1.1. Projection of the number of contacts with GPs (Demand), evolution in % (S-18)

1.1.1. Documentation sheet

Description	**Primary indicator** Projected number of contacts with general practitioners up to 2033. **Secondary indicator** Projected number of contacts with physicians up to 2033.
Calculation	PROMES (PROjecting Medical Spending) is a microsimulation model developed by the Federal Planning Bureau in collaboration with RIZIV – INAMI. The model provides a detailed analytical insight in the determinants of the evolution of healthcare expenditure covered by compulsory health insurance and makes it possible to project these in the short and medium term. In what follows, we use the projections of care consumption (number of contacts (consultations and visits) with physicians) to quantify the evolution of the demand for healthcare professionals. Care consumption is modelled on the basis of micro data from the Permanent Sample (EPS) of IMA – AIM. The model consists of about 25 modules corresponding to different expenditure groups. In what follows, the module "physicians' fees" is used. Care consumption is modelled using a two-step model in which the probability of use (step 1) and the volume (step 2) are explained in function of individual demographic and socio-economic characteristics, indicators of morbidity, previous consumption and environmental factors. Projections for exogenous variables are made on the basis of a dynamic projection model and aligned with available external data (such as demographic projections, etc.). The model is illustrated in Figure 1. The different components of the model are described in Table 1. More details can be found in Geerts et al. (2018).[1] Projections are made separately for four sub-modules: GP consultations, GP visits, medical specialist contacts and emergency specialist contacts. Results from the first two categories are aggregated to measure the projected number of contacts with GPs (main indicator) and results from all four categories are aggregated to measure the projected number of contacts with physicians (secondary indicator). The following services are not included in the calculation of the number of contacts: advices, technical medical services, medical assistance during urgent transfer by ambulance to the hospital, psychotherapies, management and renewal of the global medical file with/without MyCareNet, management and renewal of the global medical file for patients with a chronic condition, expansion of the global medical file for patients with a chronic condition, follow-up of patients with type 2 diabetes, care path contract for renal insufficiency, care path contract for diabetes, permanence and availability, management of COVID-19 patients, multidisciplinary spine consultations and teleconsultations.
Rationale	Projected numbers of contacts with physicians are used as proxies for the demand for physicians. Future trends in consumption must be analysed in regard with future trends in supply of these health professionals in order to anticipate a potential future imbalance. The projected numbers of contacts with physicians from the PROMES model are used as an indicator of future workforce demand (indicator S-18) and the projected numbers of FTEs from the workforce model used by the Planning Commission of medical supply (S-19) are used as in indicator of future workforce supply.
Data source	Federal Planning Bureau, RIZIV – INAMI, IMA – AIM
Technical definitions	The PROMES 2.17 estimates of September 2023 are based on the EPS release 17, which includes data up to 2021. Given the large impact of COVID-19 on healthcare use, the data for 2020 -2021 were not included in the care consumption regression analyses.

	The insured population projections were aligned with the population and households projection data from the Federal Planning Bureau and Statbel of January 2023 and with the unemployment projections from the Federal Planning Bureau of July 2023, which do take into account the impact of the pandemic. Only individuals residing in Belgium were included in the regression analyses. To obtain projection results for the entire insured population, including the insured persons residing abroad, a specific scaling factor is applied to the projection results for each expenditure group. Results for the projection period (2022-2033) are scaled-up results but for the observation period (2008-2021), insured persons not residing in Belgium are not included. Results are presented for Belgium and by region (based on the insured person's place of residence).
Limitations	Missing determinants of care consumption: the model uses data from the Permanent Sample, which does not contain information on some individual characteristics that may influence demand for care: (household) income, level of education, lifestyle (diet, alcohol and tobacco consumption, physical activity, etc.), medical background, professional situation, etc. Quality of the projection of the exogenous variables: even if the PROMES model explains the consumption of care, it was primarily designed to carry out projections and simulations of policies. Consequently, the quality of the results of the model depends not only on the "completeness" of the estimated model, but also on the quality of the projection of the exogenous variables (those which are not explained by the model). Although this aspect does not play an important role for policy simulation (where the emphasis is placed on the deviation from the base simulation), this is particularly important for the base projections that are used here. One must keep in mind that the model is used here for a different purpose (i.e. projection of physician workforce demand) than that for which it was designed. Medical density: in the behavioural model (see Figure 1 and Table 1), medical density is used as an explanatory variable. In addition, when results from the behavioural model are reweighted so that they can be applied to future populations, medical density is projected using projections of supply of healthcare professionals as described in indicator S-19. As one purpose of this indicator of future demand is to compare it to projections of future supply of healthcare professionals (indicator S-19) one may see this as an endogeneity issue. However, medical density only plays a minor role in the behavioural model. Nevertheless, to assess the importance of this effect, we also present results from an alternative scenario where medical density projections are maintained artificially constant from 2022 onwards. Consumption of care is used as a proxy for the demand of care and does not correspond to needs nor to health objectives (see for instance Cookson et al. 2013 and Benahmed et al., 2018).[2, 3]
Dimension	Sustainability
Related indicators	S-19 – Projection of the number of practising GPs (Supply), evolution in % A-10 – Practising physicians (/1000 population)
Reviewers	Joanna Geerts (Federal Planning Bureau); Karen Geurts (Federal Planning Bureau)

