Medical practice variations

Reference pharmacist function

Analysis of the distribution of medical practice in Belgium, in terms of volume and expenditure per service and per insured (distribution, occurrence, trends by region, province and district), for the year **2025**

NIHDI – Healthcare Service – Directorate for Research, Development and Quality promotion

Appropriate care unit

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1. INTRODUCTION

The Appropriate Care Unit was set up within the NIHDI's Directorate for Research, Development and Quality under NIHDI's Administration Contract for 2016-2018[1]. Article 35 of this contract refers to 'the setting up of an Appropriate Care Unit, aiming specifically to promote an integrated approach to the rational use of resources'. The Appropriate Care Unit has been up and running since the second quarter of 2017.

The tasks of the Unit were set out formally in the '2016-2017 Healthcare monitoring Action plan', published by NIHDI on 18 July 2016[1]. This plan lists around thirty measures designed to make healthcare provision more efficient, by encouraging appropriate practice and tackling unnecessary or inappropriate care.

The plan states that one of the tasks of the Appropriate Care Unit is to analyse the 'appropriateness of care', in order to identify un-explained variations in consumption patterns, identified after standardisation. Such variations can potentially point to non-optimal use of resources.

'Variations in medical practice' documents report on the analyses carried out in this framework. Each report focuses on a particular topic.

In this document, we present the figures and graphs relating to analyses2 of practice in the area of Reference pharmacist function, and give the explanations necessary to understand these.

We have deliberately chosen not to attempt to interpret the figures, preferring to present the results to experts who are in a better position to do so. This document has nevertheless been made available to the public in order to provide objective, open input to discussions on this issue..

The data presented in this analysis reflect the coverage of healthcare costs by compulsory health insurance. However, this does not mean that all services are provided in accordance with regulations and/or guidelines.

[1] (National Institute for Health and Disability Insurance, 2016)

[2] Readers interested in the methodology used in these quantitative analyses should consult the document entitled 'Variations in practice – Methodology'.

2. KEY DATA SUMMARY

	TOTAL	Δ[1]
PROVIDERS & PRESCRIBERS		
Main healthcare providers: *Other specialties*	-	
Main prescribers:	-	
USAGE RATE		
Number of services per year	1.592.062	
Average occurrence per patient per day (services)	-	
Average occurrence per patient per year (days)	-	
Total average occurrence	-	
Estimated number of patients (per year)	-	
Standardised usage rate (per 100 000 insured persons)	13.624	
Percentage of outpatient care	100,00%	
Percentage One-day/(One-day + Inpatient)	-	
POPULATION		
% of the selected population compared to the total number of insured people	100,00%	
Median age of patients	69 years	
Ratio of standardised usage rate women/men (services)	1,1	
Ratio of standardised usage rate preferential rate/general rate (services)	1,28	
TRENDS		
Trends[2] (2018-2025)	11,30% ***	
Trends (2018-2023)	14,62%	
Trends[3] (2023-2025)	3,42% ***	
DIRECT EXPENSES		
Annual expenditure	62.242.143 €	
Average annual expenditure per insured[4]	5,33 €	
Average annual expenditure per service	39,10 €	

[1] **Δ Dispersion marker: comparison of the coefficient of variation (CV) of the indicator with the median (MED) of the CVs of all analyses for this indicator: δ if CV > MED + 10%, δδ if CV > MED + 20%, δδδ if CV > MED + 30%.**
Exception: For median age, δ means CV > MED + 30%.

[2] The test indicates whether the observed slope is statistically significantly different from 0%.

[3] The test indicates whether the break in trend between the two periods is statistically significant.

[4] Expenditure is based on the insured people selected

3. SPECIFIC METHOD OF ANALYSIS

A. NIHDI nomenclature codes selected for analysis

The NIHDI nomenclature codes selected for the analysis are listed below :

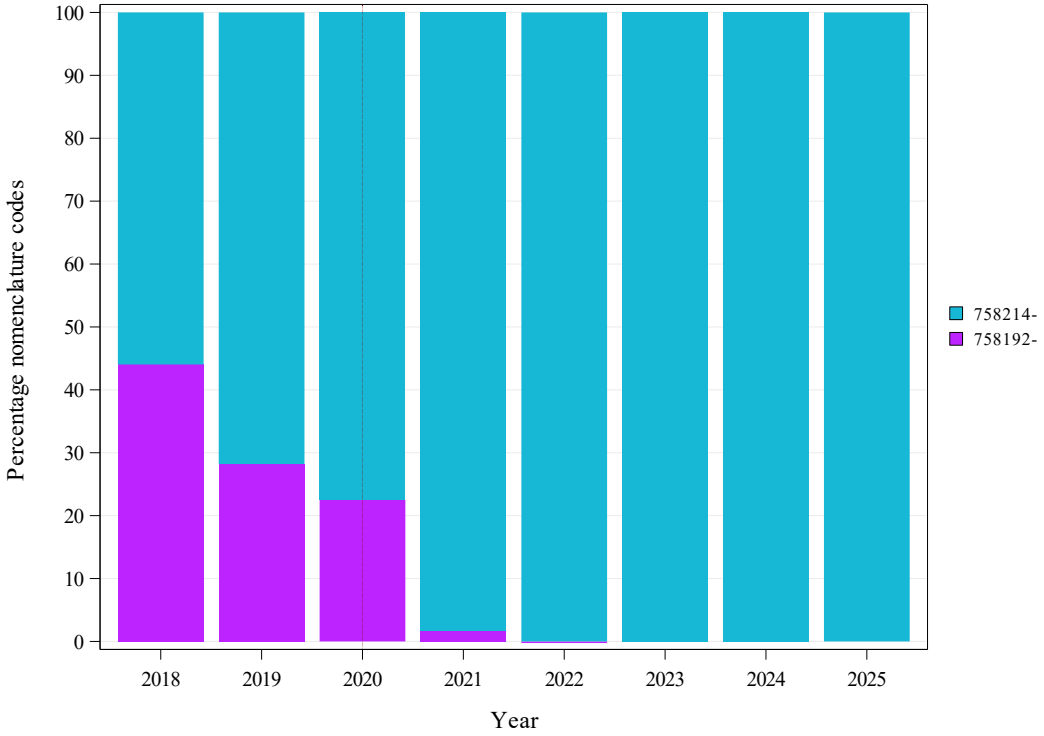
Outpatient	Inpatient	Rates	Expenses	Label	Creation	Deletion	Group N	Value
758192	**x**	yes	no	Démarrage (initiation) fonction “pharmacien de référence”	01/10/2017	31/12/2020	N86	.
758214	**x**	yes	yes	Honoraire fonction “pharmacien de référence”	01/05/2018		N86	.

This table shows the NIHDI nomenclature codes selected for this analysis, stating whether or not they were included in the analyses of services and expenditure, and giving, for each one, a description, dates of creation and deletion, where appropriate, their N group (in the NIHDI nomenclature) and their value.

B. Past history of nomenclature codes

[No modification implemented during the period]

C. Trends in the breakdown of nomenclature codes provided, by volume



Combined codes	Label
758214-	Honoraire fonction “pharmacien de référence”
758192-	Démarrage (initiation) fonction “pharmacien de référence”

This graph is limited to the main nomenclature codes in terms of volume. All nomenclature codes used for the analysis are described on page 5.

Note : The year 2020 was highlighted by a vertical dashed line, in order to draw the attention on the impact of the COVID-19 crisis.

