



COST-EFFECTIVENESS OF 13-VALENT VERSUS 23-VALENT PNEUMOCOCCAL POLYSACCHARIDE VACCINE AND NO VACCINATION IN THE CZECH NATIONAL VACCINATION PROGRAM

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Introduction

- Czech guidelines recommend 23-valent pneumococcal polysaccharide vaccination (PPV23) for people living in homes for the elderly, long-term hospitals, homes for the disabled and special-regime homes (the last were excluded for lack of valid data, assuming that wouldn't influence results since they make only a negligible part of vaccinated people)^[1].
- A 13-valent pneumococcal conjugate vaccine (PCV13) has had significant public-health impacts in children and is currently being evaluated for use in adults in the Czech Republic (CR)^[2].

Purpose

- The objective was to estimate the cost-effectiveness of the 13-valent versus 23-valent pneumococcal polysaccharide vaccine and no vaccination in the Czech national vaccination program aiming at the elderly population.

Methods

- A first-order Markov decision-analytic model was developed to compare cost-effectiveness of vaccination with PCV13, PPSV23 and no vaccination in the Czech Republic.
- PPV23 effectiveness was derived from literature and PCV13 was extrapolated from impact in children adjusting for immunosenescence in older persons^[2].
- Pneumonia, bacteremia and meningitis hospitalization and cost data were acquired from health authorities and DRG system in CR; outpatient data were based on retrospective patient survey^[3, 4, 5, 6]. The model used a lifetime time horizon and 3% discount rate.

Results

- Used according to Czech guidelines, PCV13 vaccination is associated with 0.0002 life-years gained for an additional EUR 1.002 on average (EUR 3,812,478 in total) compared to no vaccination and 0.0004 life-years gained for additional EUR 0.97 on average (EUR 3,704,061 in total) compared to PPSV23, respectively. This leads to an ICER of EUR/LYG 4,950 and 2,265 under current reimbursement (table 1).
- If all moderate and high risk people were vaccinated, the ICER would increase to EUR/LYG 5,582 and 6,691, respectively, under current reimbursement and to ICER of EUR/LYG 8,676 and 7,057 under full reimbursement.

Reimbursement perspective	Current Reimbursement		Full reimbursement	
	PCV-13 vs. No Vaccination	PCV-13 vs. PPSV-23	PCV-13 vs. No Vaccination	PCV-13 vs. PPSV-23
Czech guidelines	4 950	2 265/11 170	45 576	1 934
High risk	9 311	4 235	9 512	4 299
Moderate and high risk	5 582	6 691	8 676	7 057

Table 1: Cost effectiveness from payer's perspective under different reimbursement scenarios. PCV13 is currently reimbursed only from two thirds and PPSV23 is not reimbursed at all in the CR. The table compares ICERs in three vaccination strategies, based on number of vaccinated people, and under two different reimbursement policies.

Conclusions

Confronting the national GDP per capita with the WHO recommendation on health care spending per QALY gained, PCV13 national immunization program in the Czech Republic can be considered cost-effective even under a full reimbursement policy^[7].

