1. SUSTAINABILITY: PROJECTION-BASED INDICATORS

1.1. Physician workforce demand (S-18)

1.1.1. Documentation sheet

Description	Principal indicator: Projected number of contacts with general practitioners up to 2025. Secondary indicator: Projected number of contacts with physicians up to 2025.
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 vision of 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. Results are presented for Belgium and by region (based on the patient'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 emphases is put 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) from the one it was designed for.

	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 2020 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[2] and Benahmed et al., 2018[3]).
Rationale	Projected numbers of contacts with physicians are used as proxies for the demand for such 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. In the model of workforce projection used by the Planning Commission of medical supply (see indicator S-19), future demand is already taken into account. Indeed, in that model, workforce density is weighted by healthcare consumption. However: (1) consumption is measured by expenditures but fees are not proportional to the time spent with a patient and (2) basis scenario projections account only for the evolution of population but suppose consumption is unchanged in each segment of the population. With respect to both aspects, projected numbers of contacts with physicians from the PROMES model are better suited to estimate future demand. For that reason, projected numbers of contacts with physicians from the PROMES model are used in this report as an indicator of future workforce demand (indicator S-18) and the indicator of future workforce supply (S-19) will be cleaned from demand effects.
Data source	Federal Planning Bureau, RIZIV – INAMI, IMA – AIM
Dimension	Sustainability
Related indicators	S-19 – Physician workforce supply (projections of supply of GPs, in individuals and FTEs; projections of supply of physicians, in individuals and FTEs)

Figure 1 – Structure of the projection model

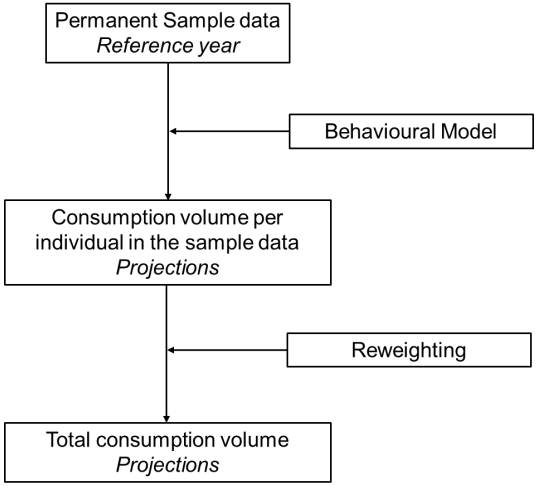


Table 1 – Components of the projection model

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 a sample of 50% of the Permanent Sample (n> 150 000) for the period 2010-2017. The behavioural model, at the individual level, links consumption of care to relevant individual characteristics such as age category, 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 this care. In particular, for consultations and visits of physicians, the probability of using care is modelled using logistic regressions including the following exogenous characteristics (for more details, see Geerts et al., 2018[4]): - Demographics: age group, gender, interaction age-gender - Individual health status: general health status indicator, chronic illness/invalidity indicator, specific chronic illness indicator - Flu epidemic variable at the national level - Social status: unemployment status, long-term unemployment status, isolated/cohabiting status - Insurance status: entitlement to increased reimbursement status, global medical file, maximum billing reimbursement