Figure 1 – Structure of the projection model

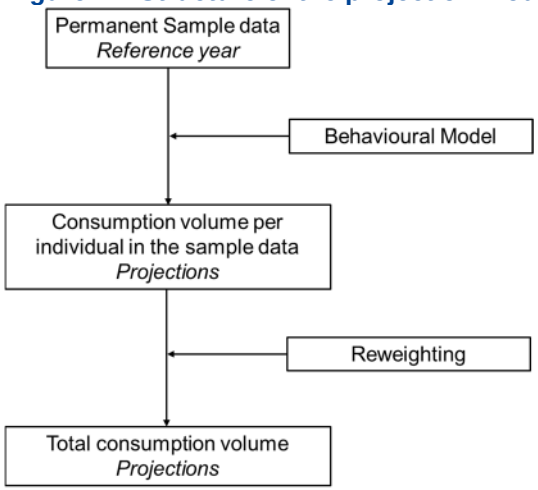


Table 1 – Components of the projection model

Element	Explanation
Permanent Sample	The Permanent Sample is a longitudinal administrative database containing data on healthcare services covered by the compulsory health insurance for a sample of the population made up of around 1/40 of the insured persons under 65 and 1/20 of the insured persons aged 65 and over.
Behavioural Model	The estimation of the behavioural model is carried out on the Permanent Sample (n> 300 000) for the period 2010-2019. The behavioural model, at the individual level, links consumption of care to relevant individual characteristics such as age, gender, health status, employment status and insured status. It allows to estimate, from specific characteristics of an individual, the probability of using care and the volume of care. For consultations and visits of physicians, the probability of using care is modelled using logistic regressions including the following exogenous characteristics: - Demographics: age group, gender, interaction age-gender - Individual health status: general health status indicator, chronic illness/invalidity indicator, indicators on specific chronic conditions - Flu epidemic variable at the national level

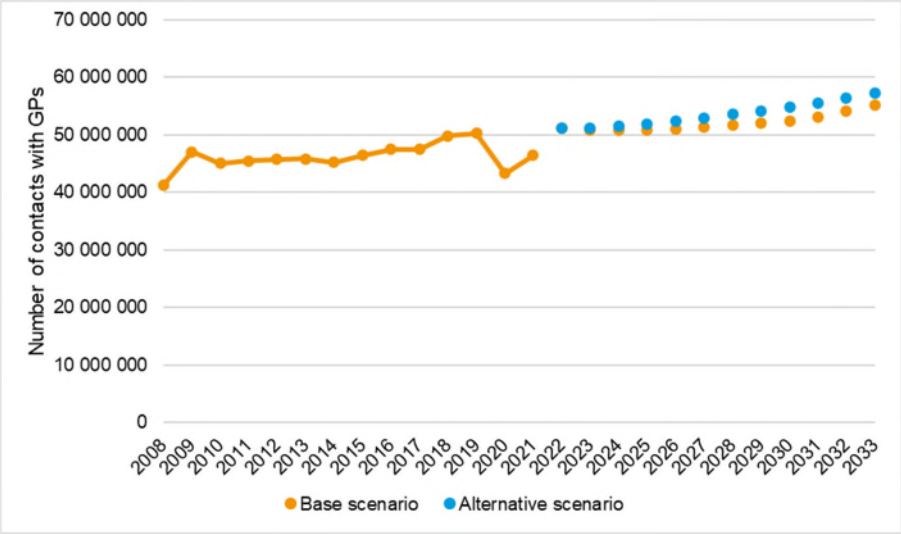
	- Socio-economic status: unemployment status, long-term unemployment status, isolated/cohabiting status, right to guaranteed income (income guarantee for the elderly, subsistence income and/or right to help from OCMW – CPAS), primary work incapacity (at least one day) - Insurance status: entitlement to increased reimbursement status, global medical file, maximum billing reimbursement - Living environment: district, population density - Medical density: number of GPs, of medical specialists and of emergency specialists per 1 000 inhabitants (at the level of the district) and the following endogenous characteristics representing previous care: - Hospitalisation (t-1, t-2, t-3) - Contacts with physicians (t-1) The volume of care is then modelled using a truncated-Poisson model.
Reweighting	Results from the behavioural models are reweighted so that they can be applied to future populations. Adjustments are made, either using external data when available, or using a separate dynamic microsimulation model for the projection of exogenous variables (on a yearly basis, based on the Permanent Sample 2008-2019). This dynamic projection model simulates the aging, year after year, of the individuals in the Permanent Sample, and projects the prevalences of the categories of the various exogenous variables. Births, deaths, immigrations and emigrations are also simulated: - Demographic characteristics using demographic projections made by the Federal Planning Bureau and Statbel - Individual health status characteristics using the dynamic microsimulation model - Flu epidemic variable using historical data from Sciensano - Social status characteristics using the dynamic microsimulation model aligned with households and unemployment projections made by the Federal Planning Bureau - Insurance status characteristics using the dynamic microsimulation model - Medical densities using projections of supply of healthcare professionals made by the Planning Commission of medical supply supported by the Planning Unit for the Supply of the Health Care Professions, FPS Public Health, Food Chain Safety and Environment