D. Source of data and analysis period

The data used in the analyses have been taken from the following databases :

Document N	For the utilisation rate and amount of expenses of persons insured and residing in Belgium, in 2018-2025
Document P	-
Document SHA, ADH	-

Analysis period	2018-2025

Document N : are monthly data sent by the health insurance funds to NIHDI, within three months. These data show the number of services provided, dates and the fees involved. Every six months, these data are compiled by the insurers, which also add data on patients: age, gender, social category and district of residence. N Documents, however, cannot be used to analyse the combinations of services received by individual patients

Document P : are six-monthly data sent by the health insurance funds to NIHDI, within four months. These data show the services provided, the service-provider, the prescriber, the place of provision of service, and the hospital where patients were treated. P Documents can be used to monitor medical consumption and pricing, but not (yet) to analyse services per patient. **(Not applicable to this analysis)**

Document SHA, ADH : are sent annually and within six months by the insurance funds to the NIHDI. They include all the services provided respectively in day admission and standard hospitalisation, in general hospitals per hospital stay.. **(Not applicable to this analysis)**

Occurrence : Occurrence values are based on the most recent year that allows consolidation by patient between P and SHA-ADH documents, usually the year preceding the last year of the analysis period. **(Not applicable to this analysis)**

E. Specific selection criteria

Several filters may have been applied to the data, so that only a selection of the population is considered in the analyses. If so, the filters used are shown in the table below :

FILTERS APPLIED TO DATA	
Sex	All
Age	All
-	-

The indicators presented in the analysis always refer to this population.

F. Specialty of healthcare providers

[Specialty of healthcare providers unknown or not applicable]

G. Specialty of prescribers

[Specialty of prescribers unknown or not applicable]

H. (Estimated) number of patients per year

In this analysis, the estimated number of patients, total average occurrence, average occurrence per day and average occurrence per year couldn't be calculated. Their unavailability is indicated by a dash “-” in the corresponding tables.

I. Standardisation

Data presented by geographical subset* or population category are standardised per year, based on age (by year), sex and preferential regime of the national population in 2025.

Note: Districts with fewer than 100 000 insured persons are associated with a neighbouring district from the same province. The following districts are therefore considered together: Oostende/Veurne, Ieper/Diksmuide, Roeselare/Tielt, Gent/Eeklo, Charleroi/Thuin, Huy/Waremme, Namur/Philippeville, Neufchâteau/Marche-en-Famenne, Virton/Bastogne/Arlon. These regroupings and labels apply to all measurements, maps and graphs produced by district. Throughout the document, the concept of regrouped district is reflected in the use of the term "district"

Standardisation renders populations comparable in relation to one or several criteria. If a difference is observed between these populations, we can therefore assume that it is not due to the criteria covered by the standardisation process.

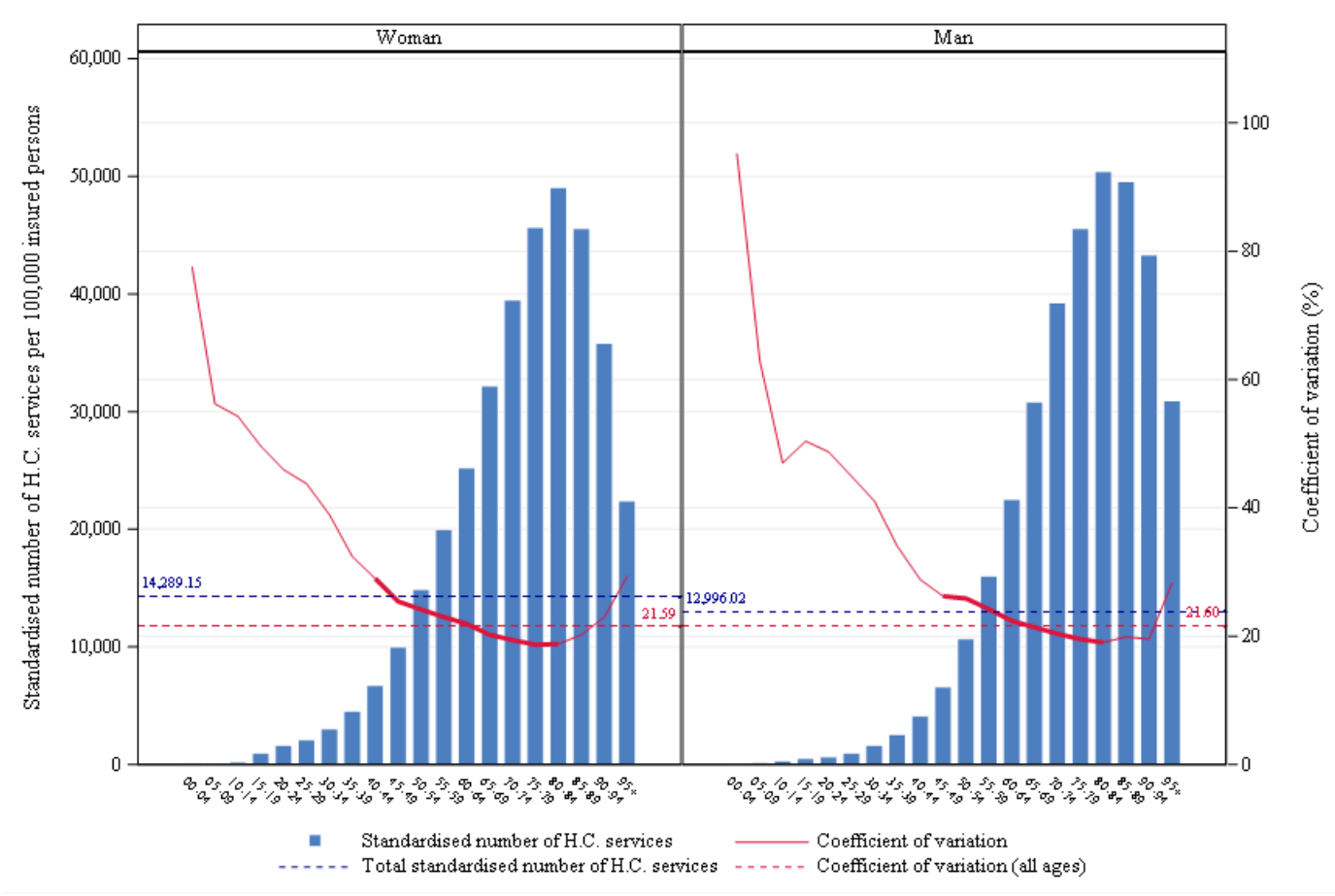
4. RESULTS

A. National standardised usage rate

	TOTAL
Number of services per year	*1.592.062*
Average occurrence per patient per day (average number of services per day)	-
Average occurrence per patient per year (average number of days per year)	-
Total average occurrence (divides the number of services)	-
Estimated number of patients per year	-
Standardised usage rate per 100 000 insured persons	13.624

B. Standardised usage rate by sex and age

	TOTAL
Number of services per year	*1.592.062*
Median age (years)	69
Mean age (years)	67,75
Standardised usage rate: women (per 100 000)	14.289
Standardised usage rate: men (per 100 000)	12.996
Ratio women/men	1,1
Percentage of women	55,92%

