

Medical practice variations

Eye mobility test

Analysis of the distribution and evolution of medical practice in Belgium, in terms of volume and expenditure per insured (analysis and trends by region, province and district), for the year **2019**



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 2016-2018¹. 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 2016². 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 unexplained 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 analyses³ of practice in the area of Eye mobility test, 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.

¹ (Institut national d'assurance maladie-invalidité, 2016)

² (Institut national d'assurance maladie-invalidité, 2016)

³ Readers interested in the methodology used in these quantitative analyses should consult the document entitled 'Variations in practice – Methodology'.

2. 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
248710	248721	yes	yes	Examen fonctionnel détaillé de la motilité oculaire dans le strabisme concomitant ou les hétérophories au synoptophore ou appareil similaire (ne peut être porté en compte que deux fois par an)	01-04-1985		N18	N25
248732	248743	yes	yes	Examen fonctionnel détaillé de la motilité oculaire dans le strabisme paralytique (test de Lancaster ou similaire) + graphique	01-04-1985		N18	N25



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

Outpatient	Inpatient	Date	Label
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This table displays the historic evolution of the definitions of the NIHDI-nomenclature codes taken into account for this analysis, if modifications were implemented during the period 2009-2019.

C. 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 insured persons (who meet the selection criteria) whose age, sex, preferential regime and residence are known 2009-2019
Document P	for the utilisation rate and amount of expenses of insured persons (who meet the selection criteria) by type of medical specialities in 2017-2019
-	-
-	-

Analysis period	2009-2019
------------------------	-----------



'N Documents' are monthly data sent by the sickness 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.

'P Documents' are six-monthly data sent by the sickness 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.

D. Specific selection criteria

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

FILTERS APPLIED TO DATA	
Gender	women and men
Age	all
-	-

E. Standardisation

The data are standardised before analysis per year, based on age, sex and preferential regime per arrondissement, province and region.



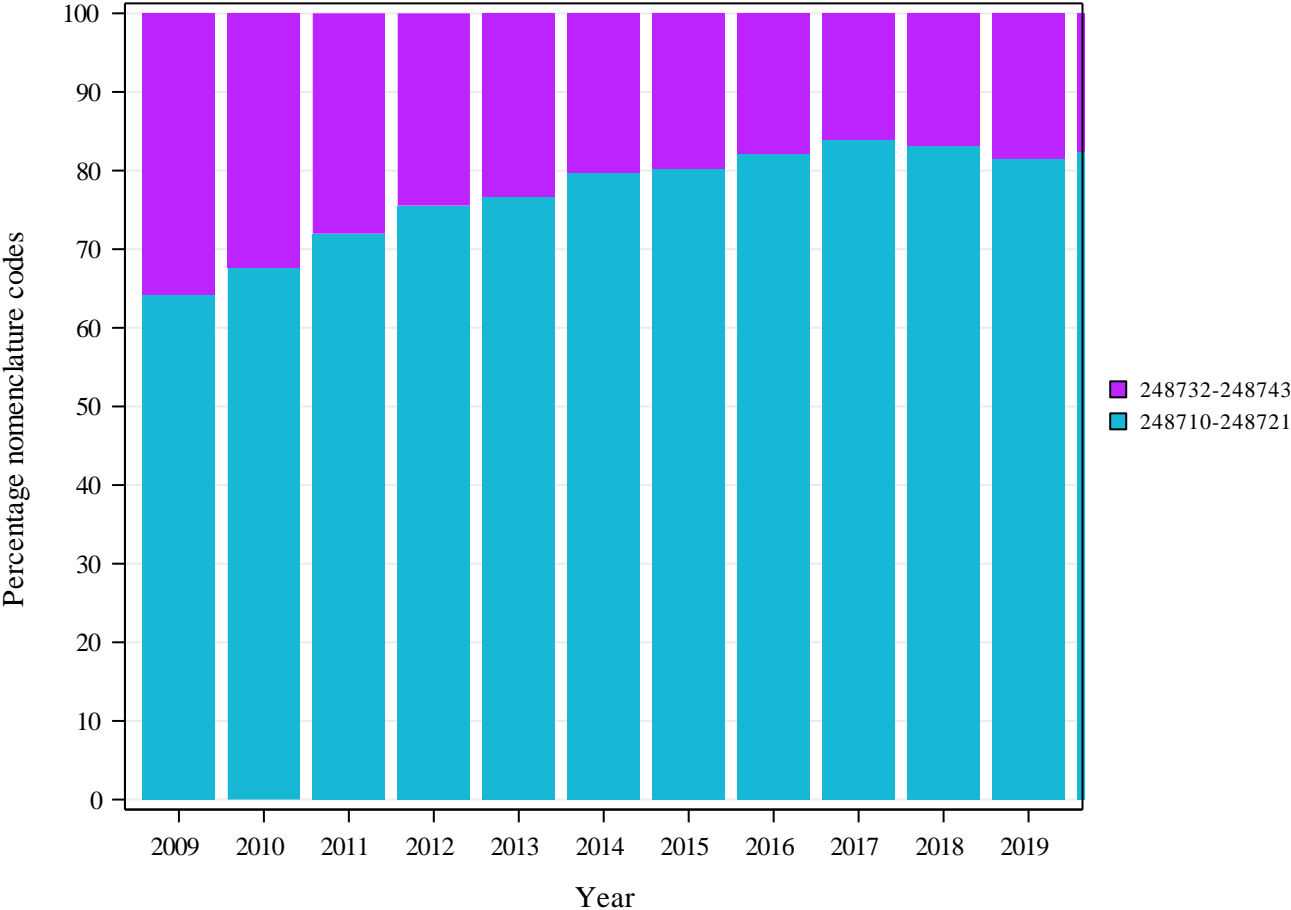
Standardisation renders populations comparable in relation to one or several criteria. If a difference is observed between these populations, we can therefore assume that it is not due to the criteria covered by the standardisation process.

3. RESULTS

A. National standardised rate of use

	TOTAL
Average number of interventions per year	90.922
Standardised rate of use per 100,000 insured persons	801

B. Breakdown of nomenclature codes provided, by volume



See page 4 for details about the NIHDI nomenclature codes selected for analysis.

C. Specialisation of healthcare providers

Specialisation of the provider	Total providers	Concerned providers	% Providers	Median of H.C. services	Number of H.C. services	% Total H.C. services	Expenses	% Expenses
Ophthalmological surgery	1110	500	45%	20	91357	100%	1.518.626,31	100%
Other specialities	5319	9	0%	2	17	0%	269,88	0%
Total	6429	509	8%	19	91374	100%	1.518.896,19	100%



This table shows the following non-standardised data, by medical specialities (average figures for the period 2019):

- The number of service-providers per specialisation who have recorded at least one service;
- The number of service-providers recording services under the nomenclature codes selected for this analysis;
- The service-providers for these codes as a percentage of the total number of service-providers recording provision of at least one service;
- The median number of services per service-provider (recording provision under these codes);
- The number of services provided;
- The service percentage, i.e. the number of services recorded for this specialisation as a percentage of total services provided;
- Expenditure;
- The expenditure percentage, i.e. the expenditure on this specialisation as a percentage of total expenditure.

