

# Horizon Scanning of Immunisation Budget For Belgium Using an Immunisation Planning Tool

Steve Vermeersch<sup>1</sup>; André Bento-Abreu<sup>1</sup>; Nicolas Dauby<sup>2,3,4</sup>; Barbara Merckx<sup>1</sup>; Goran Bencina<sup>5</sup>

<sup>1</sup>MSD, Brussels, Belgium; <sup>2</sup>Department of Infectious Diseases, Centre Hospitalier Universitaire Saint-Pierre, Brussels, Belgium; <sup>3</sup>Institute for Medical Immunology, Université Libre de Bruxelles (ULB); <sup>4</sup>Environmental Health Research Centre, Public Health School, Université Libre de Bruxelles (ULB) Brussels, Belgium; <sup>5</sup>MSD, Madrid, Spain

## Background

- Strengthening vaccination programs is one of the objectives set within the European Union Commission proposal with actions for member states to increase vaccine coverage rates (VCRs), decrease burden of vaccine-preventable diseases in Europe and address immunization gaps<sup>1,2</sup>
- Vaccination in Belgium is a regional competency and the regional vaccination programs were the basis for this analysis. Reimbursement at federal level also exists
- The purpose of this analysis was to evaluate cost-per-capita of vaccines and cost of life-long immunization in the Flanders and Wallonia-Brussels regions of Belgium of currently implemented vaccine schedules but also additional registered vaccines

## Methods

- The Immunization Planning Tool (IPT) models budgetary impact based on published demographic data (population size by age group and sex accordingly to immunization schedule), official immunization schedules, vaccination coverage rate (VCR), healthcare and drug budget and cost input assumptions including vaccine list prices as conservative overestimation
- The base case results include 7 or 8 vaccines protecting against 13 or 14 infectious diseases, according to the current immunization schedules implemented by the Belgian regions of Flanders<sup>3</sup> and Wallonia-Brussels<sup>4</sup> (Table 1)
- The VCR remained unchanged during the time of analysis for all vaccines included in the base case
- Vaccine public list prices were used in the model. These were kept constant over time<sup>5</sup>
- The Healthcare budget in Belgium was projected to increase annually by 2.5%. Demographics until 2025 were retrieved from United Nations projections<sup>6</sup>
- For estimation of the cost throughout life, a theoretical approach was applied that every citizen is immunized in full compliance with the immunization schedule(s)
- The vaccine and immunization costs for the regions of Flanders and Wallonia-Brussels<sup>4,7</sup> were calculated separately, due to the difference in immunization schedules and VCRs. When applicable, results from the two regions were combined to estimate the costs for Belgium
- Reimbursed vaccines were not considered in this model but estimated separately to account for 32 Mio €/year<sup>9</sup>
- Results of the base case are for the year 2020

## Scenario Analysis: Inclusion of Vaccines Not Included in Current Immunization Programs

- The inclusion of vaccines which are currently registered but not yet included in the immunization schedules (Table 1) was tested in a scenario analysis. In this case, 14 vaccines offer protection against 20 infectious diseases
- The Measles-Mumps-Rubella (MMR) and Meningococcal C (MenC) vaccines were replaced in the model by the Measles-Mumps-Rubella-Varicella (MMRV) and Meningococcal ACWY (MenACWY) vaccines, respectively, during the period 2021-2022
- VCR remained unchanged during the time of the analysis for all vaccines currently included in the immunization schedules (and that were not replaced by other vaccines)
- For three new vaccines (Influenza vaccine for all adults 65+, Pneumococcal polysaccharide vaccine (PPSV23) and Zoster vaccine), a 3-year gradual VCR increase, after their inclusion in the immunization schedules, was considered in the model
- For the Meningococcal B (MenB) vaccine, a VCR to similar Meningococcal C vaccine was considered in the model since its inclusion in the immunization schedule (year 2023)
- Results of this scenario analysis are for the year 2025, to account for VCR stabilization of the new vaccines

## References

- Ethgen O, Rémy V, Wargo K. *Hum Vaccin Immunother*. 2018;14(12):2911-2915.
- Carroll S, Rojas AJ, Glennard AH, et al. *J Mark Access Health Policy*. 2015 Aug 12;3.
- Vlaams Agentschap zorg en gezondheid. Vaccination scheme. <https://www.zorg-en-gezondheid.be/basisvaccinatieschema> Access date: 01.06.2020.
- Vax info. Enquête de couverture vaccinale en Wallonie 2016. <https://www.vaxinfo.be/spip.php?article2000&lang=fr> Access date: 01.06.2020.
- Rijksinstituut voor ziekte- en invaliditeitsverzekering / Institut national d'assurance maladie-invalidité (RIZIV/INAMI). Programme web - Médicaments. <https://www.riziv.fgov.be/fr/programmes-web/Pages/specialites-pharmaceutiques.aspx> Access date: 01.06.2020.
- United Nations. World population prospects 2019. [cited 2019 Nov 18]. Available from: <https://population.un.org/wpp/> Access date: 01.06.2020.
- Vlaams Agentschap zorg en gezondheid. Studie van de vaccinatiegraad in Vlaanderen 2016. <https://www.zorg-en-gezondheid.be/sites/default/files/atoms/files/Vaccinatiegraadstudie%202016.pdf>
- Organisation for Economic Co-operation and Development. Health spending 2019. [https://stats2.oecd.org/index.aspx?DatasetCode=HEALTH\\_PHMC](https://stats2.oecd.org/index.aspx?DatasetCode=HEALTH_PHMC) Access date: 01.06.2020.
- Centre Belge d'Information Pharmacothérapeutique. <https://www.cbip.be> Access date: 01.06.2020.