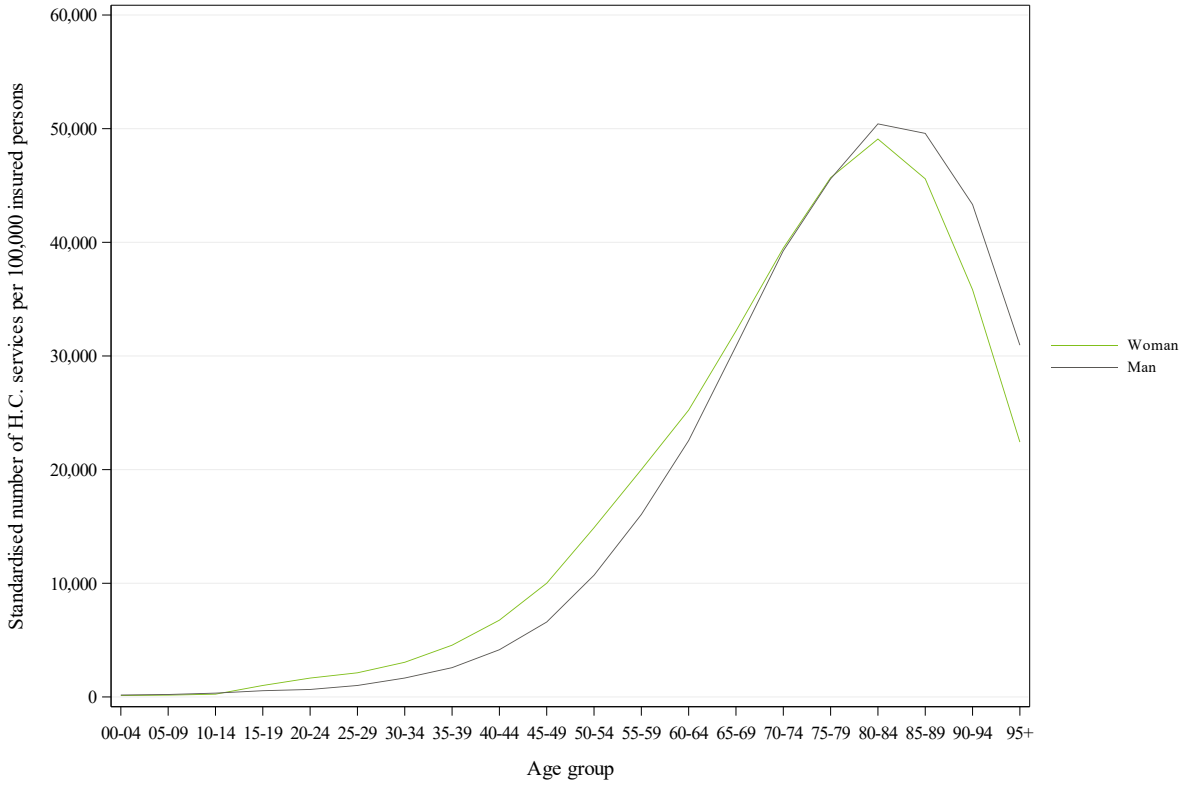


Standardised usage rate per 100 000 insured persons, and coefficient of variation for the districts*, by age group and sex, for the year 2025

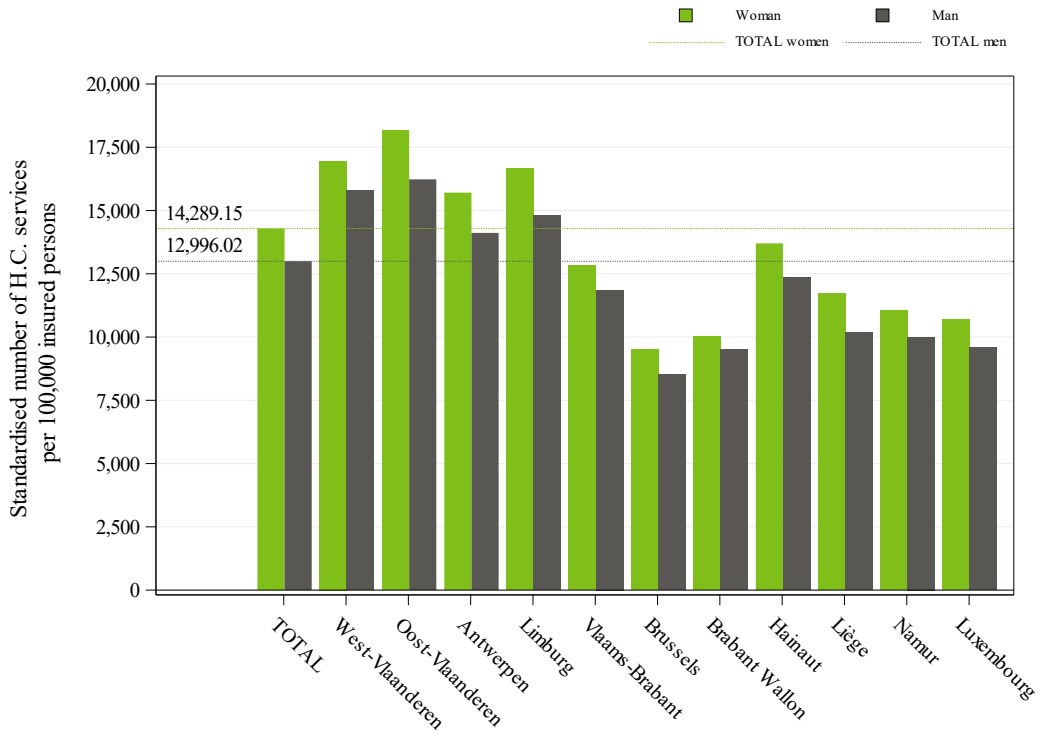
This figure is made up of bar charts for each sex.

The **coefficient of variation**, shown by the red line, measures the relative dispersion of the standardised usage rates observed for each district*, by age group and sex (standard deviation divided by the mean). This line is shown in bold for age groups where the coefficient of variation can be validly interpreted (i.e. for age groups in which there are sufficient insured persons per district* to allow for a proper comparison).

The left-hand vertical axis of the graph represents the standardised usage rate, and the right-hand axis the coefficient of variation. The horizontal axis shows the age groups. The horizontal dotted lines show the total values of the standardised usage rates (in blue) and of the coefficient of variation (in red).



Comparison of the standardised usage rates by age group and by sex (per 100 000 insured persons) in 2025



Standardised usage rate per 100 000 insured persons, by sex and by province for the year 2025

This histogram shows standardised usage rates by province and by sex.

The grey bars show the rates for men, while the green bars show the rates for women, for each province.