D. Specialisation of prescribers

Specialisation of the prescriber	Total prescribers	Concerned prescribers	% Prescribers	Median of prescriptions	Number of prescriptions	% Prescriptions	Expenses	% Expenses
Not applicable	0	0	0%	0	91374	100%	1.518.896,19	100%



This table shows, in order, the following non-standardised data per specialities (average figures for the period 2019):

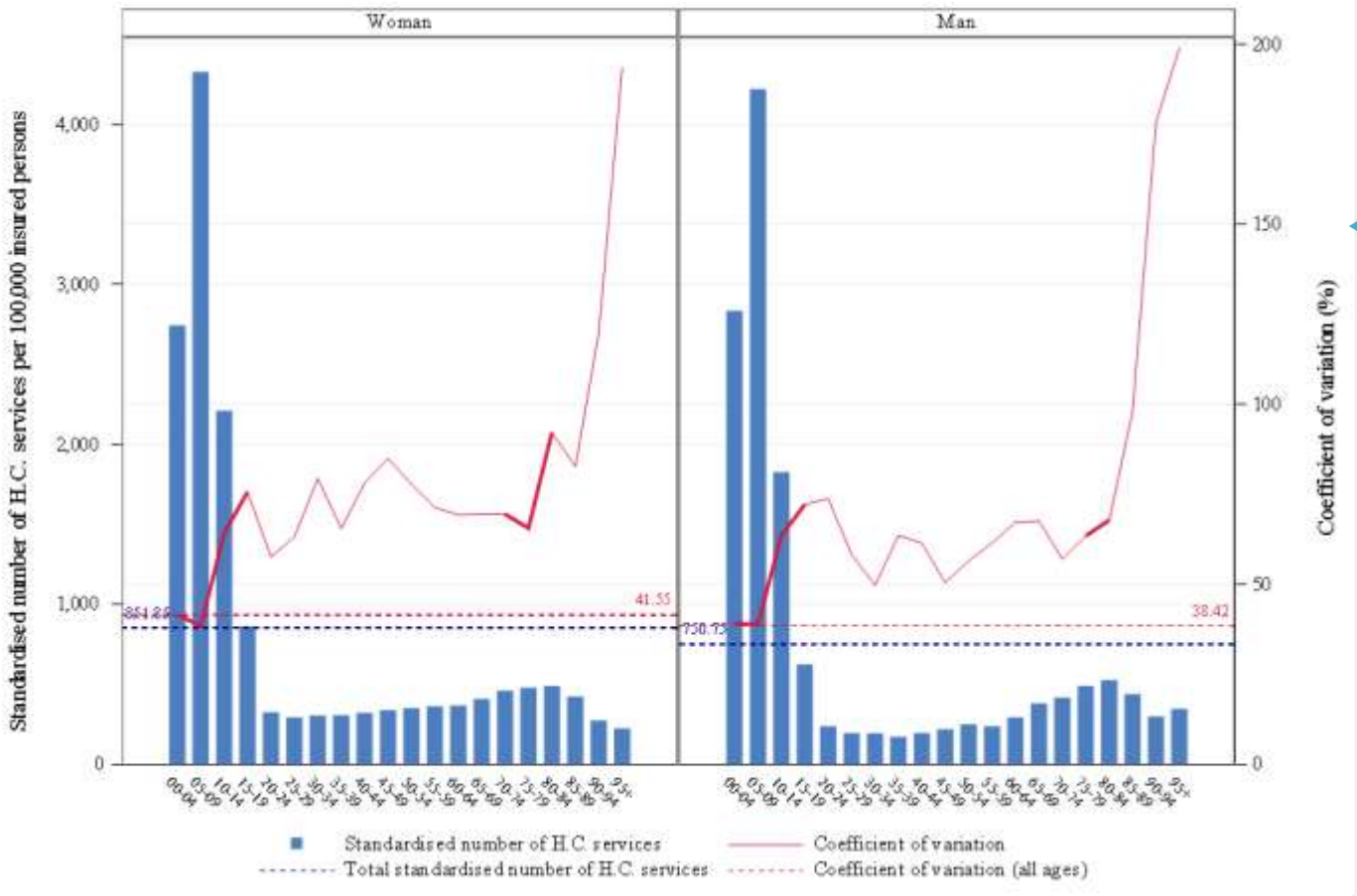
- The number of prescribers who have prescribed at least one service;
- The number of prescribers prescribing the nomenclature codes selected for this analysis;
- The prescribers prescribing these codes as a percentage of the number of prescribers prescribing at least one service;
- The median number of services per prescriber (prescribing these codes);
- The number of services prescribed;
- The percentage of services prescribed, i.e. the number of prescriptions issued for this specialisation as a percentage of total services prescribed;
- Expenditure;
- The expenditure percentage, i.e. expenditure on this specialisation as a percentage of total expenditure.

E. Standardised rate of use by gender and age group

	TOTAL
<i>Average number of interventions per year</i>	90.922
Median age (years)	10
Mean age (years)	21,93
Max/Min Ratio of the median age (by district)	4,29
Percentage of women	52,94%

Max/Min Ratio:

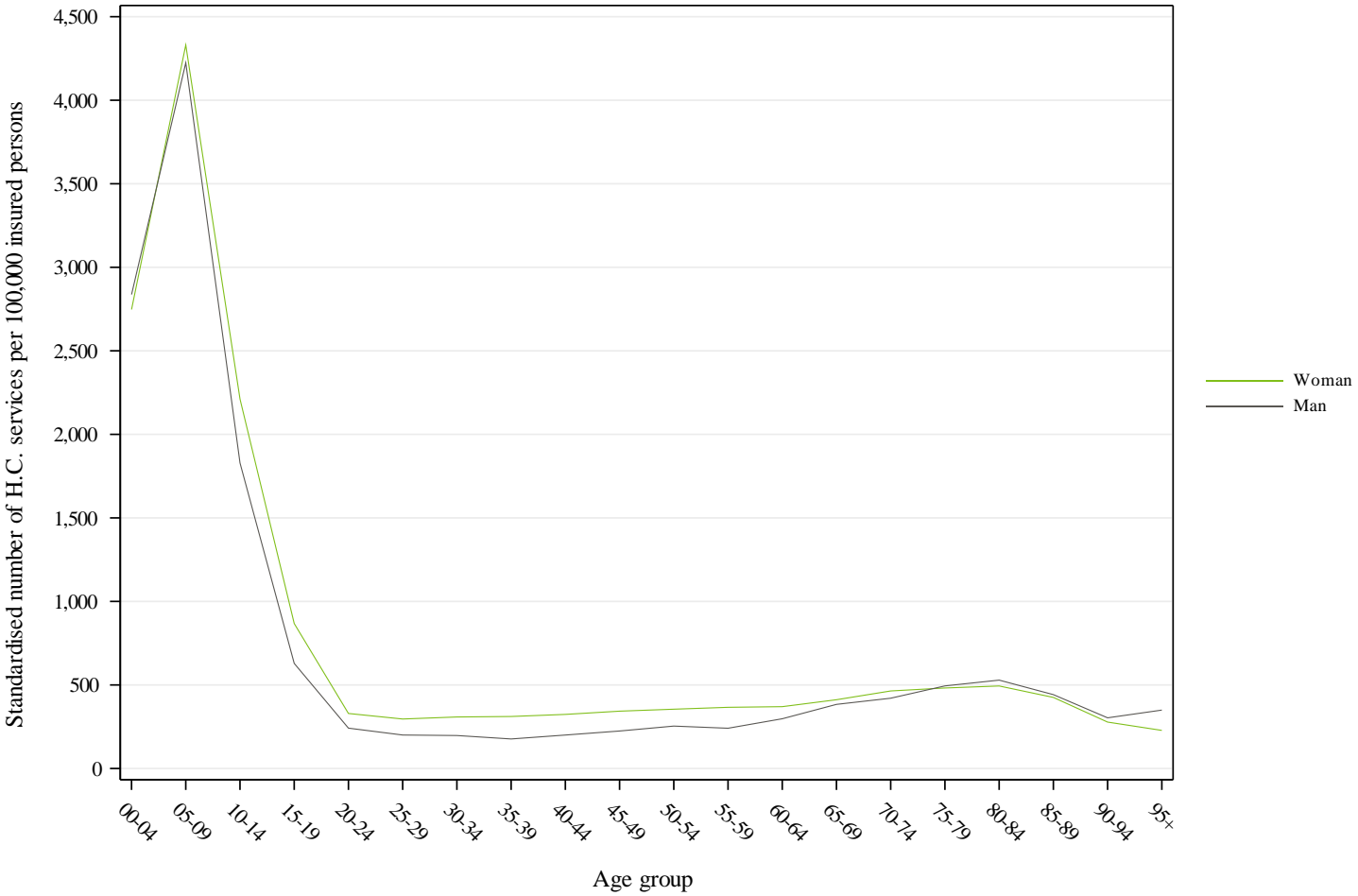
The max/min ratio measures the dispersion of values. It is calculated as the ratio of the maximum value found for the variable, in all districts, to the minimum value. If this minimum value is equal to zero, the max/min ratio cannot be calculated, and should be given as 'NA' ('not applicable').