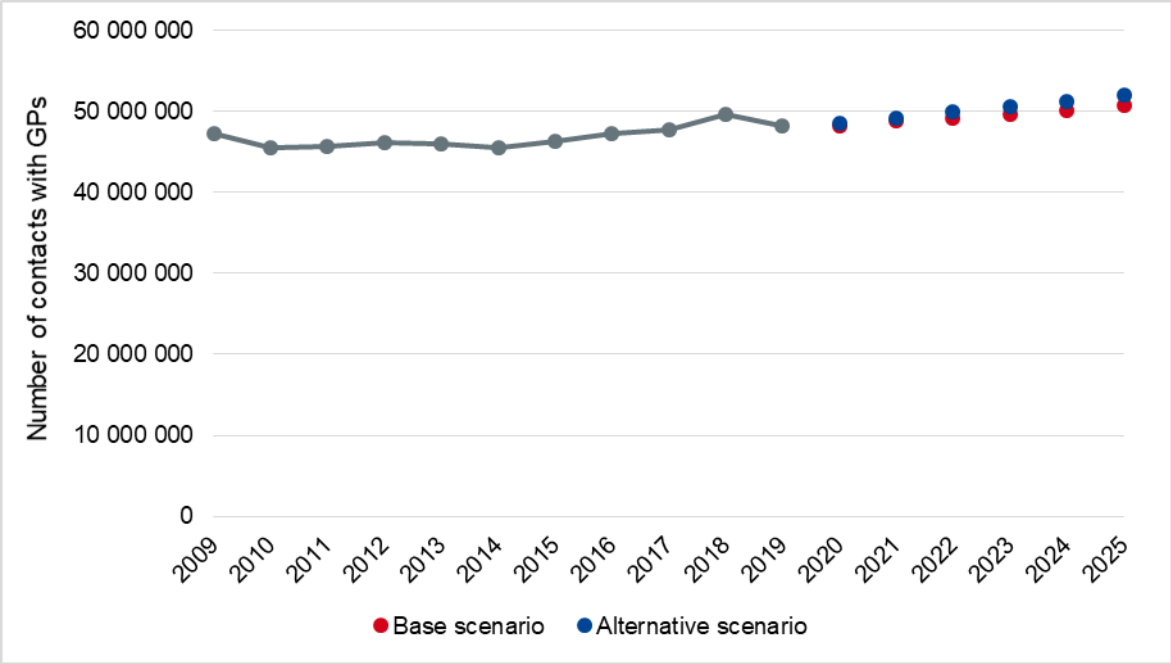
	- Living environment: district, urbanisation level - Medical density of physicians - Co-payment ("*ticket modérateur / remgeld*") and the following endogenous characteristics representing previous care: - Hospitalisation (t-1, t-2, t-3) - Contacts with physicians (t-1) The volume of care is then modelled 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 2008-2017). This dynamic projection model simulates the aging, year after year, of the individuals in the Permanent Sample, and the undergoing transitions between the categories of the various exogenous variables. Births, deaths, immigrations and emigrations are also simulated. - Demographic characteristics are projected using demographic projections made by the Federal Planning Bureau and Statbel - Individual health status characteristics are projected using the dynamic microsimulation model - Flu epidemic variable is projected using historical data from Sciensano - Social status characteristics are projected using the dynamic microsimulation model aligned with households and unemployment projections made by the Federal Planning Bureau - Insurance status characteristics are projected using the dynamic microsimulation model - Urbanisation level is projected using the dynamic microsimulation model - Medical densities are projected 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

In 2017, there were around 47.7 million contacts (consultations and visits) with GPs in Belgium. This number is expected to increase to 50.7 million in 2025 which represents an average annual increase of 0.8% (base scenario, Figure 2). When maintaining medical density artificially constant (i.e. neutralising potential induced demand effect), the expected increase in the number of contacts with GPs is slightly larger, up to 51.9 million in 2025, that is an average annual increase of 1.1% (alternative scenario, Figure 2).