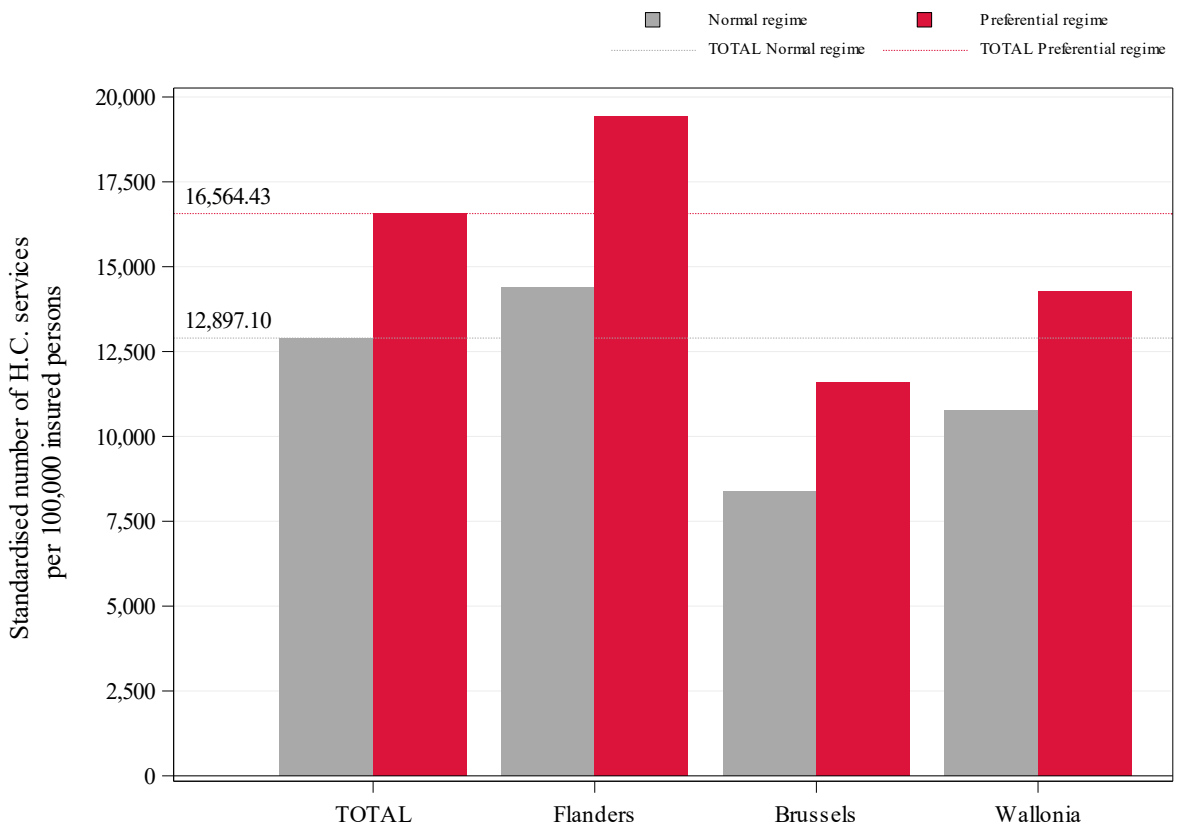
The grey and green broken lines show the total standardised usage rates, again grey for men, green for women.

C. Rate of outpatient care

	TOTAL
Number of services per year	*1.592.062*
Percentage of out-patient care	100,00%

D. Standardised usage rate by reimbursement scheme

	TOTAL
Number of services per year	*1.592.062*
Percentage provided under the preferential reimbursement scheme	28,12%
Standardised usage rate with preferential reimbursement scheme (per 100 000)	16.564
Standardised usage rate without preferential reimbursement scheme (per 100 000)	12.897
Ratio Preferential scheme /General scheme	1,28



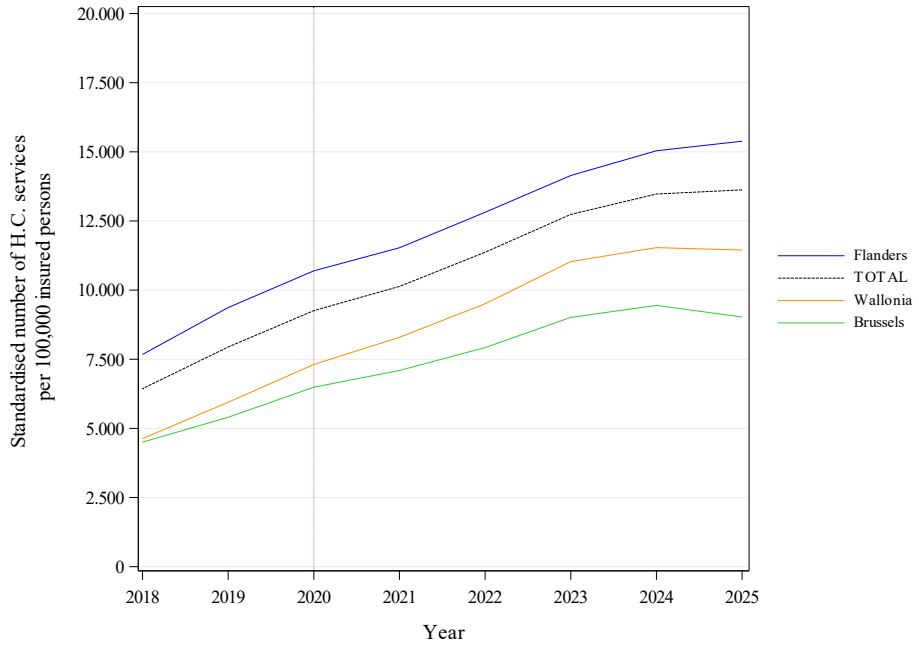
Standardised usage rate by reimbursement scheme and by region

This graph shows the standardised usage rates per 100 000 insured with (in red) and without (in grey) the preferential reimbursement scheme, by region and in total.

The red and grey dotted lines show the overall standardised rates of use of patients per 100 000 insured, with and without the preferential reimbursement scheme, respectively.

E. Trends in standardised usage rates

	TOTAL	Statistical significance
Number of services per year	***1.592.062***	
Trend (2018-2025)	**11,30%**	***** (12.22%)**
Trend (2018-2023)	14,62%	***
Trend (2023-2025)	3,42%	



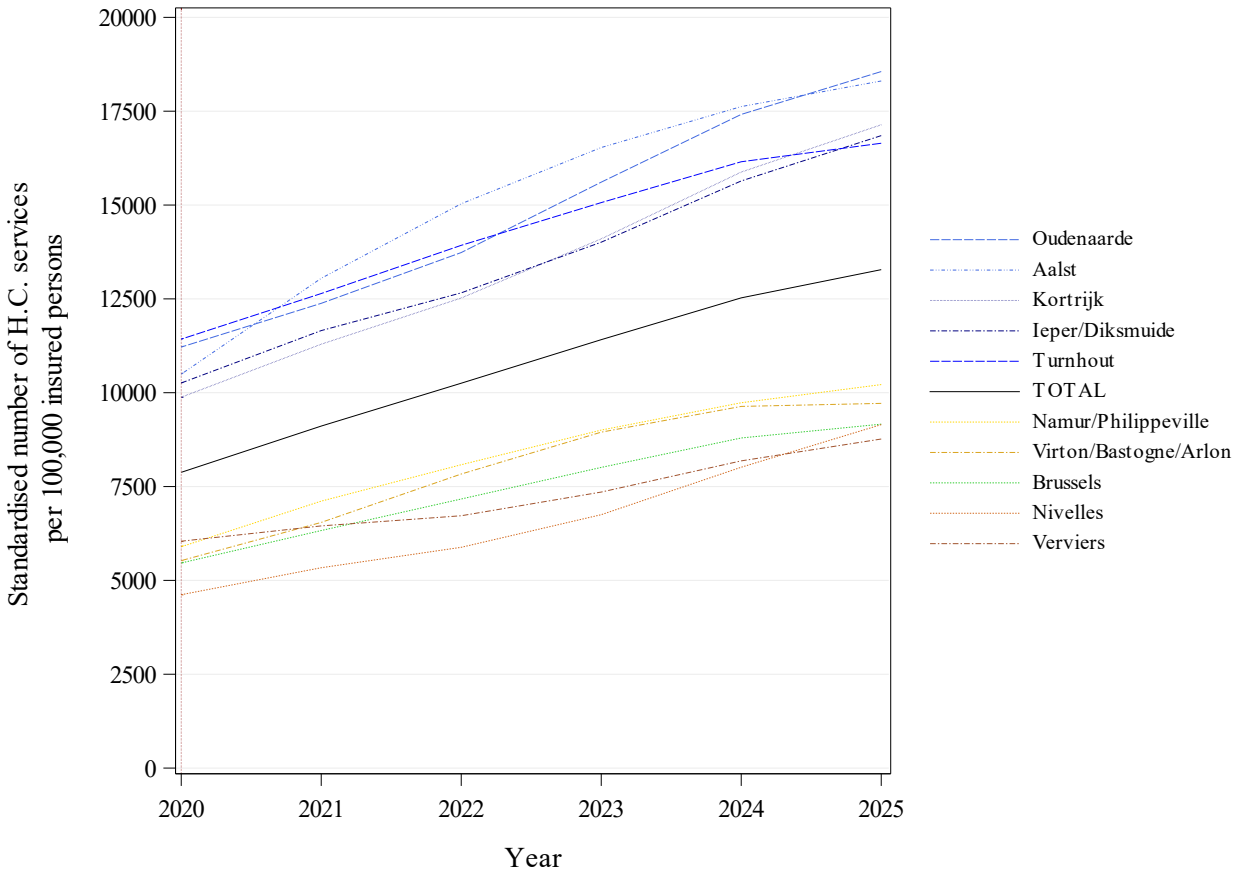
Trends in the standardised usage rate per 100 000 insured persons, by region

These trends correspond to the average annual growth rate.