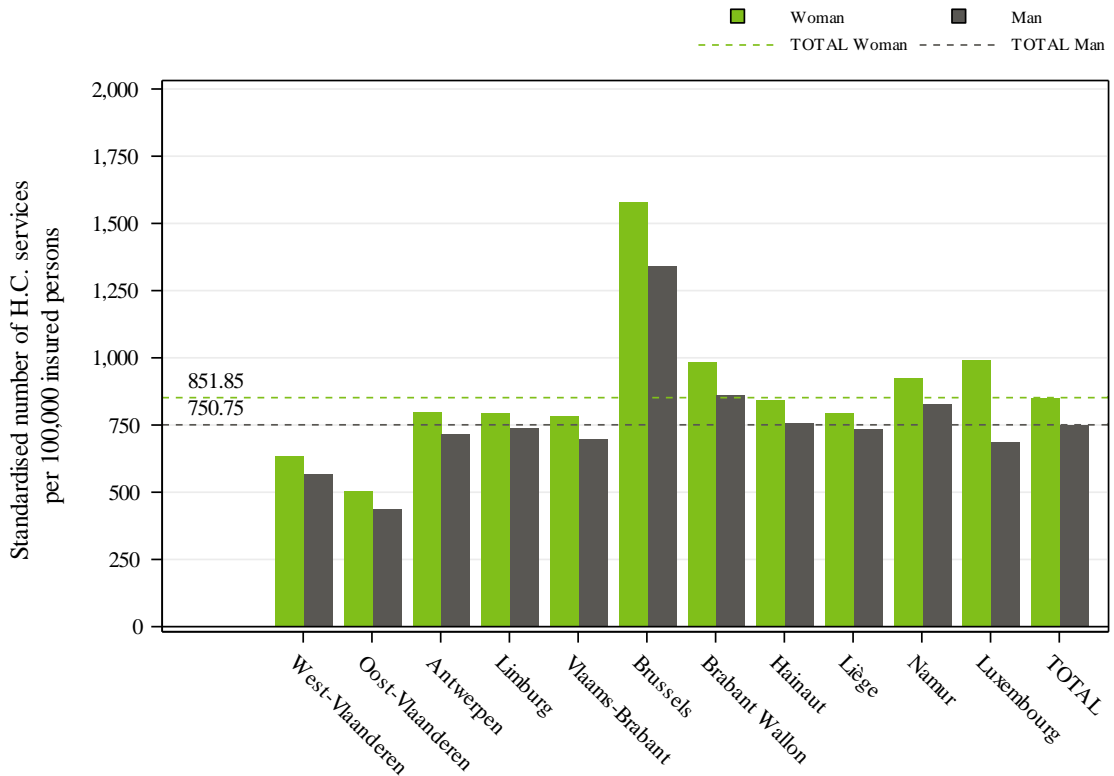
This figure is made up of bar charts for each gender. The **coefficient of variation**, shown by the red line, measures the relative dispersion of the standardised rates of use observed for each district, by age group and gender (standard deviation divided by the mean). This line is shown in bold for age groups where the variation coefficient 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 plots the standardised rate of use, and the right-hand axis plots the variation coefficient. The horizontal axis shows the division by age group. The horizontal dotted lines show the total values of the standardised rates of use (in blue) and of the variation coefficient (in red).

Standardised rate of use per 100,000 insured persons, and variation coefficient for the districts, by age group and gender, for the year 2019



Comparison of the standardised rates of use for women and men (per 100,000) in 2019

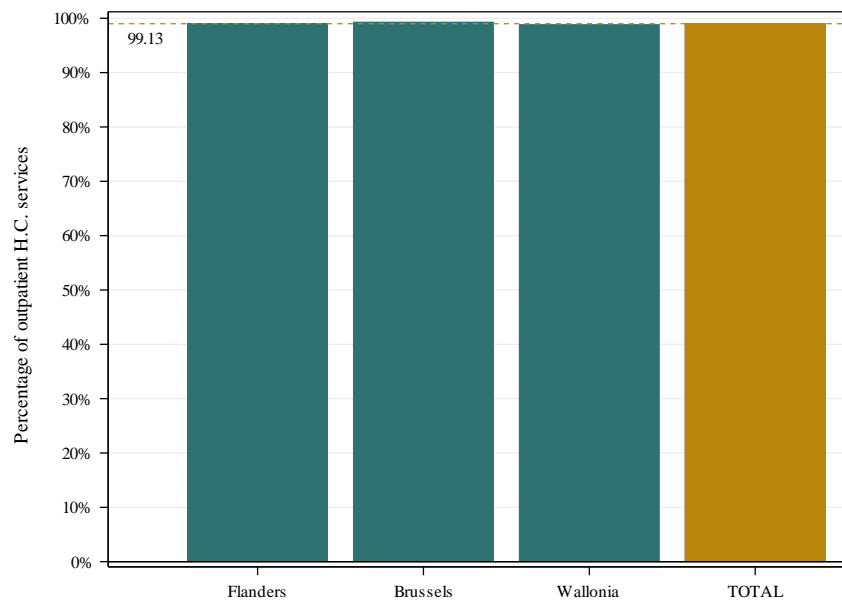


This histogram shows standardised rates of use by province and by gender. The grey bars show the rates for men, while the green bars show the rates for women, for each province. The grey and green broken lines show the total standardised rates of use, again grey for men, green for women.