**Table 1. Immunization Schedule in the Belgian Regions of Flanders and Wallonia-Brussels**

Vaccine	Schedule in the Regions of Flanders (F) and Wallonia-Brussels (WB)	Comment
<b>Vaccines included in current immunization schedules</b>		
Hexavalent (diphtheria, tetanus, acellular pertussis, Haemophilus influenzae b, hepatitis B and inactivated polio) vaccine	8, 12, 16 weeks, 15 months	
Diphtheria, tetanus, acellular pertussis and inactivated polio vaccine (DTaP/PIPV)	6 years (F) 5-6 years (WB)	
Human Papillomavirus vaccine	2 doses at 12-13 years (F) 2 doses at 13-14 years (WB)	
Influenza adult dose vaccine	Special populations (F)	Only in Flanders for vaccination of residents in elderly homes, in institutions for persons with disabilities, in psychiatric institutions
Meningococcal C conjugate vaccine	15 months	
Measles mumps and rubella vaccine	12 months, 10-11 years (F) 12 months, 11-12 years (WB)	
Pneumococcal conjugate vaccine	8, 16 weeks, 12 months	
Tetanus and diphtheria toxoids and acellular pertussis vaccine (Tdap)	14 years (F) 15-16 years (WB) Pregnant women (both regions)	Only in Flanders for revaccination adults every 10 years, cocoon vaccination, vaccination of persons who work with small children
<b>Vaccines not included in current immunization programs</b>		
Rotavirus vaccine	8, 12, 16 weeks	3rd dose depends on the vaccine used (Federal reimbursement exists)
Influenza adult dose vaccine	Adults 65+ At risk populations, persons employed in the health sector, people living together with at risk populations	Federal reimbursement exists
Pneumococcal polysaccharide vaccine (PPSV23)	Adults 65+ Adults at medium risk (50+) Adults at high risk (18+)	
Measles, mumps, rubella and varicella vaccine	12 months, 10 years (F) 12 months, 11-12 years (WB)	
Meningococcal I ACWY	15 months, 15-16 years	
Meningococcal B	8 weeks, 16 weeks, 11-14 months	
Zoster vaccine	Adults 65+	

## Results

- Results of base case and scenario analysis are presented in Table 2 and Table 3 for the Belgian regions of Flanders and Wallonia-Brussels, respectively

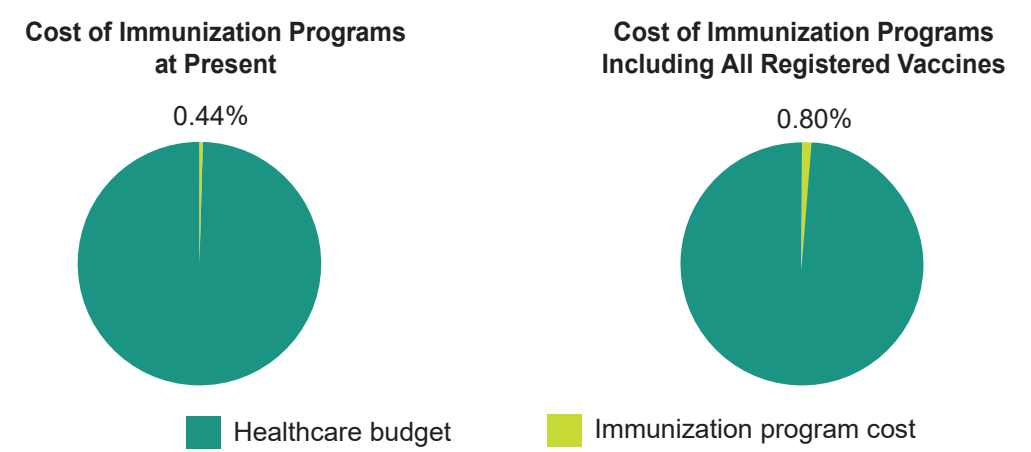
### Current Immunization Schedule

- The estimated cost of vaccines for the year 2020 in Flanders is €63.9 million and in Wallonia-Brussels is €34.4 million
- The estimated cost of the immunization programs in Flanders is €77 million and in Wallonia-Brussels is €41 million
- The cost of both immunization programs represents 0.44% of the total healthcare budget in Belgium (Figure 1)
- The cost per capita of vaccines in Belgium is €8.5. This cost is several folds lower compared to the drug costs of other therapeutic groups<sup>8</sup> (see Figure 2)
- If every individual in Belgium would be immunized in full compliance with the current immunization schedule, the cost of life-long immunization would be €930