A non-significant statistical test indicates that the trend estimated by the model (in brackets) is stable, or that there is no break in the trend.

This graph shows a coloured curve for each region and a black curve for the entire Belgian population. The horizontal axis shows the years, and the vertical axis shows the standardised usage rate per 100 000 insured persons.

Note : The year 2020 was highlighted by a vertical dashed line, in order to draw the attention on the impact of the COVID-19 crisis.



Trends in the standardised usage rate per 100 000 insured persons by district*

This graph shows a coloured line for each district* and a black line for the entire Belgian population. The horizontal axis shows the years, and the vertical axis shows the standardised usage rate per 100 000 insured persons.

To better highlight changes over time, the rates shown are **rolling averages** of the rates for the three years preceding the year in question (including the year itself).

The graph only shows the five districts* with the highest average rates and the five districts* with the lowest average rates over the last 3 years studied (excluding the districts of Hainaut heavily impacted by the 2019 administrative reorganization).

Note : The year 2020 was highlighted by a vertical dashed line, in order to draw the attention on the impact of the COVID-19 crisis.

		Usage Rate	Annual increase			
		2025 *(per 10^5 insured)*	**2018-2025**	**2018-2023**	**2023-2025**	**Structural break**
Provinces	West Flanders	*16.345*	11,45%	14,51%	4,15%	**
	East Flanders	*17.196*	12,10%	15,91%	3,11%	***
	Antwerp	*14.898*	9,22%	11,66%	3,35%	*
	Limburg	*15.715*	8,38%	8,57%	7,91%	NS
	Flemish Brabant	*12.328*	10,75%	13,14%	4,98%	NS
	Brussels	*9.028*	10,45%	14,89%	0,08%	***
	Walloon Brabant	*9.722*	15,18%	17,70%	9,11%	NS
	Hainaut	*13.016*	14,43%	19,61%	2,45%	***
	Liège	*10.943*	13,18%	18,64%	0,60%	***
	Namur	*10.513*	12,99%	18,71%	-0,13%	***
	Luxembourg	*10.137*	12,57%	18,87%	-1,74%	***
Regions	Flanders	*15.384*	10,45%	13,01%	4,29%	NS
	Brussels	*9.028*	10,45%	14,89%	0,08%	***
	Wallonia	*11.449*	13,81%	18,97%	1,88%	**
	TOTAL	***13.624***	**11,30%**	**14,62%**	**3,42%**	***

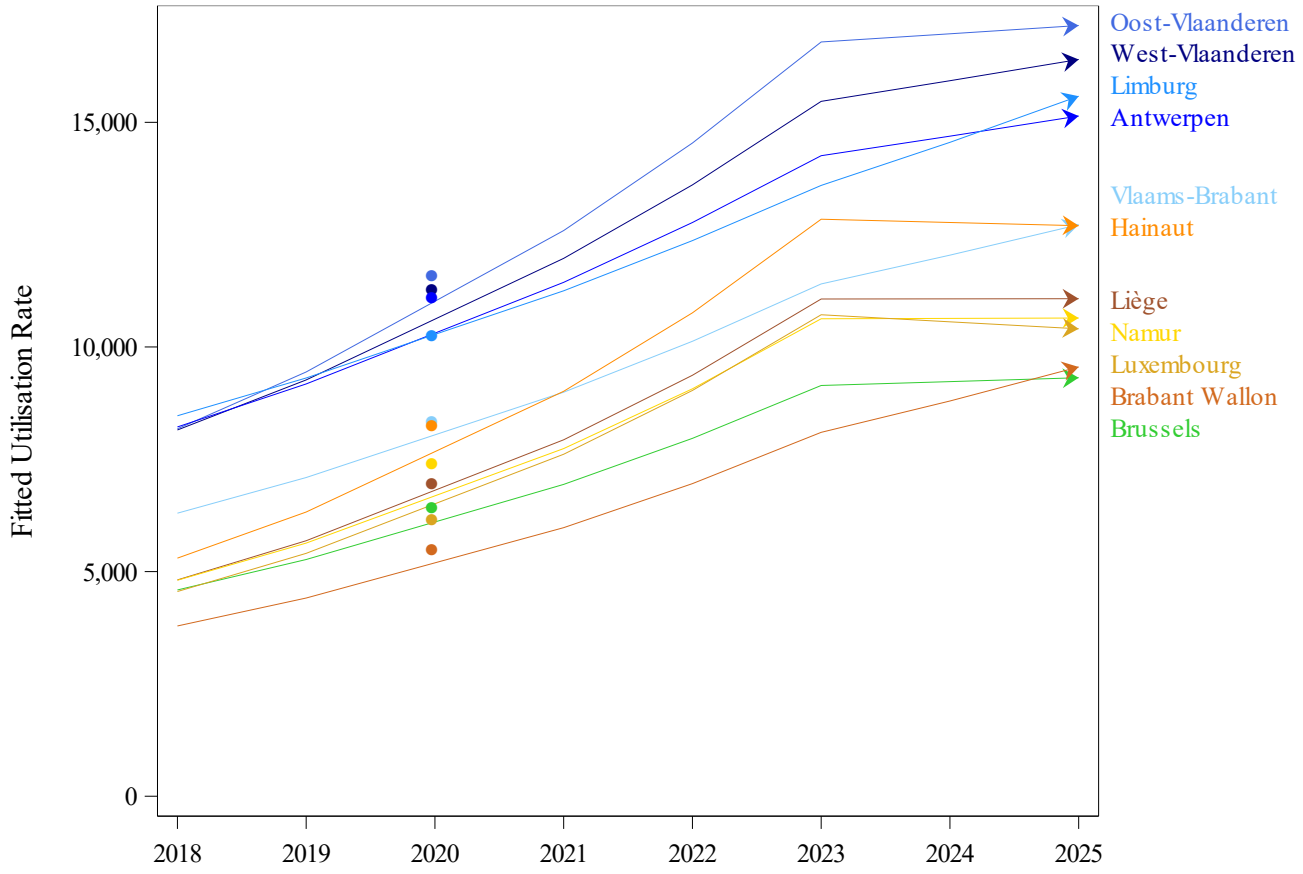
Trends in the usage rates, by province and region

This table reports the standardised **usage rates** for the last year analysed (2025), as well as the average **rates of increase**, by province, by region and in total, for the entire period (2018-2025), for the last years (2023-2025) and for the period preceding the last years (2018-2023).