Standardised rate of use per 100,000 insured persons, by gender and by province for the year 2019

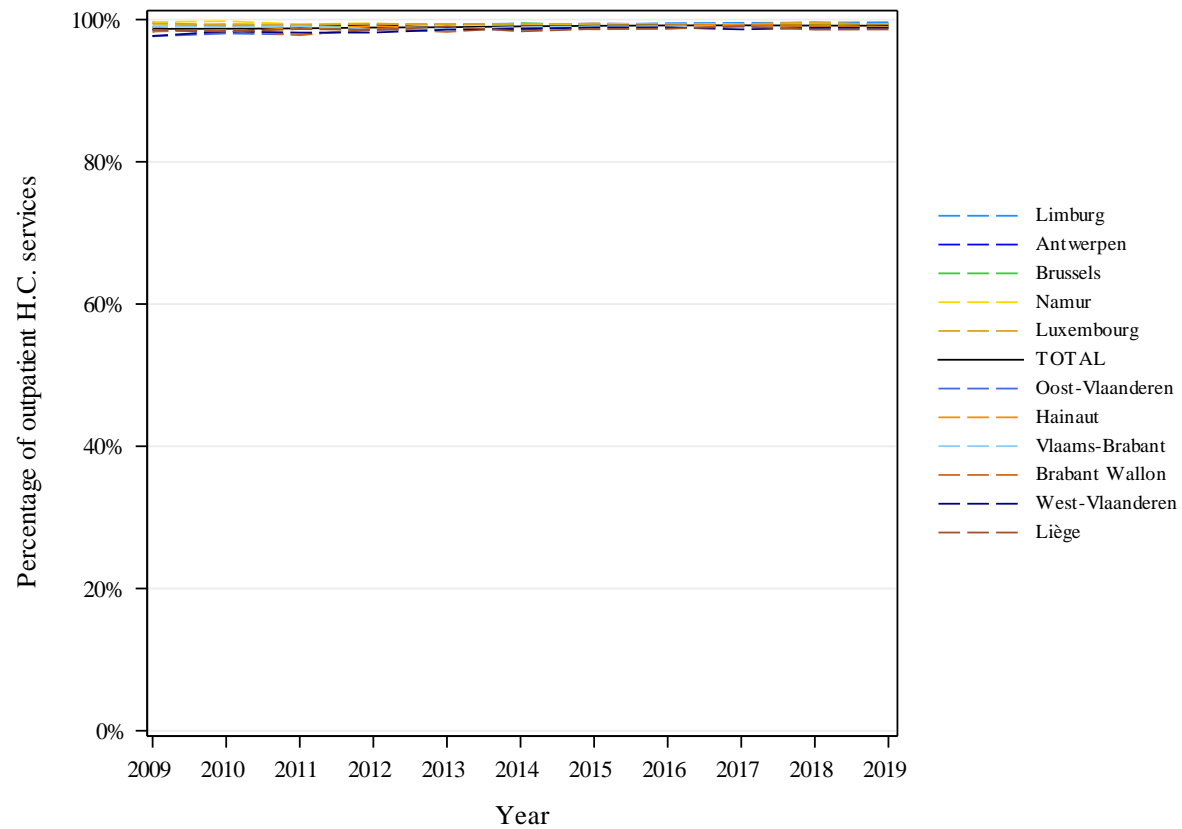
F. Standardised rate of use: hospital and outpatient care

	TOTAL
<i>Average number of interventions per year</i>	90.922
Percentage of out-patient care	99,13%
Max/min ratio of out-patient care percentage (by district)	1,02



Percentage of outpatient care, total and by region

This graph shows the percentage of outpatient services (including hospital day admissions), i.e. the number of outpatient services provided as a percentage of total services (outpatient and hospital stays). As well as one bar per region, there is a bar for the whole Belgian population. A dotted line also shows this overall ratio.

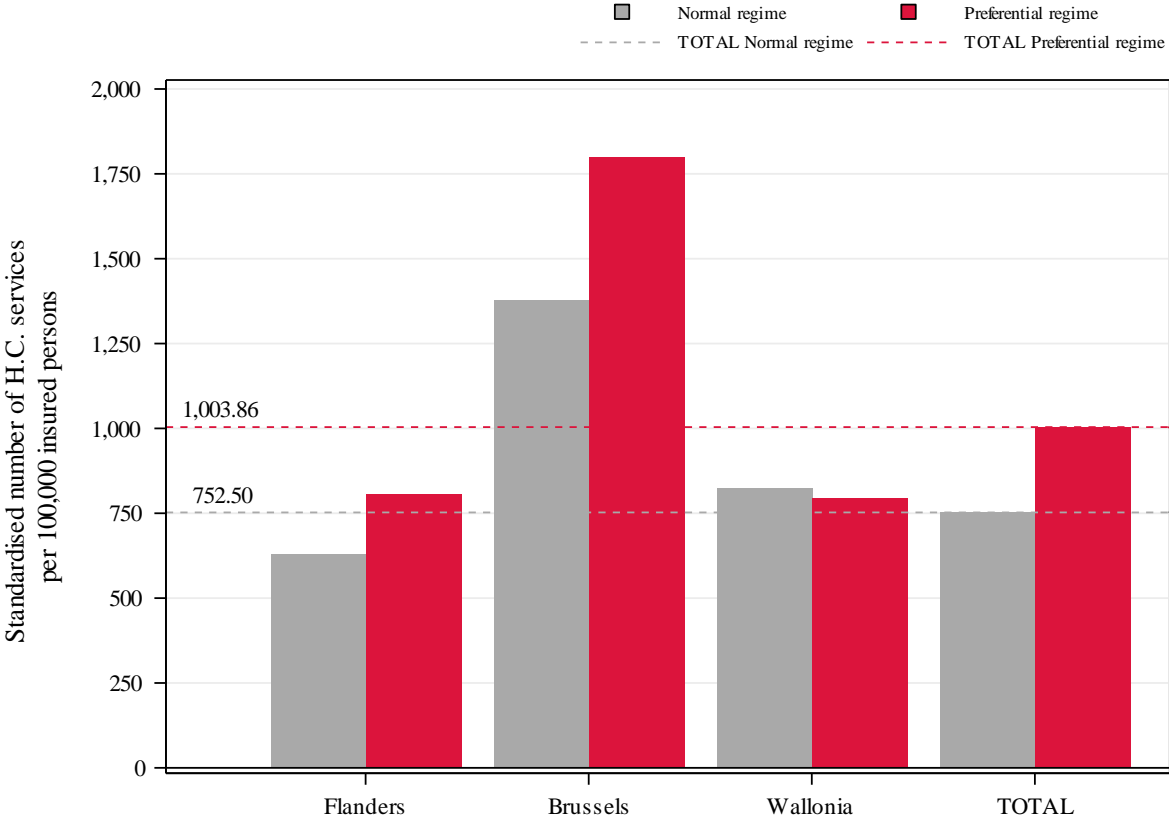


Change over time in the percentage of outpatient care, by province

N.B.: A complementary document to this chapter, about the handling of patients per health care sector, is enclosed in this report (cf. page 35).

