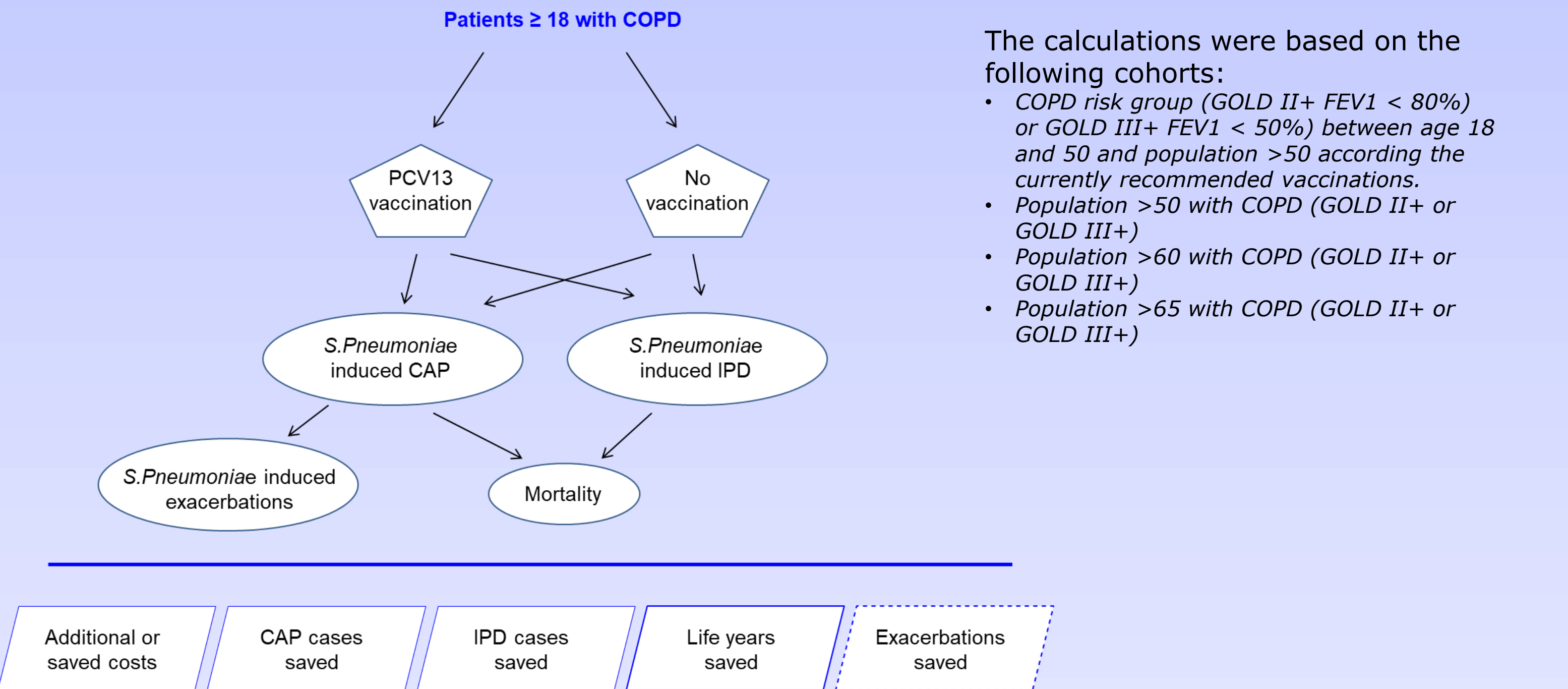


Source: own developed

Methods

A multi-cohort, COPD population-based model was developed over a 5-year time-horizon, which includes the following states: hospitalized and outpatient CAPs, invasive-pneumococcal-diseases (IPDs), exacerbations and mortality. Patients without immunization are considered for PCV13 vaccination according to the selected vaccination-rates. A repetition-vaccination is considered. The model includes a serotype shift over time. Results show within which risk-groups savings could be achieved (treatment costs avoided offset PCV13 cost) and within which risk-groups additional health expenditure were generated from the payer's perspective.