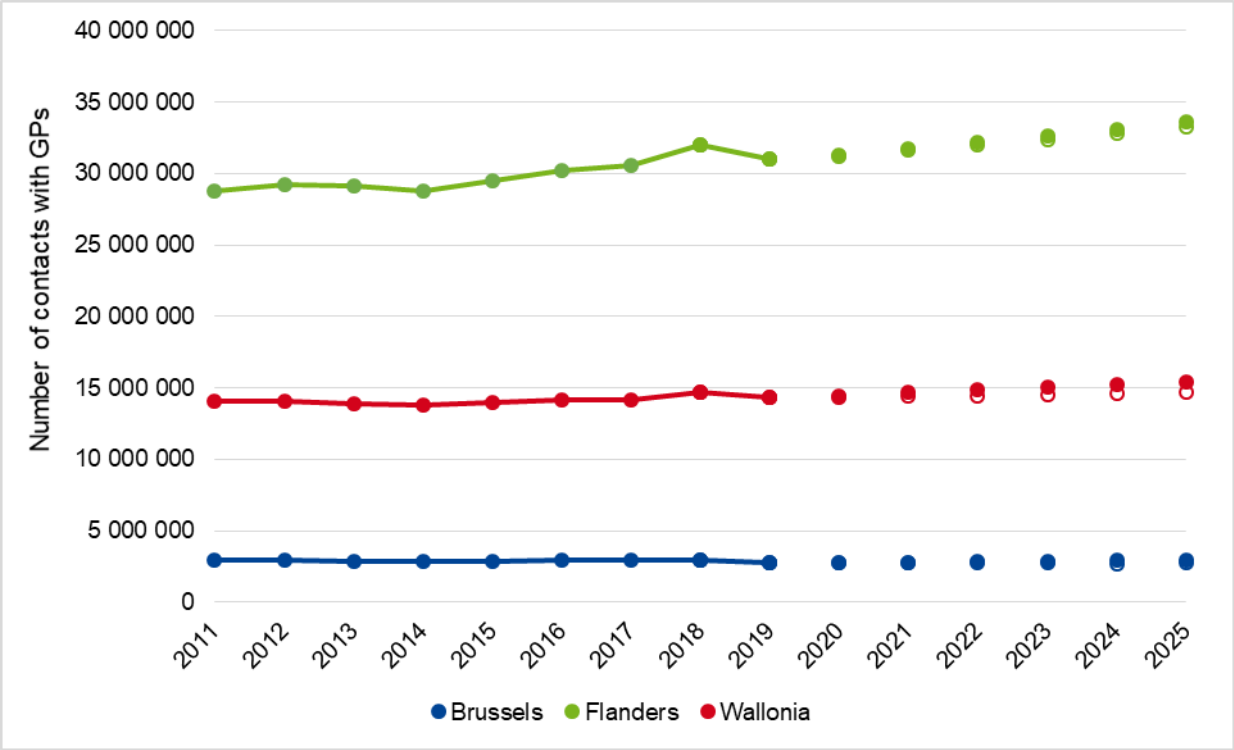
Between 2020 and 2025, the number of contacts with GPs in Belgium is expected to increase by 7.1% (alternative scenario, Table 2). The increase is a bit lower in Brussels (5.5%) than in Wallonia (7.0%) and Flanders (7.4%) (alternative scenario, Figure 3 and Table 3).

Figure 2 – Projected number of contacts (consultations and visits) with GPs in Belgium (2020-2025)



Source: Federal Planning Bureau, PROMES model estimates June 2020 based on EPS 13. In the alternative scenario, medical density projections are maintained artificially constant. The peak in 2018 may be due to different factors such as the introduction of eAttest for GP consultations (GPs submit financial statements directly to the sickness fund rather than on paper to the patient) which accelerated the reimbursement and booking; a longer influenza peak in 2018; the projected values of other exogenous variables.

Figure 3 – Projected number of contacts (consultations and visits) with GPs in the three Belgian regions (2020-2025)