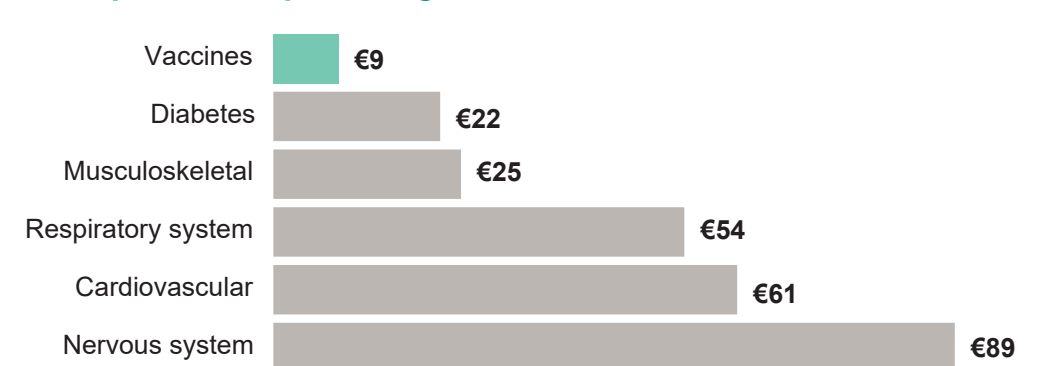
### Inclusion of Registered Vaccines Not Yet Included in Current Immunization Schedules

- When all registered vaccines are included to the immunization programs, the cost of immunization represents 0.80% of the total healthcare budget in Belgium (Figure 1)
- The vaccine cost per capita in Belgium increases to €17 when all registered vaccines are included in the immunization schedules
- The cost to immunize a citizen for his entire life against 20 infectious diseases ranges from €1956 for men to €2063 for women (Table 2 and Table 3)

**Figure 1. Cost of Immunization Programs Relative to Healthcare Budget in Belgium**



**Figure 2. Cost Per Capita of Vaccines and Drugs for Different Therapeutic Groups, in Belgium**



**Table 2. Cost of Vaccines and Immunization in Flanders**

	Immunization Schedule	
	Current	Including All Registered Vaccines
Total cost of immunization program (EUR)	76,947,859	149,010,897
Total cost of vaccines (EUR)	63,900,916	122,386,966
Immunization program costs of healthcare budget (%)	0.29%	0.48%
Cost of immunization program per capita (EUR)	11.5	21.7
Cost of vaccine per capita (EUR)	9.5	17.9
Cost of life-long immunization per person (Men; EUR)	930	1956
Cost of life-long immunization per person (Women; EUR)	930	2063

**Table 3. Cost of Vaccines and Immunization in Wallonia-Brussels**

	Immunization Schedule	
	Current	Including All Registered Vaccines
Total cost of immunization program (EUR)	41,047,909	96,667,294
Total cost of vaccines (EUR)	34,425,191	78,591,271
Immunization program costs of healthcare budget (%)	0.15%	0.31%
Cost of immunization program per capita (EUR)	8.5	19.5
Cost of vaccine per capita (EUR)	7.1	15.8
Cost of life-long immunization per person (Men; EUR)	930	1956
Cost of life-long immunization per person (Women; EUR)	930	2063

## Limitations

- Vaccine public list prices were used in the model. Furthermore, the analysis assumed no change of vaccine prices during 2020 – 2025. These were kept constant over time
- Assumptions were made on the VCR of the new vaccines: PPSV23 and Zoster vaccine
- The VCR of new vaccines replacing existing vaccines was assumed to remain the same
- The analysis was based on the regional vaccination programs of Flanders and Wallonia Brussels. Federal reimbursed vaccines were not considered
- Health impacts are not considered with this model

## Conclusions

- Although vaccination is widely recognized as one of the most cost-effective public health interventions for disease prevention, results of this analysis shows that vaccines still entail a relatively low level of investment in Belgium
- The total cost of immunization in Belgium currently represents 0.44% of the Healthcare budget in Belgium. This cost would still represent less than 1% (0.80%) of the healthcare budget if all registered vaccines should be included in the immunization programs
- Improving uptake of vaccination is critical in periods when payers are looking for solutions for more efficient healthcare resource use, but this will require appropriate budgets and resources to be allocated to vaccination programs