1.1.2. Results

General practitioners

In 2021, there were around 46.5 million contacts (consultations and visits) with GPs in Belgium (50.3 million in 2019). This number is expected to increase to 55.3 million in 2033 which represents an average annual increase of 0.7% between 2022 and 2033 (base scenario, Figure 2). When maintaining medical density artificially constant, the expected increase in the number of contacts with GP is slightly larger, up to 57.3 million in 2033, that is an average annual increase of 1.0% between 2022 and 2033 (alternative scenario, Figure 2).

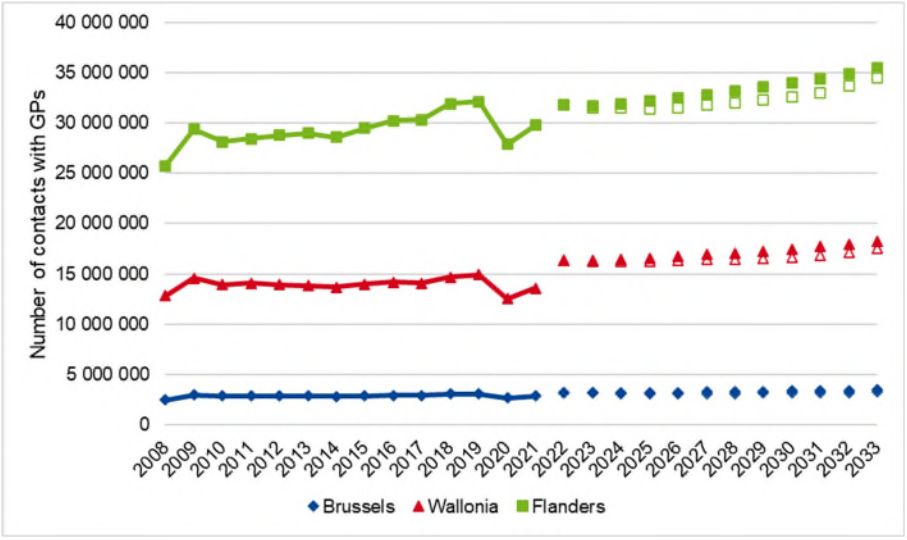
Figure 2 – Projected number of contacts (consultations and visits) with GPs in Belgium (2022-2033)



Source: Federal Planning Bureau, PROMES model estimates September 2023 based on EPS 17. In the alternative scenario, medical density projections are maintained artificially constant.

At a five-year horizon, between 2022 and 2027, the number of contacts with GPs in Belgium is expected to increase by 3.4% (alternative scenario, Table 2). This corresponds to an increase of 3.2% in Brussels, 3.4% in Flanders and 3.6% in Wallonia (alternative scenario, Figure 3 and Table 3).

Figure 3 – Projected number of contacts (consultations and visits) with GPs in the three Belgian regions (2022-2033)



Source: Federal Planning Bureau, PROMES model estimates September 2023 based on EPS 17. In the alternative scenario (represented by plain markers), medical density projections are maintained artificially constant. Empty markers depict the base scenario.

