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Estimating the short-term expected public health impact from the introduction of the 15-valent pneumococcal conjugate vaccine in Greece

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Introduction

- Pneumococcal disease remains one of the most common **vaccine-preventable childhood morbidity and mortality causes, responsible for invasive pneumococcal disease (IPD) and non-invasive clinical manifestations, such as non bacteremic pneumonia and otitis media (OM)[1].**
- IPD incidence in children **has decreased substantially since the introduction of the pediatric pneumococcal conjugate vaccines[2].**
- However, **the emergence of disease caused by non-vaccine serotypes, as well as the persistence of certain vaccine-targeted serotypes**, has resulted persistent IPD associated morbidity and mortality and, thus, the need for further improvements in prevention strategies.
- In the 2023 National Immunization Program (NIP) **both the 13-valent vaccine (PCV13) and 15-valent vaccine (PCV15) are recommended[3].**

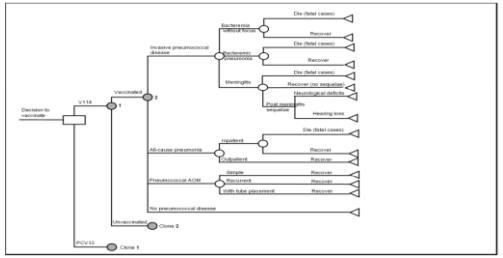
Aim

To quantify the short term (5 years) clinical and economic impact of switching from a PCV13-based strategy to a PCV15-based strategy in Greece.

Methods

- A published Markov model was utilized to estimate short term epidemiological/economic effect from the inclusion of the PCV15 (Figure 1)[4].

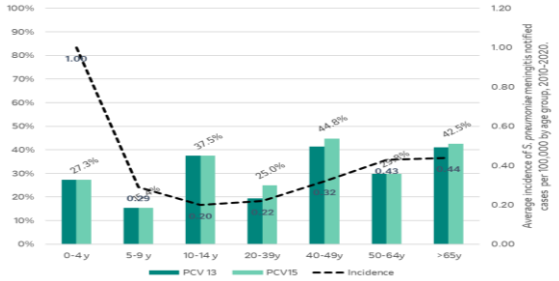
Figure 1: Schematic outline of the model



Inputs of the model

- IPD incidence and serotype distribution were derived from a retrospective surveillance study of pneumococcal meningitis in Greece (Figure 2)[2].

Figure 2: Meningitis incidence and serotype distribution[2]



- Due to the lack of local data, IPD case fatality rates, all cause pneumonia and all cause acute AOM were derived from the published literature[5-7].

Inputs of the model (cont')

- Vaccines costs were sourced from the latest Price bulleting, while medical costs were obtained from the literature or other official sources -Greek DRGs[8,9].

Results

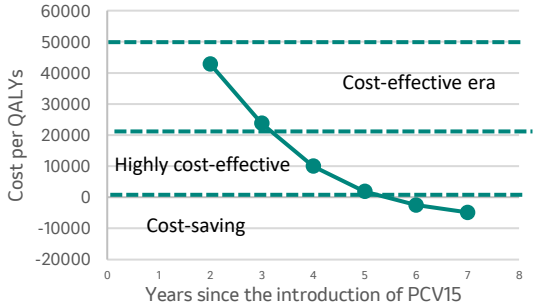
- Switching from PCV13 to PCV15 (birth cohort: 82,700) is expected to prevent 215 IPD cases, 100 pneumonia cases, 8590 OM cases and 25 IPD-related deaths over the next 5 years. Additionally, a PCV15-based strategy would provide 38 additional QALYs.
- Considering the cost of averted morbidity, a PCV15-based strategy is considered as highly cost effective, with a € 1,847 cost per QALY.

Table 1: Health and cost impact of switching from PCV13 to

	PCV15	PCV13	Incremental
Clinical outcomes			
IPD cases	4,985	5,200	-215
Pneumonia cases	169,391	169,491	-100
AOM cases	398,512	407,102	-8,590
PMS cases	842	868	-26
IPD deaths	775	800	-25
Costs €			
Vaccine	75,311,857	67,442,030	7,869,827
IPD treatment costs	96,708,185	100,261,832	-3,553,647
Pneumonia treatment costs	283,700,606	283,846,242	-145,637
AOM Treatment Costs	164,866,289	168,672,561	-3,806,273
PMS treatment costs	7,623,839	7,811,006	-187,167
Total Costs (€)	628,210,776	628,033,664	177,112
Outcomes			
QALYs	41,380,225	41,380,129	96
ICER			**1,847**

- A PCV-15 vaccination strategy appears as cost-effective immediately, after 4 years as highly cost-effective, and after 6 years as a cost-saving intervention.

Figure 3: Categorization of the intervention over time since the PCV15 introduction



Conclusions

- 2023's PCV15 inclusion the NIP provides the opportunity to reduce further morbidity and mortality, as well as the costs incurred by the healthcare system
- PCV-15 vaccination strategy is a cost-effective strategy that will be also cost-saving in a short time.
- If the purchase price of PCV15 is lower, the switching between cost effectiveness outputs (e.g., from cost effective -> Highly cost effective) will be quicker.

References

1. WHO, Pneumococcal conjugate vaccines,2. Xirogianni et al. Vaccine 2022 3. MoH, National immunization program of 2022, 4 Min et al. Vaccines,. 5. US CDC, Stoecker, et al. 2021, 6. Ramirez et al. CID 2017, 7.US CDC Active Bacterial Core Surveillance System (ABCs), 8. MoH, Drug Price Bulletin 2022, 9. MoH, Diagnosis related group (DRGs)