




## Reply letter to “response to article by Johnna Perdrizet et al.” by Gomez and colleagues

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### ABSTRACT

This communication seeks to address the questions and criticisms issued by Gomez and colleagues in their letter on our original study “Cost-effectiveness analysis of replacing the 10-valent pneumococcal conjugate vaccine (PCV10) with the 13-valent pneumococcal conjugate vaccine (PCV13) in Brazil infants.” Gomez and colleagues are concerned that the assumptions used in our model may have unintended negative impacts for Brazil decision-making and we intend to clarify any potential misinterpretation of our assessment.

### ARTICLE HISTORY

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### 1. Uncertainty in incidence rates is assessed and the best source for serotype distribution is used

Gomez and colleagues suggest an alternative data source for our base case invasive pneumococcal disease (IPD) incidence rates and question the appropriateness of SIREVA II for estimating serotype coverage. We agree that IPD incidence rates may present uncertainties, especially because, as we pointed in the limitations discussion, the data are from a passive laboratory surveillance system. Therefore, we rigorously tested IPD incidence rates in scenario analysis to assess the impact on results. As stated in our discussion “we tested the incidence data in scenario analysis using both Brazil and Chile IPD isolate case data [from SIREVA II]. Results showed that the use of PCV13 would remain cost saving compared with maintaining PCV10 in the Brazilian NIP, even when using other assumptions for IPD incidence rates.” The serotype coverage for PCVs were taken from a regional surveillance program (SIREVA II) implemented by the Pan American Health Organization (PAHO), which provides information on serotype distribution data for *Streptococcus pneumoniae* (Spn). It is important to note, that according to PAHO, the objective is to provide (1) a bank of biological material that allows the disease burden to be estimated, (2) direct national authorities in decision-making, (3) assist in determining the ideal PCV to be used in the region, and (4) facilitate the measurement of the impact of vaccine interventions.<sup>1</sup> Therefore, we believe this is the best source to obtain the serotype prevalence for Brazil across all ages given the objective set by PAHO for this surveillance program.

### 2. Greater protection from more serotype coverage is estimated to reduce otitis media episodes

In Gomez and colleagues’ opinion, the reduction in acute otitis media (AOM) cases caused by switching to PCV13 may not occur because of PCV10’s impact on AOM caused by

Nontypeable *Haemophilus influenzae* (NTHi). The protective effects of PCVs against AOM caused by NTHi is unknown, and additional evidence for both vaccines is necessary to quantify impact on AOM beyond Spn.<sup>2</sup> However, specifically for PCV10, the Clinical Otitis Media and Pneumonia Study (COMPAS) conducted in Latin America did not find a significant effect on NTHi-clinically confirmed AOM.<sup>3</sup> Our model predicts that broader serotype coverage afforded by PCV13 compared with PCV10 translates into further reductions of Spn AOM because of the substantial amount of 19A, 6A, and 3 disease circulating in Brazil. This is akin to real-world observations, where reduction in AOM cases have been observed in other countries when switching from a lower-valent to a higher-valent PCV.<sup>4</sup>

### 3. Structural uncertainty was tested and confirmed conclusion that PCV13 is the most cost-effective option in Brazil

The cost-effectiveness model used for this Brazil study uses the same assumptions as many other peer-reviewed studies, including country examples for Mexico, Colombia, Finland, Netherlands, Canada, Malaysia, Italy, and Australia.<sup>5–10</sup> This scientific methodology used for pneumococcal disease serotype trends has been recognized and is a strength of this study because we were able to show with numerous predictions from multiple countries the possible range of outcomes when switching to PCV13. These trendlines serve as a proxy for what Brazil can expect for a PCV13 NIP infant program and ultimately capture variations in uptake, antimicrobial resistance, underlying serotype dynamics, indirect effect, and historical schedules observed in other countries. Under these various scenarios, using the US, UK, Canada, and Quebec serotype dynamics, the conclusion for PCV13 remained the same; it

was more cost-saving and effective compared with maintaining PCV10.

#### 4. Countries should consider epidemiological factors when evaluating a vaccine switch

The World Health Organization (WHO) states that PCV13 offers additional benefit in settings where disease attributable to serotype 19A and 6C is significant and countries should consider epidemiological factors, including substantial changes in the prevalence of vaccine serotypes and in antimicrobial resistance patterns, to assess any transition between vaccines.<sup>11</sup> The SIREVA II report from last years in Brazil brings not only the prevalence changes, pointing to further increases in 19A disease, but also a considerable change in the antimicrobial resistance profile once more related to this serotype. Our methods include serotype prevalence and therefore which serotypes are causing disease cases and deaths, which Gomez and colleagues unfortunately disagree with when assessing the appropriateness of a vaccine for the population. The methods used in this study are especially necessary in the current policy context to inform decision makers on PCV use given the significant progressive increase in 19A, 6A, and 3 in Brazil.

#### Disclosure of potential conflicts of interest

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