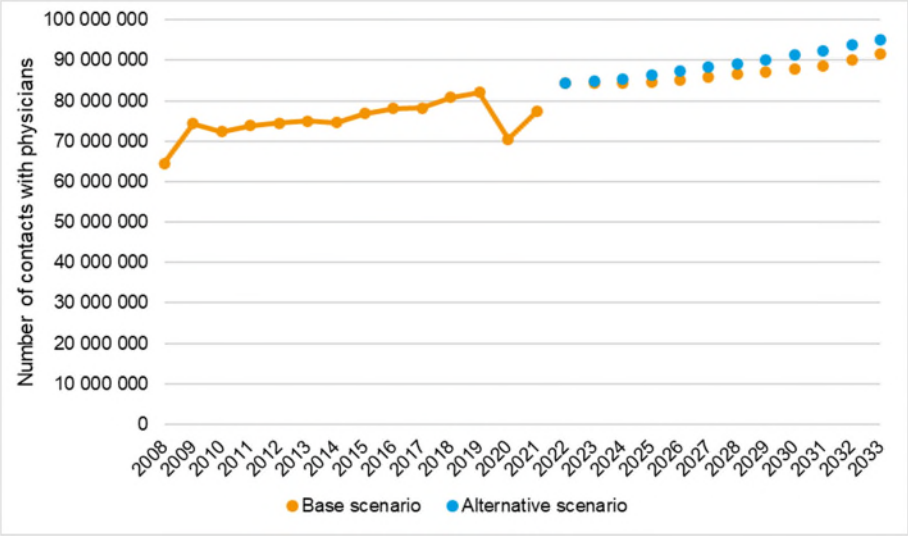
All physicians

For all physicians, in Belgium in 2021, there were around 77.4 million contacts (consultations and visits), compared to around 82.0 million in 2019. The number of contacts with physicians is expected to increase to 91.5

million in 2033 which represents an average annual increase of 0.8% between 2022 and 2033 (base scenario, Figure 4). When maintaining medical density artificially constant, the expected number of contacts in 2033 is 95.1 million, corresponding to an average annual increase of 1.1% between 2022 and 2033 (alternative scenario, Figure 4).

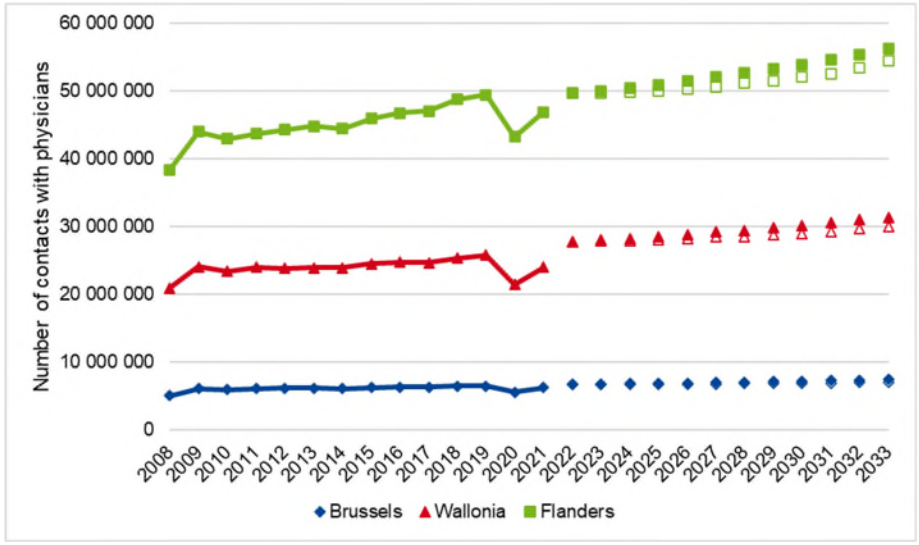
At a five-year horizon, between 2022 and 2027, the number of contacts with physicians in Belgium is expected to increase by 4.7% (alternative scenario, Table 2). The increase is lower in Brussels (4.0%) than in Flanders (4.7%) and in Wallonia (5.0%) (alternative scenario, Figure 5 and Table 4).

Figure 4 – Projected number of contacts (consultations and visits) with physicians in Belgium (2022-2033)



Source: Federal Planning Bureau, PROMES model estimates September 2023 based on EPS 17. In the alternative scenario, medical density projections are maintained artificially constant.

Figure 5 – Projected number of contacts (consultations and visits) with physicians in the three Belgian regions (2022-2033)



Source: Federal Planning Bureau, PROMES model estimates September 2023 based on EPS 17. In the alternative scenario (represented by plain markers), medical density projections are maintained artificially constant. Empty markers depict the base scenario.