Fig. 2: Model Design



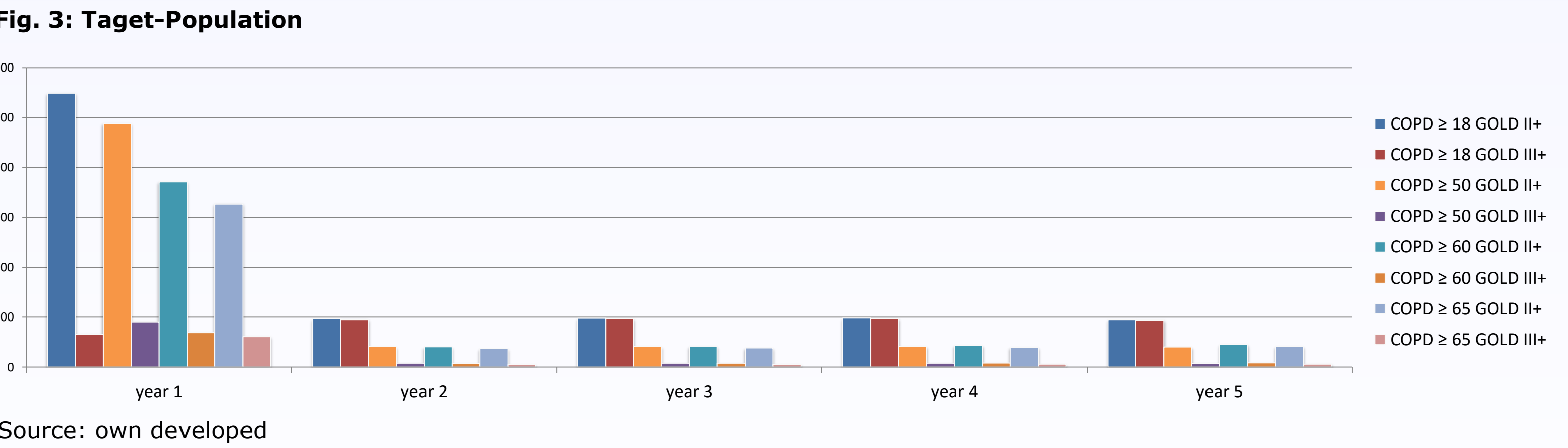
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Epidemiological und clinical Data

Epidemiological data were extracted from local sources. The prevalence of COPD and associated GOLD stages were derived from the Austrian BOLD study (Schirnhöfer et al. 2007). For missing information German BOLD data were used. Local DRG data has recorded 37,125 hospital pneumonia (J12-J18) admissions in the year 2013. Based on this a rate of 4.49/1,000 Inhabitants were used. In 2015 422 IPD cases were registered. Based on a 3-year observational period an incidence rate of 4.66/100,000 inhabitants (≥18 years) was assessed for Austria. The percentage of exacerbations induced by pneumococci amounts 12.5% (Obert et al. 2012); 65% of which with PCV13 serotypes.