In order to find out whether the trend in the last years differs from that in the years before, a linear mixed model was fitted in two steps. In the first step a change in trend on the national level is tested. If this test is significant, in a second step, the model tests whether the difference in trend is significant for each province, region and at the national level. The data of 2020 are excluded from the models.

The significance of the test for a change in trend is reported in the Structural break column : * P-value ≤ 0.05 / ** P-value ≤ 0.01 / *** P-value ≤ 0.001 and NS for a non-significant result.

'NA' is shown where the nomenclature codes selected for the analysis have not been used for the entire last period or when the statistical tests cannot be evaluated.



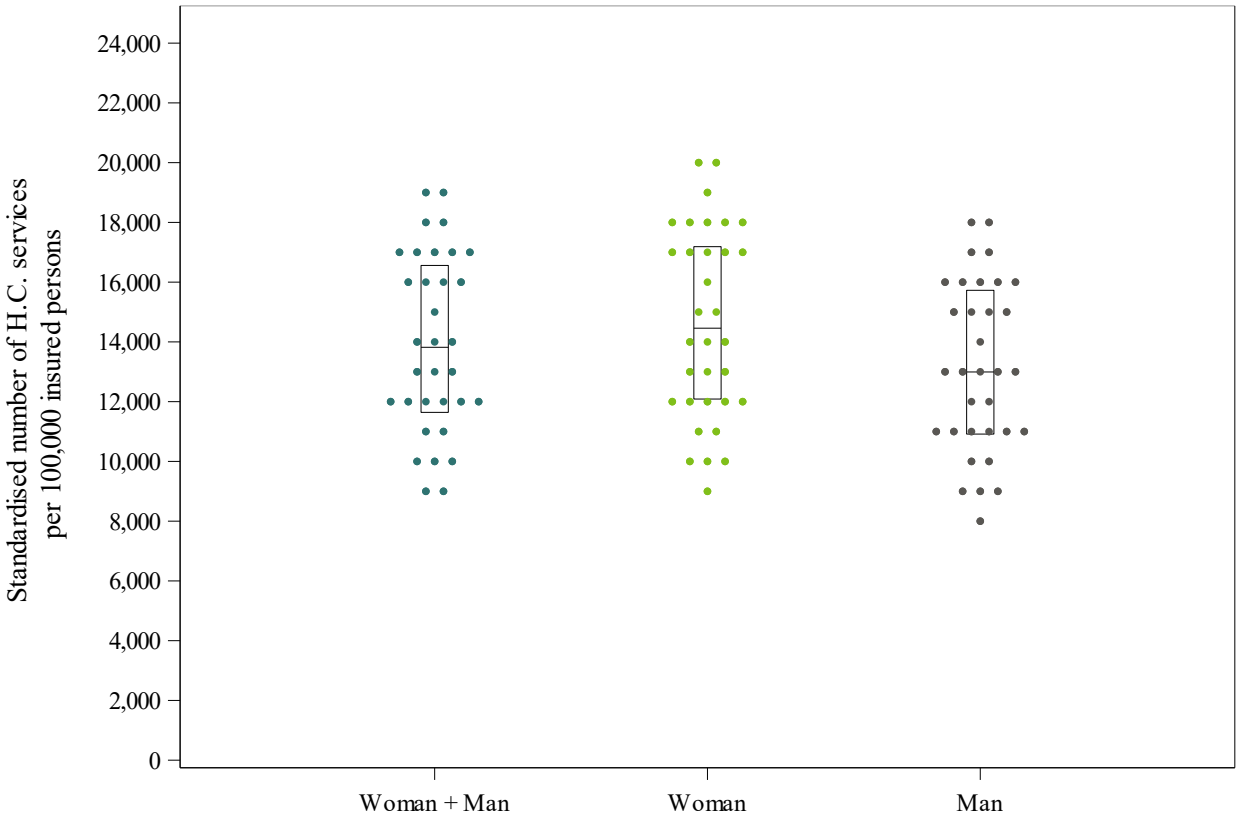
Trend break assessment model by province – Regression lines

Regression lines per province showing a possibly different slope for the last years (2023-2025) compared to the years before (2018-2023).

Data of 2020 was excluded from this analysis, but is indicated on the graph for information.

F. Geographical variations in standardised usage rates

	TOTAL
Number of services per year	***1.592.062***
Coefficient of variation (2025)	**21,57**
Coefficient of variation (2023-2025)	**20,44**
Coefficient of variation (2018-2020)	**26,68**
Statistically significant difference ? ($p \leq 0.05$)	*Yes (0,0006)*

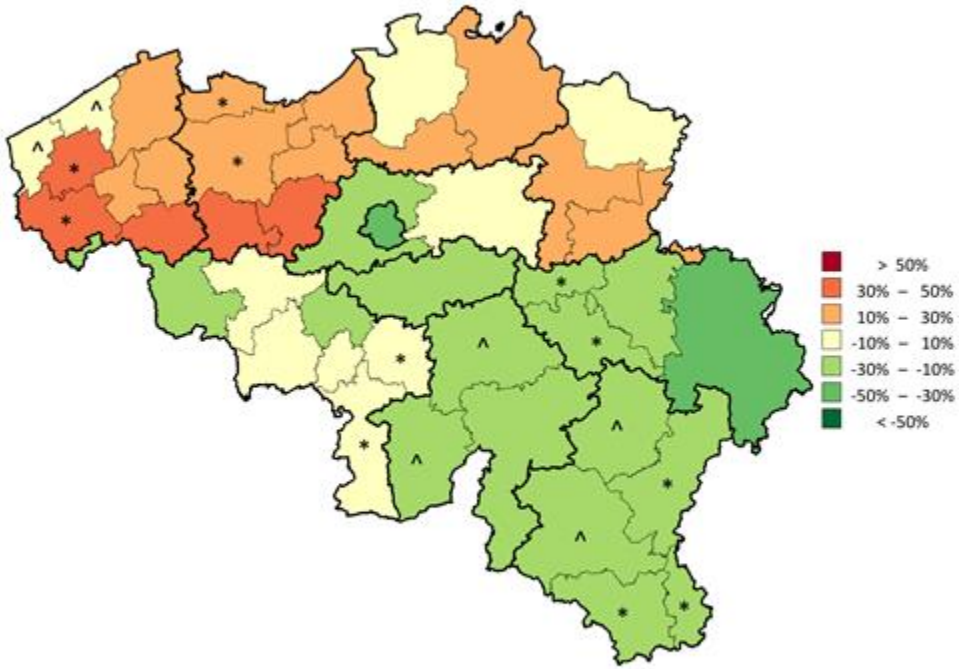


'Dot plot' showing standardised usage rates by district*, by sex

A **dot plot** is a distribution chart, which is useful for highlighting groups in the data, gaps in the distribution and outliers. Here, each dot represents the usage rate of a district*, for its entire population or broken down by sex.

The rates are rounded to the nearest unit, ten, hundred, etc., depending on the value of the maximum rate, in order to better group the values.

The graph also shows a box with the 25th, 50th and 75th percentiles of the non-rounded standardised usage rates for all districts. The bottom line of the box represents the 25th percentile, while the upper line represents the 75th percentile. The line inside the box represents the 50th percentile.



Map showing distribution of standardised usage rates, by district*

On this map of Belgium, thin lines show the boundaries of the districts, while thick lines show the provincial borders.