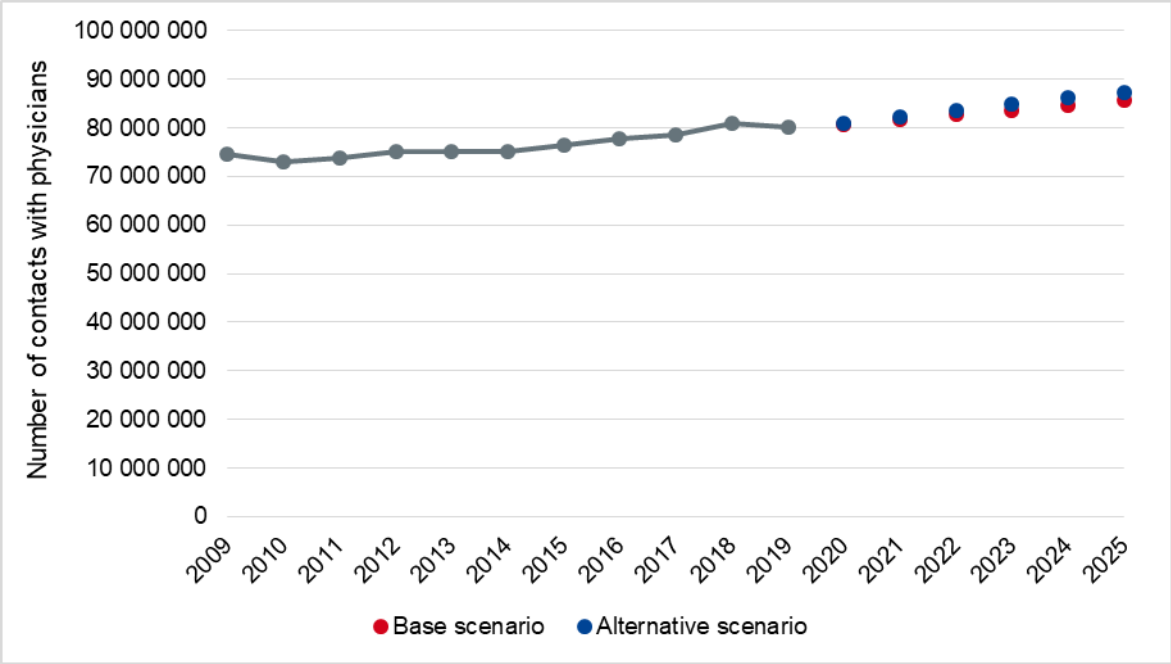


Source: Federal Planning Bureau, PROMES model estimates June 2020 based on EPS 13. In the alternative scenario (represented by plain dots), medical density projections are maintained artificially constant. Empty dots depict the base scenario. Region is determined by the patient's place of residence.

For all physicians in Belgium in 2017, there were around 78.5 million contacts (consultations and visits). The number of contacts with physicians is expected to increase to 85.8 million in 2025 which represents an average annual increase of 1.1% (base scenario, Figure 4). When maintaining medical density artificially constant (i.e. neutralising potential induced demand effect), the expected number of contacts in 2025 is 87.4 million, corresponding to an average annual increase of 1.4% (alternative scenario, Figure 4).

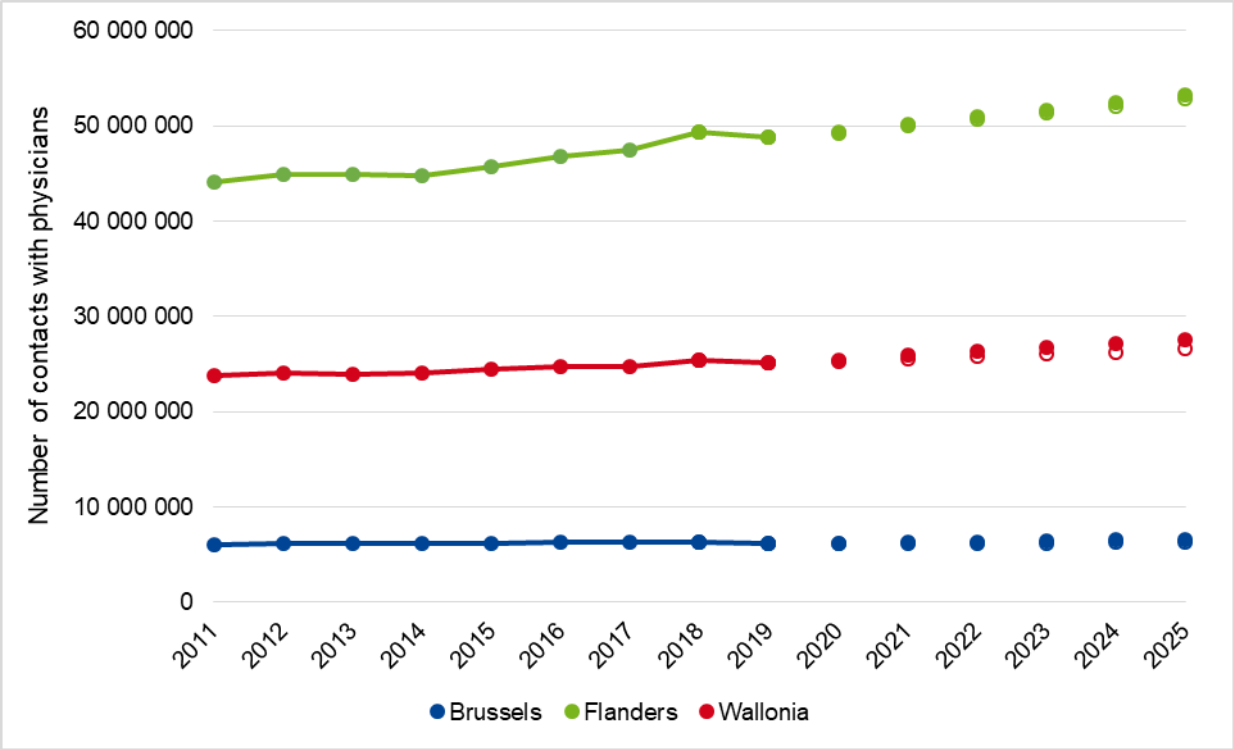
Between 2020 and 2025, the number of contacts with physicians in Belgium is expected to increase by 7.9% (alternative scenario, Table 2). The increase is a bit lower in Brussels (6.6%) than in the two other regions (8.0%) (alternative scenario, Figure 5 and Table 4).