G. Standardised rate of use by reimbursement scheme

	TOTAL
<i>Average number of interventions per year</i>	90.922
Percentage provided under the preferential reimbursement scheme	25,76%
Standardised rate of use with preferential reimbursement scheme (per 100,000)	1.004
Standardised rate of use without preferential reimbursement scheme (per 100,000)	753
Ratio Preferential scheme /General scheme	1,33

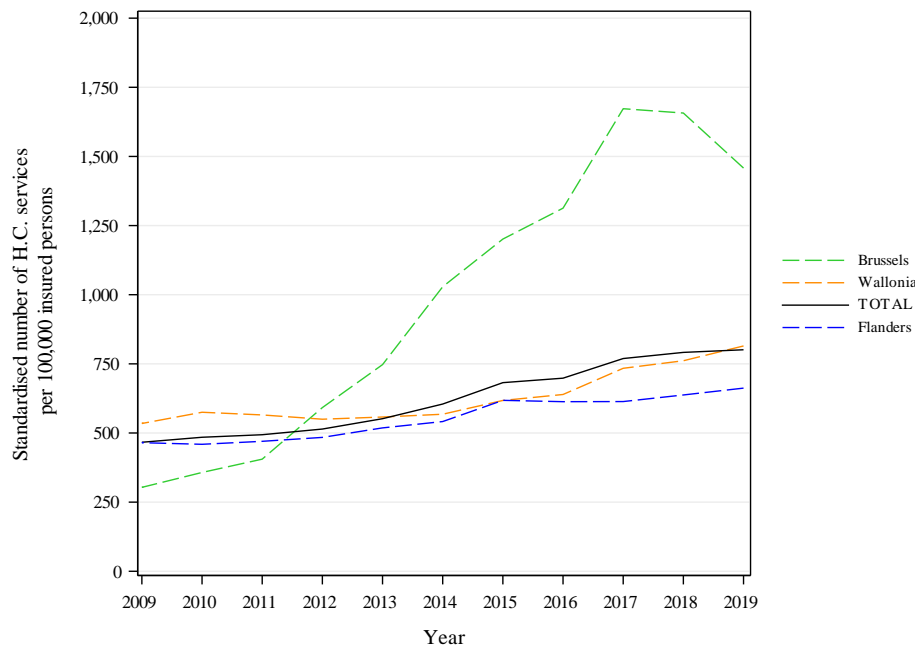


Standardised rate of use by reimbursement scheme and by region

This graph shows the standardised rates of use 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, with and without the preferential reimbursement scheme, respectively.

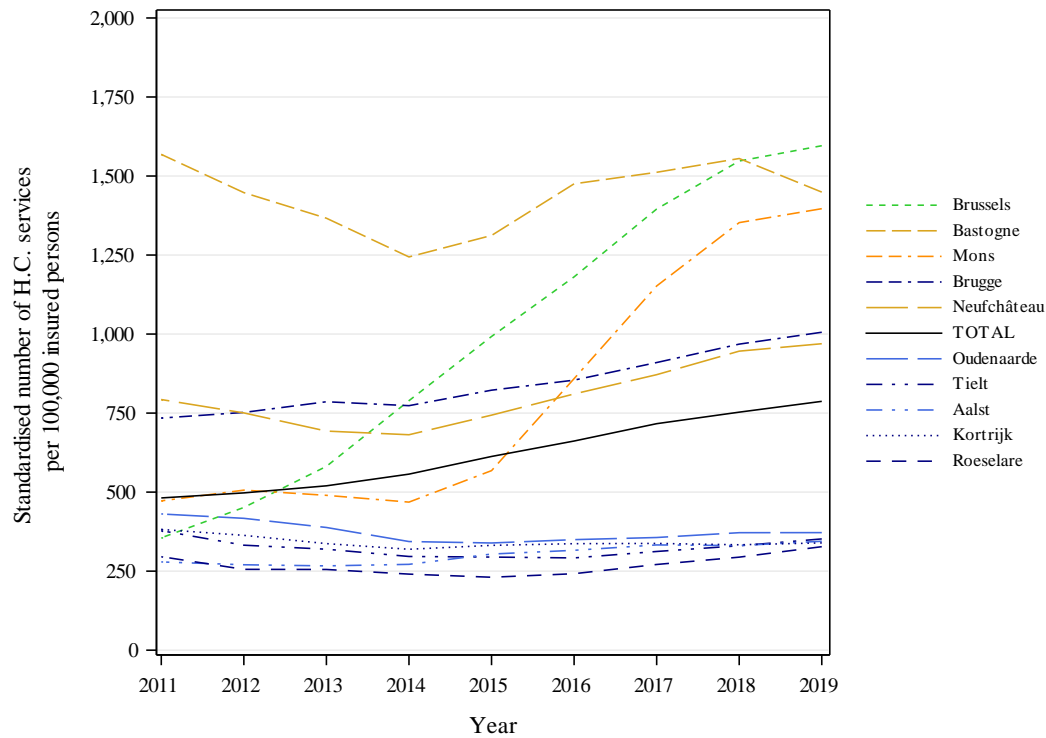
H. Trends in standardised rates of use

	TOTAL
<i>Average number of interventions per year</i>	90.922
Trend (2009-2019)	5,55%
Trend (2017-2019)	2,04%



This graph shows a coloured curve for each region and a black curve for the whole Belgian population. The x-axis shows the years, and the y-axis shows the standardised rate of use per 100,000 insured persons.

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



Trends in the standardised rate of use per 100,000 insured persons, by district

This graph shows a coloured line for each district and a black line for the whole Belgian population. The x-axis shows the years, and the y-axis shows the standardised rate of use 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.

		Rate of use	Annual increase		Structural break
		2019 (per 10 ⁵ insured)	2009-2019	2017-2019	
Provinces	West Flanders	600,66	3,14%	2,78%	*
	East Flanders	471,29	0,21%	6,19%	
	Antwerp	757,48	4,87%	4,19%	
	Limburg	766,29	2,96%	7,80%	
	Flemish Brabant	740,58	5,98%	-0,47%	
	Brussels	1457,96	16,99%	-6,64%	
	Walloon Brabant	920,49	11,19%	9,63%	
	Hainaut	799,42	7,72%	3,33%	
	Liège	763,46	2,42%	2,13%	
	Namur	875,26	0,11%	19,27%	
	Luxembourg	839,11	0,70%	-0,74%	
Regions	Flanders	662,27	3,60%	3,89%	
	Brussels	1457,96	16,99%	-6,64%	
	Wallonia	814,75	4,31%	5,36%	
TOTAL		800,93	5,55%	2,04%	

Trends in the rates of use, by province and region

This table shows the standardised **rates of use** (or of intervention) for the last year analysed (2019), but also the average **rates of increase**, by province, by region and in total, for the longer period (2009-2019) and the shorter period (2017-2019).

The **continuity** (or break) of the **long-term and short-term trends** was statistically evaluated using **linear regressions**. These analyses, specific to each geographical entity (i.e., province, region), make it possible to highlight whether the evolution of standardised rates of use over the last three years of the analysis period differs significantly from the evolution of rates over the whole period.

The significance of the test (and its degree of significance) is reported in the Structural break column : * Value from $p \leq 0.05$ / ** Value from $p \leq 0.01$ / *** Value from $p \leq 0.001$. If there is no asterisk, the trend observed is not statistically significant.