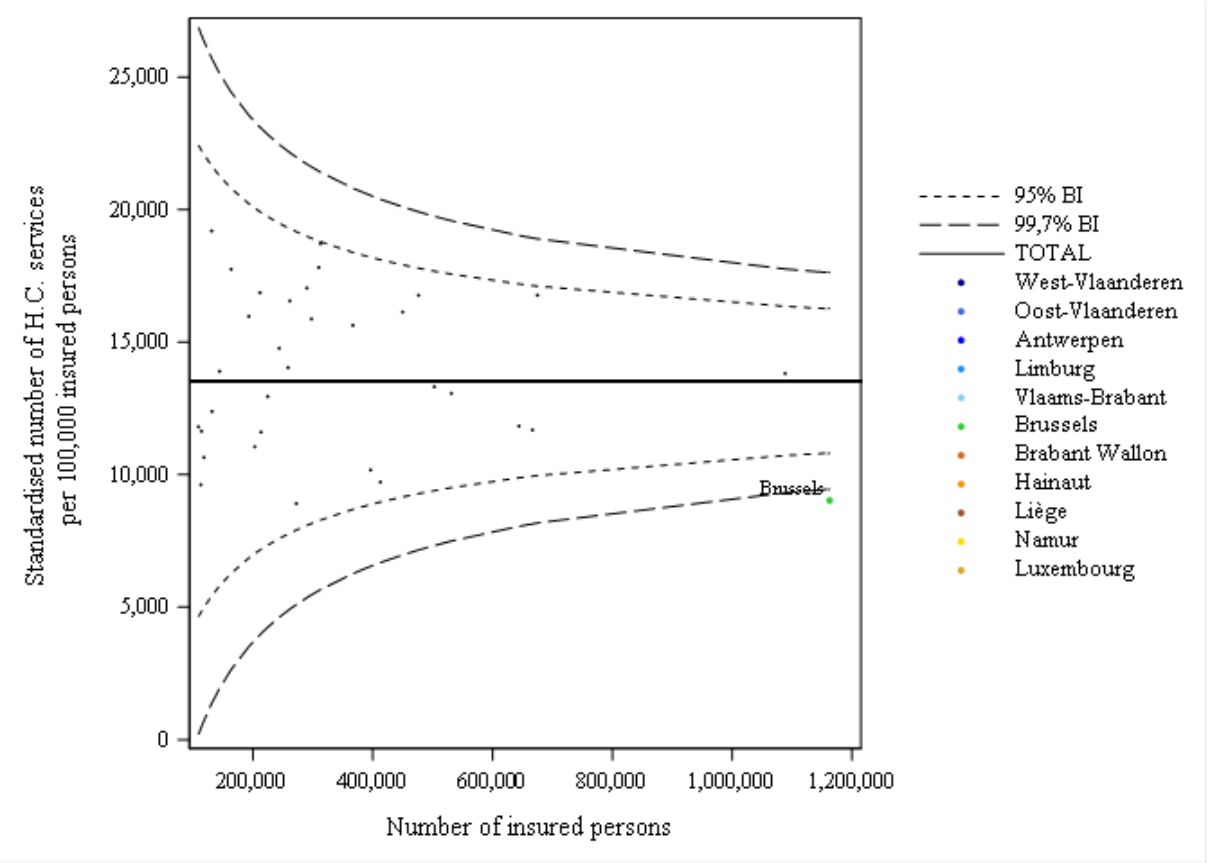
The districts* are coloured using a colour scale based on the level of usage rate in the district* compared to the Belgian national rate (overall rate). This ratio is expressed as a percentage: e.g. 0% if the district* rate is equal to the overall rate, 20% if the rate is 20% above the overall rate, and -20% if the rate is 20% below the overall rate.

The percentages are calculated using the standardised rates of the last year analysed, and are displayed in bands of 20%. The following colour coding applies:

Colour	Category
	More than 50%
	Between 30% and 50%
	Between 10% and 30%
	Between - 10% and 10%
	Between -30% and -10%
	Between -50% and - 30%
	Less than -50%
	Not used

N.B.: The interpretation of this map is to be done in parallel with the funnel plot (next page).

* Districts marked with * or ^ are grouped together within the same province.
see page 13, Standardisation



«Funnel plot » showing the standardised usage rates by district* by the number of insured persons

In this graph, the standardised usage rate in a district* is positioned versus the size of its population. Besides the dots representing the districts*, 95% and 99.7% **confidence intervals** are also shown on the graph. These are dependent of the size of the districts*.

The thicker horizontal line shows the national standardised usage rate. The outlier districts* are identified as those districts* that fall outside the 99.7% confidence intervals, the zone between the 95% and 99.7% confidence intervals being considered as "warning zone".

N.B.: The interpretation of this graph is to be done in parallel with the map of the distribution of usage rates (previous page).

G. Standardised healthcare expenditure borne by the insurance

	TOTAL
Number of services per year	*1.592.062*
Annual expenditure (€)	*62.242.143*
Average cost per service (€)	39,10
Average cost per insured [1] (€)	5,33

[1] Reminder: Expenditure is based on the insured selected for the analysis (see section 3.E, Specific selection criteria)

		Standardised expenditure (per insured[1])	Relative difference compared to total
Provinces	West Flanders	6,39 €	19,89%
	East Flanders	6,72 €	26,08%
	Antwerp	5,82 €	9,19%
	Limburg	6,14 €	15,20%
	Flemish Brabant	4,82 €	-9,57%
	Brussels	3,53 €	-33,77%
	Walloon Brabant	3,8 €	-28,71%
	Hainaut	5,09 €	-4,50%
	Liège	4,28 €	-19,70%
	Namur	4,11 €	-22,89%
	Luxembourg	3,96 €	-25,70%
Regions	Flanders	6,01 €	12,76%
	Brussels	3,53 €	-33,77%
	Wallonia	4,48 €	-15,95%
	TOTAL	**5,33 €**	

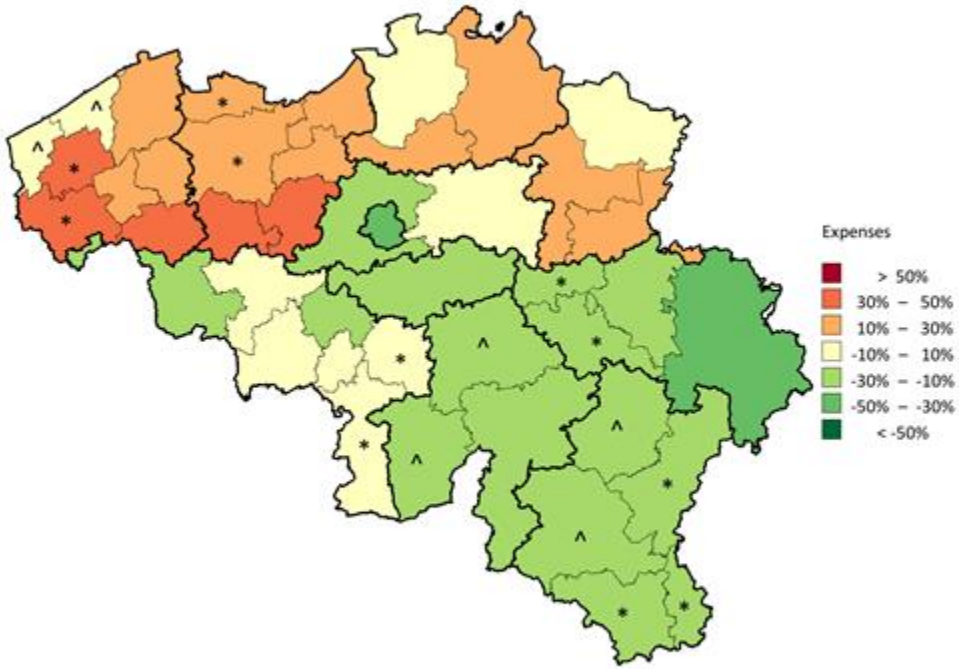
Regional and provincial distribution of standardised expenditure (2025)

[1] Reminder: Expenditure is based on the insured selected for the analysis (see section 3.E, Specific selection criteria)

Trends in expenditure, by service and by nomenclature code

Nomenclature Codes	2018	2019	2020	2021	2022	2023	2024	2025	% Average yearly growth	% Services 2025
758214-	4,75	31,70	32,42	32,75	33,12	35,65	37,82	39,10	35,14%	100,0%

The average expenditure per nomenclature code and per year is listed for the codes selected in terms of volume (see section 3.A), for which services were invoiced in 2025. They are ranked in descending order of frequency, according to the percentage of the volume served in 2025 (last column).
When there are a large number of nomenclature codes concerned, the list is limited to those that account for at least 1% of the total volume.