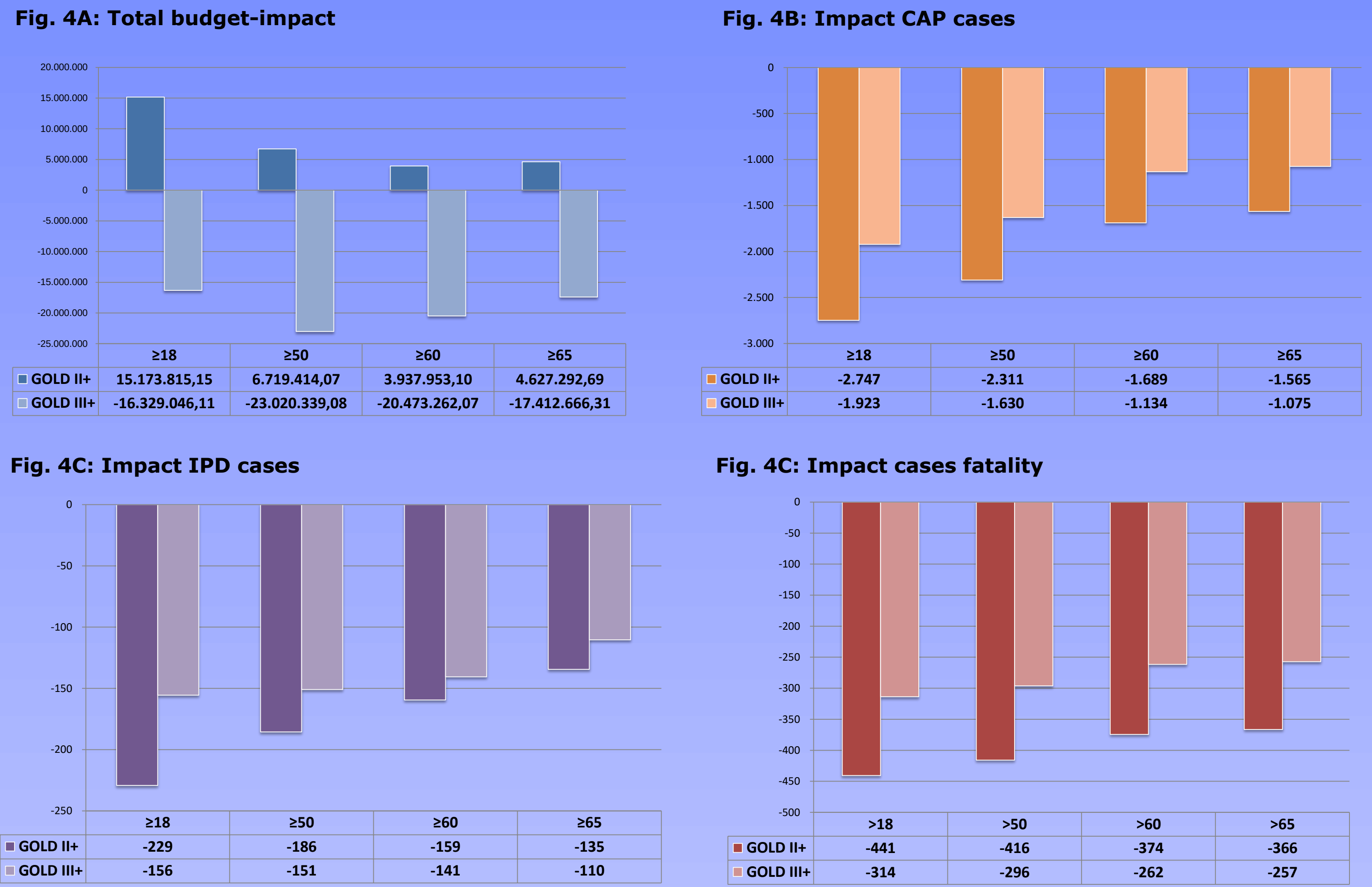
Resource Use and Costs

The BIA includes primary costs of hospitalized and outpatient CAPs, hospitalized IPDs, COPD exacerbation costs and costs for vaccination including application. Vaccination costs consider the fact of previously immunized people, repetition-vaccination and an assumed vaccination rate (60% to 74%) over the 5 year time horizon. The target population receiving vaccination is displayed in **Fig. 3**.