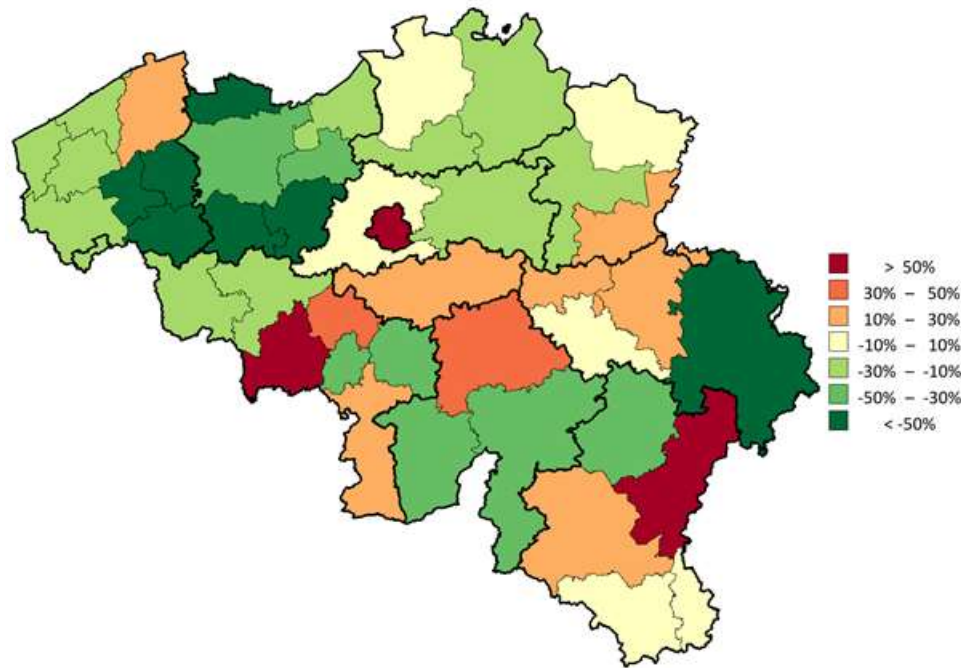
'NA' is shown where the nomenclature codes selected for the analysis have not been used for the whole of the three-year period.

I. Geographical variations in standardised rates of use

	TOTAL
<i>Average number of interventions per year</i>	90.922
Coefficient of Variation (2019)	39,42
Max/Min Ratio* of the standardised rates of use (by region)	2,2
Max/Min Ratio* of the standardised rates of use (by district)	4,37

Coefficient of Variation (2017-2019)	40,92
Coefficient of Variation (2009-2011)	48,02
<i>Statistically significant difference? (p-value)</i>	No

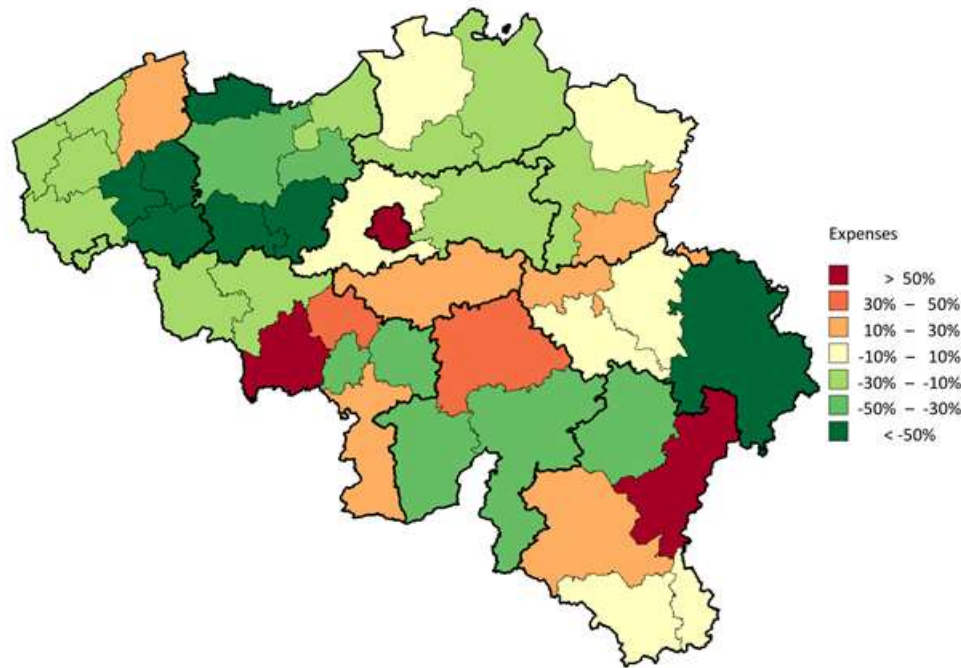
* An 'NA' result indicates a ratio which cannot be calculated, i.e. the minimum value = zero (cf. E. Standardised rate of use by gender and age group)



Map showing distribution of standardised rates of use, 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 rate of use in the district compared to the Belgian median. This comparison 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 total rate, and -20% if the rate is 20% below the overall rate. The percentages are calculated using the mean standardised rate of use of the last three years, and are displayed in bands of 20%. The following colour coding applies:

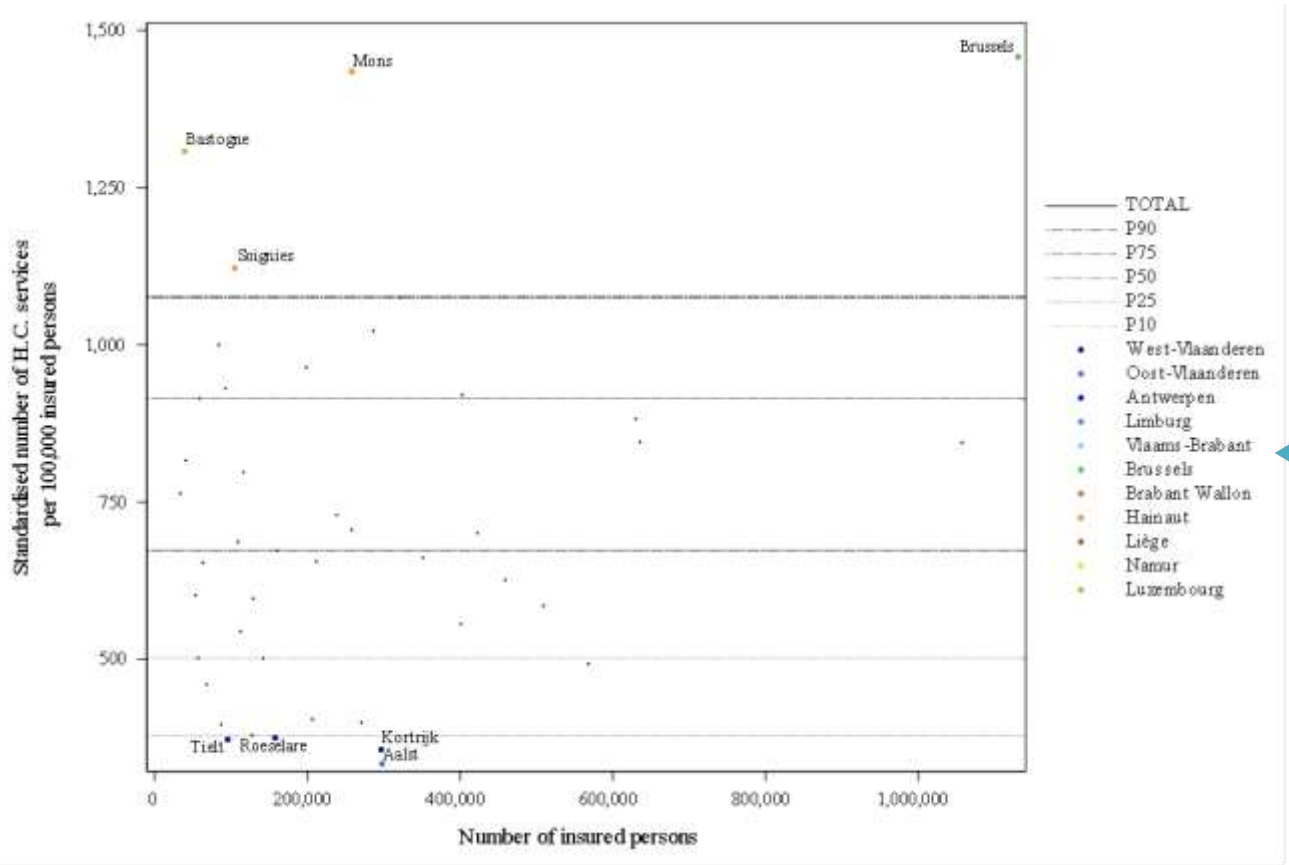
Colour	Category
Dark red	More than 50%
Orange-red	Between 30% and 50%
Orange	Between 10% and 30%
Yellow	Between -10% and 10%
Light green	Between -30% and -10%
Medium green	Between -50% and -30%
Dark green	Less than -50%
White	No use made