Map showing distribution of standardised expenditure, by district* (per insured person)

On this map of Belgium, thin lines show the boundaries of the districts, while thick lines show the provincial borders.

The districts* are coloured using a colour scale based on the level of expenditure per insured in the district* compared to Belgian national (overall) expenditure per insured. This ratio is expressed as a percentage: e.g. 0% if expenditure in the district* is equal to the overall expenditure, 20% if it is 20% higher, and -20% if it is 20% lower.

The percentages are calculated using the standardised expenditure of the last year analysed and are displayed in bands of 20%. The following colour coding applies:

Colour	Category
	More than 50%
	Between 30% and 50%
	Between 10% and 30%
	Between - 10% and 10%
	Between -30% and -10%
	Between -50% and - 30%
	Less than -50%
	No expenditure

* Districts marked with * or ^ are grouped together within the same province.
see page 13, Standardisation



On this map, the districts* are coloured using a colour scale based on the level of expenditure per service in the district * versus the national expenditures per service.

This comparison is expressed as a percentage:

Colour	Category
	More than 50%
	Between 30% and 50%
	Between 10% and 30%
	Between - 10% and 10%
	Between -30% and -10%
	Between -50% and - 30%
	Less than -50%
	No expenditure

Map showing distribution of standardised expenditure, by district* (per service)

* Districts marked with * or ^ are grouped together within the same province.
see page 13, Standardisation

Standardised expenditure per service in 2025

by demographic category

	Estimated std. expenditure per service		Occurrence per year	Occurrence per year	Occurrence per day
	(€)	Tot. Relative Diff. (%)	(Services)	(Days)	(Services)
TOTAL	39,10		-	-	-
Sex					
Men	39,10	0,00%			
Women	39,10	0,00%			
Reimbursement scheme					
General	39,10	0,00%			
Preferential	39,10	0,00%			
Region					
Flanders	39,10	0,00%			
Brussels	39,09	-0,01%			
Wallonia	39,09	-0,01%			
Age					
00-04	39,04	-0,14%			
05-09	39,06	-0,09%			
10-14	39,05	-0,12%			
15-19	39,05	-0,11%			
20-24	39,07	-0,08%			
25-29	39,07	-0,07%			
30-34	39,07	-0,07%			
35-39	39,07	-0,06%			
40-44	39,08	-0,04%			
45-49	39,08	-0,03%			
50-54	39,08	-0,03%			
55-59	39,09	-0,02%			
60-64	39,09	-0,01%			
65-69	39,10	0,00%			
70-74	39,10	0,01%			
75-79	39,10	0,02%			
80-84	39,10	0,02%			
85-89	39,11	0,03%			
90-94	39,11	0,03%			
95+	39,11	0,03%			

5. APPENDICES

A. Analysis of variance (ANOVA), except Brussels

Statistical significance of the differences observed in 2025		
By region?	Yes	***
By sex?	Yes	***
By reimbursement scheme?	Yes	***
By sex and per region?	No	NS
By reimbursement scheme and per region?	Yes	***
By sex and per reimbursement scheme?	Yes	**
By sex and reimbursement scheme and per region?	No	NS

In order to be able to assess the significance of the observed differences, a linear mixed ANOVA model was fitted to the data of all districts* of the Walloon and Flemish regions, after standardising for age. The model has region, sex and reimbursement scheme as fixed effects and also contains all two-way and three-way interactions between these effects.

In order to interpret the model correctly, first the three-way interaction should be evaluated, followed by the two-way interactions and finally by the main effects. If the three-way interaction is significant, the interpretation of the model should be done at this level only and the two-way interactions and main effects should not be interpreted. If the three-way interaction is not significant, the two-way interactions are evaluated. Every main effects that appears in a significant interaction should be interpreted at the level of the interaction and not at the level of that main effect. Main effects can only be interpreted directly if they don't appear in a significant interaction.

The **asterisks** represent the level of statistical significance of the tests: * P-value ≤ 0,05 / ** P-value ≤ 0,01 / *** P-value ≤ 0,001 or NS for a non-significant result.

B. Frequency of practice occurrences (per patient)

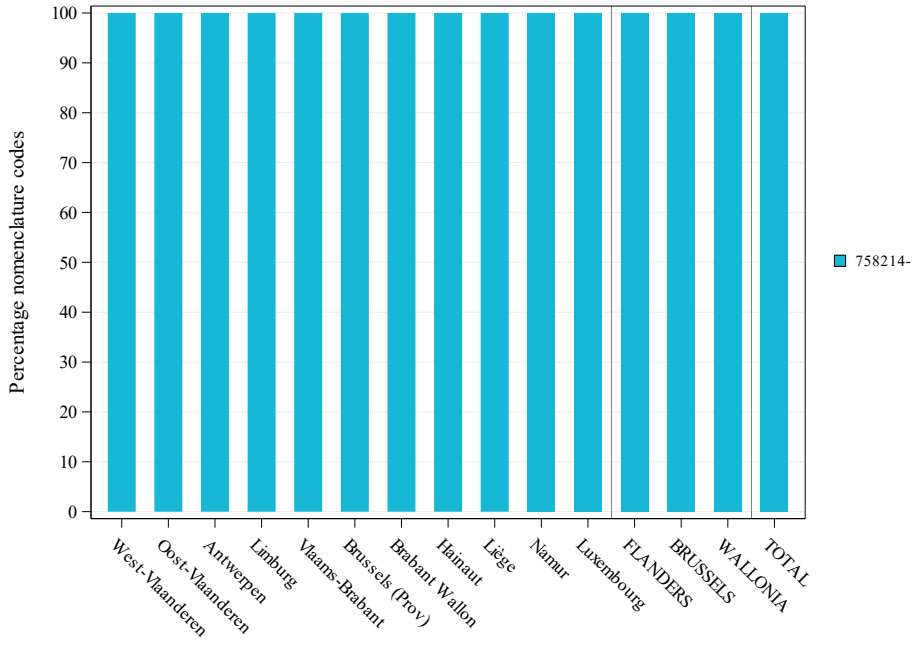
[Data is not available]

C. Types of patient care

[Data is not available]

D. Coding variations and practice alternatives

➔ **Variations in coding :**



Volume breakdown of nomenclature codes

Combined codes	Label
758214-	Honoraire fonction “pharmacien de référence”

Significance	By region	By province
Use of **Nomenclature codes**[1]	NA	NA

The **asterisks** represent the level of statistical significance of Chi-square test: * P-value ≤ 0,05 / ** P-value ≤ 0,01 / *** P-value ≤ 0,001. **NS** and **NA** respectively indicate that the variations are not significant or not applicable.

[1] The calculation of significance is carried out here by comparing the geographical differences in the use of the different nomenclature codes to code the practice.