Results

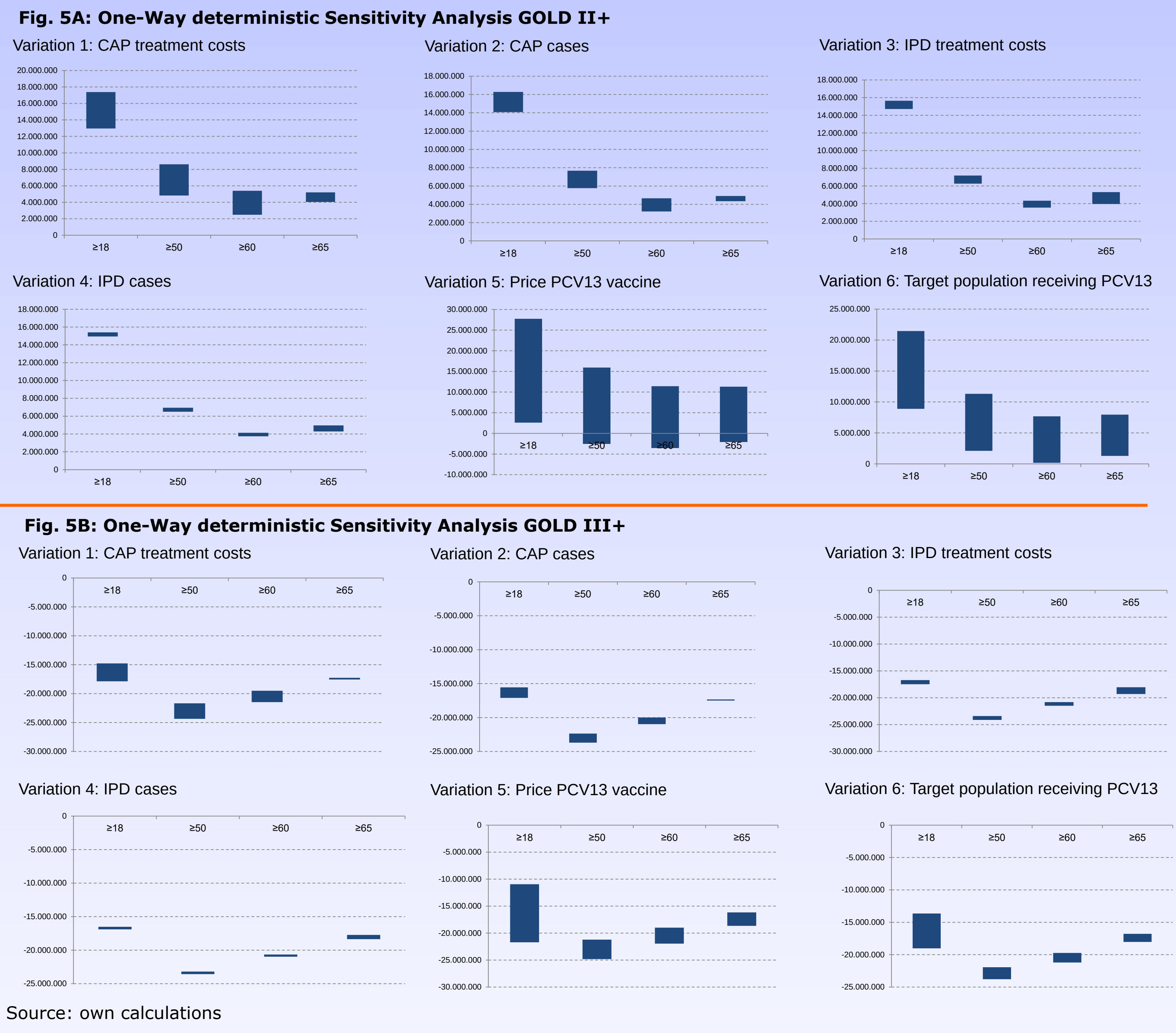
Among risk-groups with COPD GOLDIII+ vaccination leads in all age-groups (≥18, ≥50, ≥60, ≥65) to cost-savings over 5-years (from 16.3 million € [≥18] to 23 million € [≥50]). Calculations are based on the present pharmacy selling price, which is payed out-of-pocket. Between 1,923-1,075 CAPs and 110-156 IPDs could be avoided over 5-years. Among risk-groups with COPD GOLDII+ reimbursement would increase health-expenditure between 15.2 million € (≥18) and 3.9 million € (≥50); between 2,747-1,565 CAPs and 135-229 IPDs could be avoided. In GOLDII+ age-groups a PCV13 reimbursement-(break-even)-price between 53-66€ would result in a 0 effect to health-care budgets.



Source: own calculations

Sensitivity Analysis

Deterministic sensitivity analysis was carried out. **Fig. 5A** display results for the GOLD II+ risk population and **Fig. 5B** for the GOLD III+ risk population.



The highest impact on budget-impact results can be identified in varying the price of the PCV13 vaccine, the vaccinated population followed by cost for treating CAPs. SA results exhibits a greater influence for the risk group of COPD patients with GOLD II+ compared to GOLD III+.

Conclusion

An increase of immunized persons – due to the incentive of reimbursement – would reduce disease-burden significantly and lead among high-risk patients to huge savings.

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Additional Literature with the author