Table 2 – Projected increase in the number of contacts with GPs and all physicians in Belgium (2022-2033)

	GPs		Physicians	
	Projected annual increase			
	base scenario	alternative scenario	base scenario	alternative scenario
2022	10.33%	10.33%	8.88%	8.88%
2023	-0.66%	0.03%	0.01%	0.60%
2024	-0.10%	0.61%	0.20%	0.80%
2025	0.03%	0.76%	0.33%	0.94%
2026	0.29%	1.01%	0.60%	1.21%
2027	0.62%	0.97%	0.73%	1.08%
2028	0.65%	1.01%	0.75%	1.10%
2029	0.74%	1.08%	0.77%	1.11%
2030	0.83%	1.17%	0.81%	1.16%
2031	1.03%	1.39%	0.94%	1.30%
2032	2.01%	1.50%	1.57%	1.41%
2033	2.16%	1.64%	1.62%	1.44%
	Projected five year increase			
2022-2027	0.18%	3.42%	1.89%	4.72%
2027-2032	5.36%	6.32%	4.93%	6.23%

Source: Federal Planning Bureau, PROMES model estimates September 2023 based on EPS 17. In the alternative scenario, medical density projections are maintained artificially constant.

Table 3 – Projected increase in the number of contacts with GPs in the three Belgian regions (2022-2033)

GPs	Brussels	Flanders	Wallonia
	Projected annual increase (alternative scenario)		
2022	9.94%	6.53%	19.99%
2023	0.67%	-0.02%	0.01%
2024	0.24%	0.63%	0.65%
2025	1.11%	0.70%	0.80%
2026	0.63%	1.10%	0.90%
2027	0.52%	0.92%	1.16%
2028	0.69%	1.18%	0.74%
2029	1.45%	1.01%	1.15%
2030	1.05%	1.27%	1.01%
2031	0.64%	1.25%	1.81%
2032	1.18%	1.57%	1.44%
2033	1.40%	1.67%	1.64%
	Projected five year increase (alternative scenario)		
2022-2027	3.21%	3.37%	3.57%
2027-2032	5.10%	6.44%	6.31%

Source: Federal Planning Bureau, PROMES model estimates September 2023 based on EPS 17. In the alternative scenario, medical density projections are maintained artificially constant.

Table 4 – Projected increase in the number of contacts with physicians in the three Belgian regions (2022-2033)

Physicians	Brussels	Flanders	Wallonia
	Projected annual increase (alternative scenario)		
2022	8.21%	6.00%	15.98%
2023	1.09%	0.51%	0.64%
2024	0.47%	0.78%	0.91%
2025	1.07%	0.92%	0.95%
2026	0.68%	1.30%	1.19%
2027	0.58%	1.06%	1.24%
2028	1.02%	1.28%	0.80%
2029	1.50%	1.02%	1.16%
2030	1.10%	1.22%	1.05%
2031	0.59%	1.24%	1.58%
2032	1.37%	1.48%	1.29%
2033	1.32%	1.51%	1.33%
	Projected five year increase (alternative scenario)		
2022-2027	3.96%	4.65%	5.02%
2027-2032	5.70%	6.42%	6.03%

Source: Federal Planning Bureau, PROMES model estimates September 2023 based on EPS 17. In the alternative scenario, medical density projections are maintained artificially constant.

Key points

- **Results from the microsimulation model PROMES with constant medical densities show an expected increase in the number of contacts with GPs in Belgium: from around 51.3 million contacts in 2022 up to 57.3 million in 2033, that is an average annual increase of 1%.**
- **Between 2022 and 2027, an increase of the number of contacts with GPs of 3.4% is projected for Belgium (3.2% in Brussels, 3.6% in Wallonia and 3.4% in Flanders).**
- **The number of contacts with all physicians in Belgium is expected to increase from around 84.2 million contacts in 2022 up to 95.1 million in 2033, that is an average annual increase of 1.1%.**
- **Between 2022 and 2027, an increase of the number of contacts with physicians of 4.7% is projected for Belgium (4.0% in Brussels, 5.0% in Wallonia and 4.7% in Flanders).**

References

1. Geerts J, Van den Bosch K, Willemé P. PROMES – Un nouvel instrument de projection des dépenses de l'AMI pour les soins de santé. Brussels: Bureau Fédéral du Plan; 2018.
2. Benahmed N, Deliège D, De Wever A, Pirson M. La planification des médecins en Europe: une revue de la littérature des modèles de projection. Revue d'Épidémiologie et de Santé Publique. 2018;66(1):63-73.
3. Cookson R, Sainsbury R, Glendinning C. Jonathan Bradshaw on Social Policy: Selected writings 1972-2011. York: University of York; 2013.