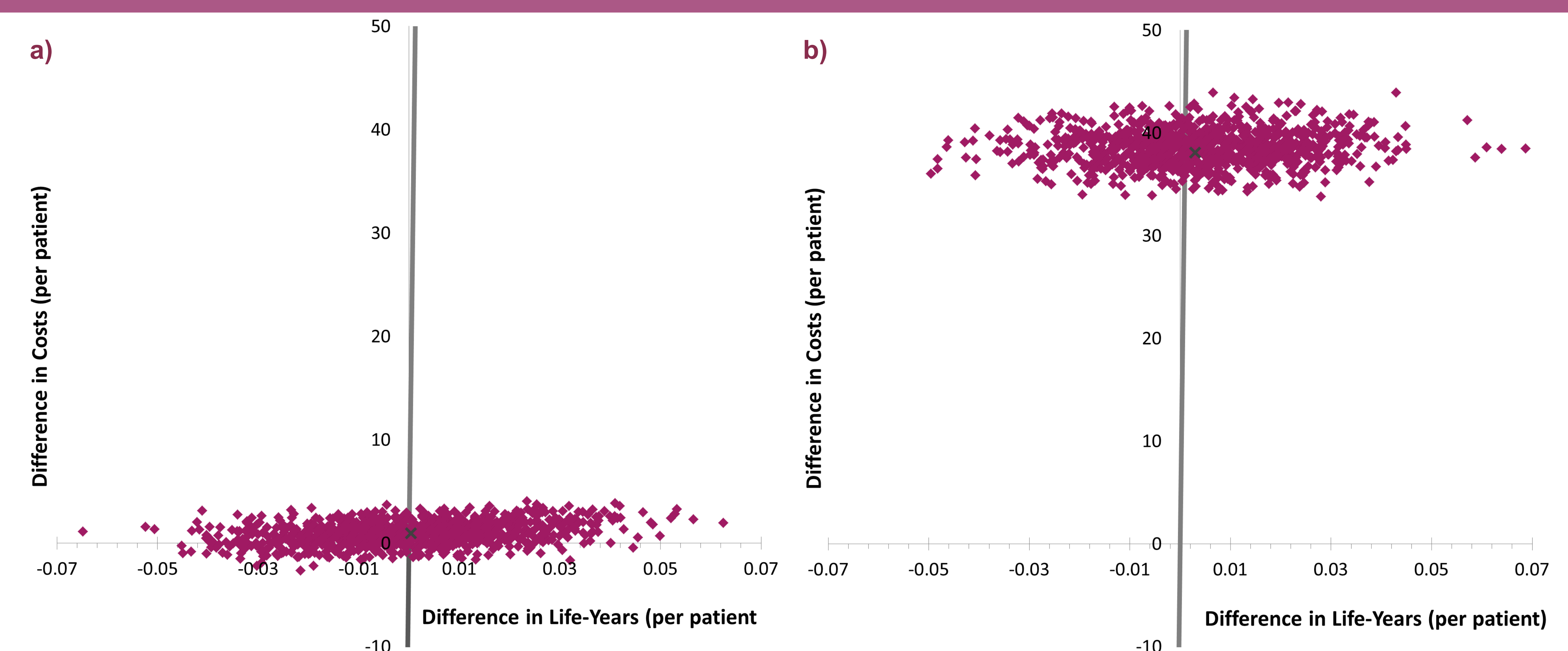


Figure 1: Probabilistic Sensitivity Analysis: a) Base case – analysis on whole population in the CR; b) Vaccinated only - analysis on subpopulation defined in Czech guidelines only. The grey line represent willingness to pay threshold (WTP). PCV13 shows to be cost-effective as more than 50% of the simulated results fall within the right upper quadrant.

Age group	Base Case			Vaccinated Only		
	Incremental Cost [EUR]	LYG	ICER [EUR/LYG]	Incremental Cost [EUR]	LYG	ICER [EUR/LYG]
50-64	0.27	-0.0002	Dominated	39.74	0.0039	10 065
65-74	0.90	0.0025	363	38.61	0.0048	7 982
75-84	2.46	-0.0007	Dominated	37.38	0.0033	11 331
85-99	6.6	0.0006	9 894	38.17	0.0026	14 894
Total	0.97	0.0004	2 265	38.11	0.0034	11 170

Table 2: Cost-effectiveness: Base case and Vaccinated Only costs and LYGs stratified by age groups. Due to bias, PCV13 seems to be dominated by PPSV23 in two age groups in the Base case. In both analyses, PCV13 is the most cost-effective option in the age group 65-74.

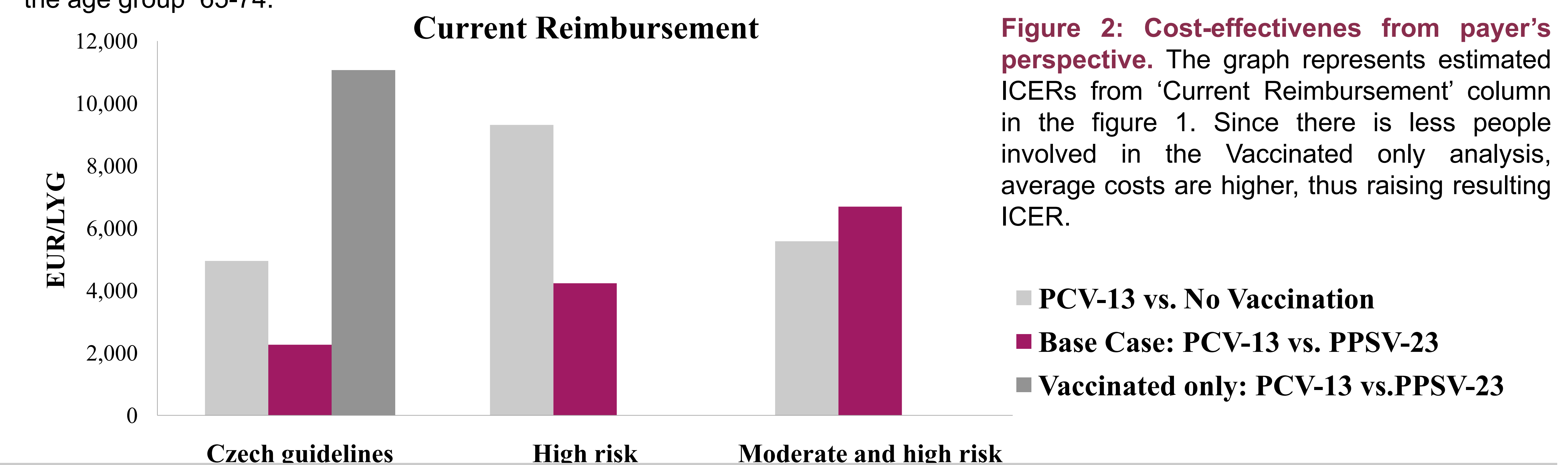


Figure 2: Cost-effectiveness from payer's perspective. The graph represents estimated ICERs from 'Current Reimbursement' column in the figure 1. Since there is less people involved in the Vaccinated only analysis, average costs are higher, thus raising resulting ICER.