Map showing distribution of standardised expenditure, 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 expenditure in the district compared to Belgian median expenditure. This comparison 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 mean standardised expenditure for the last three years and are displayed in bands of 20%. The following colour coding applies:

Colour	Category
Dark Red	More than 50%
Red	Between 30% and 50%
Orange	Between 10% and 30%
Yellow	Between - 10% and 10%
Light Green	Between -30% and -10%
Green	Between -50% and - 30%
Dark Green	Less than -50%
White	No expenditure



In this graph, the standardised rate of use in a district is placed according to the size of its population. As well as the dots for districts, the **confidence intervals** (expected variation in the standardised rate of use when the only source of variation is random) are also shown on the graph (horizontal percentile lines). These are independent of the size of the districts. The thicker horizontal line shows the national standardised rate of use. The outlier districts are indicated by values above P90 and below P10.

'Funnel plot' showing the distribution of standardised rates of use by district, by number of insured persons

J. Standardised healthcare expenditure borne by the insurance

	TOTAL
<i>Average number of interventions per year</i>	90.922
Average annual expenditure (€)	1.511.458
Average cost per intervention (€)	16,62
Average annual expenditure per insured (€)	0,13
Max/Min Ratio* of expenditure per insured (by region)	2,2
Max/Min Ratio* of expenditure per insured (by district)	4,36

* An 'NA' result indicates a ratio which cannot be calculated, i.e. the minimum value = zero (cf. E. Standardised rate of use by gender and age group)

		Standardised expenditure (per insured)	
Provinces	West Flanders	0,1 €	
	East Flanders	0,08 €	
	Antwerp	0,13 €	
	Limburg	0,13 €	
	Flemish Brabant	0,12 €	
	Brussels	0,24 €	
	Walloon Brabant	0,15 €	
	Hainaut	0,13 €	
	Liège	0,13 €	
	Namur	0,14 €	
	Luxembourg	0,14 €	
	Regions	Flanders	0,11 €
		Brussels	0,24 €
Wallonia		0,13 €	
TOTAL		0,13 €	

Regional and provincial distribution of standardised expenditure (2019)

Nomenclature	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average annual growth rate
248710-248721	14,97	15,22	15,40	15,67	15,90	16,23	16,24	16,26	16,44	16,68	16,67	1,08%
248732-248743	15,00	15,21	15,33	15,55	15,77	16,02	16,05	16,07	16,19	16,41	16,42	0,91%

Change over time in expenditure, by service and by nomenclature code

4. KEY DATA SUMMARY

		TOTAL	
PROVIDERS & PRESCRIBERS			
Main healthcare providers:	<i>Ophthalmological surgery</i>	100,00%	
Main prescribers:	<i>Not applicable</i>	-	
RATE OF USE			
Average number of interventions (per year)		90.922	
Standardised rate of use (per 100,000 insured persons)		800,93	
≥ 2 occurrences per patient (2019) ⁴		17,4%	
Percentage of outpatient care		99,13%	
POPULATION			
Median age		10 years	
Max/min ratio ⁵ of the median age (by district)		4,29	
Percentage of women ⁶		52,94%	**
Ratio Preferential rate/General rate ⁶		1,33	**
TRENDS			
Trend ⁶ (2009-2019)		5,55%	NS
Trend ⁶ (2017-2019)		2,04%	
GEOGRAPHICAL VARIATIONS			
Coefficient of variation ⁶ (2009-2011)		48,02	NS
Coefficient of variation ⁶ (2017-2019)		40,92	
Max/min ⁵ Ratio of number of interventions ⁶ (per 100,000 insured persons, by region)		2,2	***
Max/Min Ratio ⁵ of number of interventions (per 100,000 insured persons, by district)		4,37	
DIRECT EXPENDITURE			
Average annual expenditure		1.511.458 €	
Average annual expenditure per insured		0,13 €	
Max/Min Ratio ⁵ of expenditure per insured (by region)		2,2	
Max/Min Ratio ⁵ of expenditure per insured (by district)		4,36	
Average cost of interventions		16,62 €	
CODING VARIATIONS & PRACTICE ALTERNATIVES⁴			
Variations in practice coding ⁶ (by province)		Yes	***
Variations in the choice of practice alternatives ⁶ (by province)		NA	NA

⁴ More detailed results are shown in a document enclosed to this report.

⁵ An 'NA' result indicates a ratio, which cannot be calculated, i.e. the minimum value equals zero.

⁶ If the result(s) show(s) a significant difference, the level of statistical significance is symbolized by one to three asterisks (increasingly significant). Otherwise, NS is displayed (not significant).

5. APPENDICES

A. Analysis of variance (ANOVA)

Statistical significance of the differences observed in 2019		
<i>By region?</i>	Yes	***
<i>By gender?</i>	Yes	**
<i>By reimbursement scheme?</i>	Yes	**
<i>By gender and per region?</i>	No	
<i>By reimbursement scheme and per region?</i>	Yes	*
<i>By gender and per reimbursement scheme?</i>	No	
<i>By gender and reimbursement scheme and per region?</i>	No	

In order to be able to assess the significance of the observed differences, an **ANOVA analysis** can be carried out.

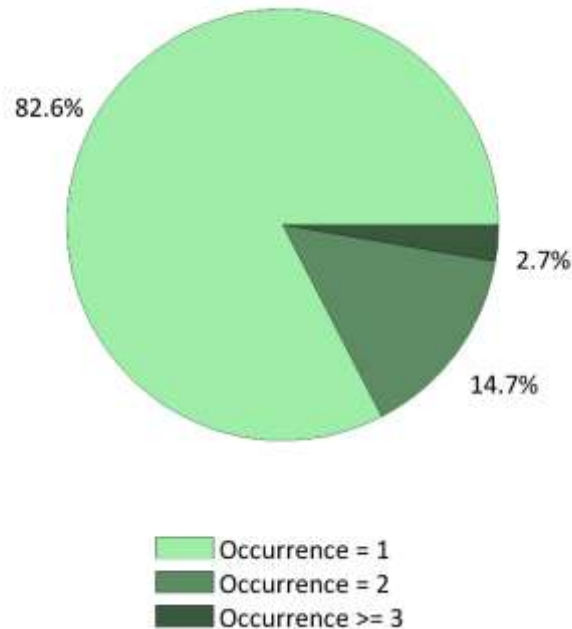
The ANOVA analysis applied here examines each **factor** separately (region, gender and reimbursement scheme). The **statistical significance** of the observed differences in the rate of use for each of these three factors is therefore first assessed separately.