Figure 4 – Projected number of contacts (consultations and visits) with physicians in Belgium (2020-2025)



Source: Federal Planning Bureau, PROMES model estimates June 2020 based on EPS 13. 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 (2020-2025)



Source: Federal Planning Bureau, PROMES model estimates June 2020 based on EPS 13. In the alternative scenario (represented by plain dots), medical density projections are maintained artificially constant. Empty dots depict the base scenario. Region is determined by the patient's place of residence.

Table 2 – Projected increase in the number of contacts with GPs and all physicians in Belgium (2020-2025)

	GPs		Physicians	
	Projected annual increase			
	base scenario	alternative scenario	base scenario	alternative scenario
2020	0.23%	0.67%	0.66%	0.99%
2021	1.06%	1.57%	1.29%	1.68%
2022	0.94%	1.40%	1.19%	1.56%
2023	0.88%	1.33%	1.15%	1.50%
2024	0.82%	1.29%	1.09%	1.44%
2025	1.31%	1.36%	1.39%	1.45%
	Projected five year increase			
2020-2025	5.10%	7.14%	6.26%	7.87%

Source: Federal Planning Bureau, PROMES model estimates June 2020 based on EPS 13. 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 (2020-2025)

	Brussels	Flanders	Wallonia
	Projected annual increase (alternative scenario)		
2020	-0.23%	0.73%	0.71%
2021	0.70%	1.59%	1.69%
2022	1.26%	1.42%	1.37%
2023	1.31%	1.33%	1.32%
2024	0.70%	1.40%	1.18%
2025	1.44%	1.42%	1.23%
	Projected five year increase (alternative scenario)		
2020-2025	5.52%	7.36%	6.97%

Source: Federal Planning Bureau, PROMES model estimates June 2020 based on EPS 13. In the alternative scenario, medical density projections are maintained artificially constant. Region is determined by the patient's place of residence.

Table 4 – Projected increase in the number of contacts with physicians in the three Belgian regions (2020-2025)

	Brussels	Flanders	Wallonia
	Projected annual increase (alternative scenario)		
2020	0.32%	1.05%	1.05%
2021	1.13%	1.70%	1.79%
2022	1.16%	1.57%	1.64%
2023	1.68%	1.49%	1.49%
2024	1.14%	1.51%	1.38%
2025	1.32%	1.47%	1.45%
	Projected five year increase (alternative scenario)		
2020-2025	6.60%	7.98%	7.98%

Source: Federal Planning Bureau, PROMES model estimates June 2020 based on EPS 13. In the alternative scenario, medical density projections are maintained artificially constant. Region is determined by the patient's place of residence.

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] Cookson R, Sainsbury R, Glendinning C. Jonathan Bradshaw on Social Policy: Selected writings 1972-2011. York: University of York; 2013.

[3] 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.

[4] Geerts J, Van den Bosch K, Willemé P. Description et utilisation du modèle PROMES (WP 4 DC2019). Brussels: Bureau Fédéral du Plan; 2018.