On the other hand, the analysis is also applied in a **multifactorial** way, crossing two or three factors, in order to identify possible significant differences that are more specific. For example, are there significant differences in the rate of use by gender at the regional level?

The **asterisks** represent the level of statistical significance of the observed data with the following values: * Value threshold of $p \leq 0,05$ / ** Value threshold of $p \leq 0,01$ / *** Value threshold of $p \leq 0,001$. The absence of an asterisk indicates that the difference observed is statistically insignificant.

B. Frequency of practice occurrences

Frequency	Per year	Per day
2 occurrences	14,7%	0,4%
≥ 3 occurrences	2,7%	n.a.
≥ 2 occurrences	17,4%	0,4%



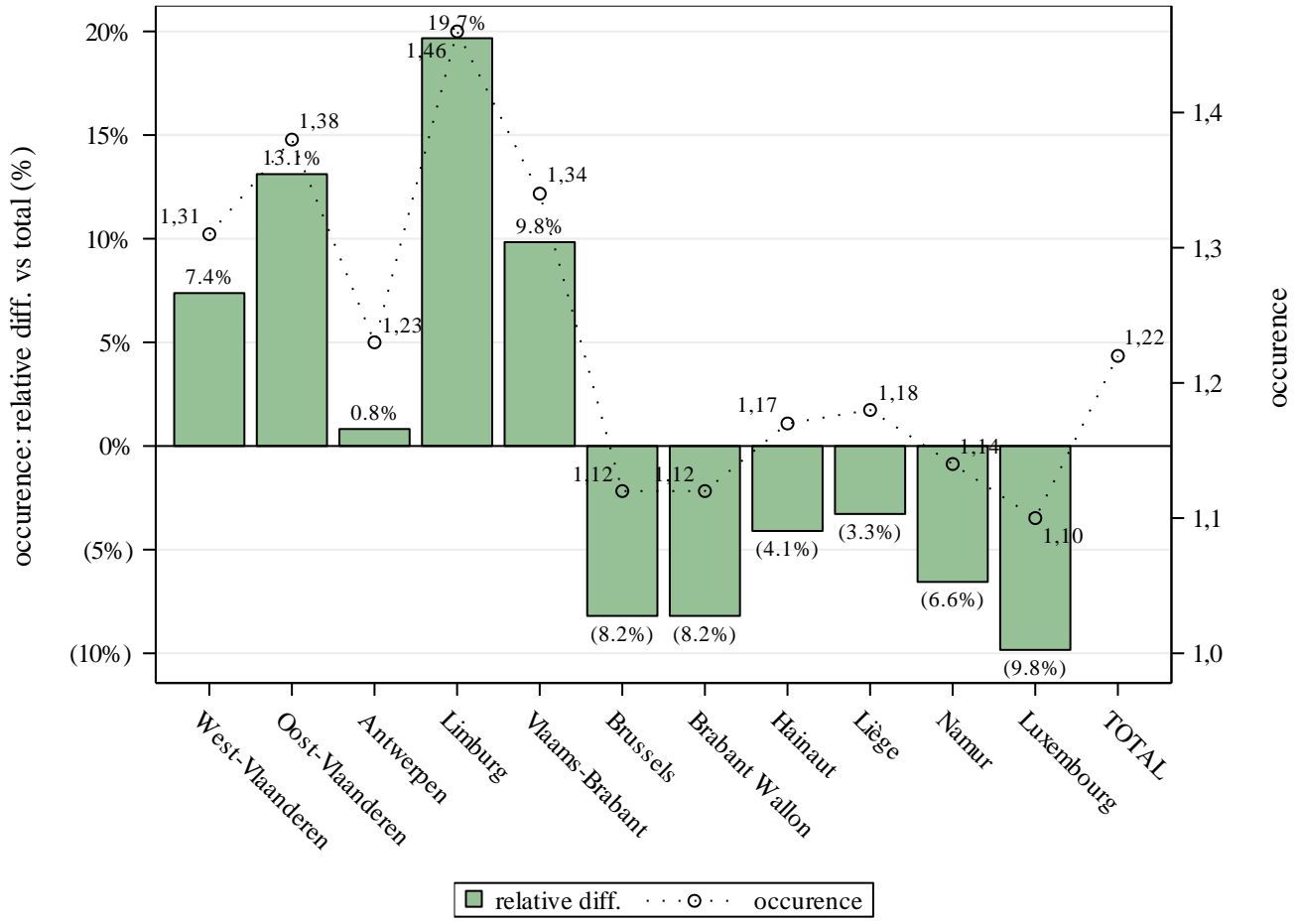
Distribution of practice recurrences per year (2019)

Some practices may be billed several times for the same patient in the same year or even on the same day. This may be due to a **repetition of the practice**, but also to an anatomical effect, which may lead, depending on the organ concerned, to performing the same practice **bilaterally**, which may therefore cause a double occurrence on the same day.

In order to interpret the results per day validly, it is useful to note that the same patient may be counted several times if, for example, he or she has received two identical services simultaneously, twice a year.

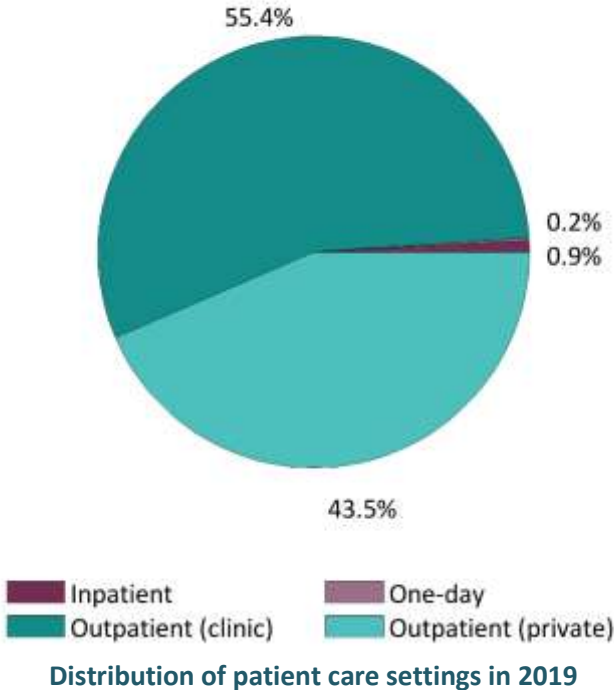
These frequency analyses of occurrences are carried out over the year **2019** using the following databases: Documents P, ADH and SHA.

Values « **n.a.** » are indicated if the data were not available at the time of this report.



Frequency of practice occurrences by province and variation vs national value (2019)

C. Patient care settings

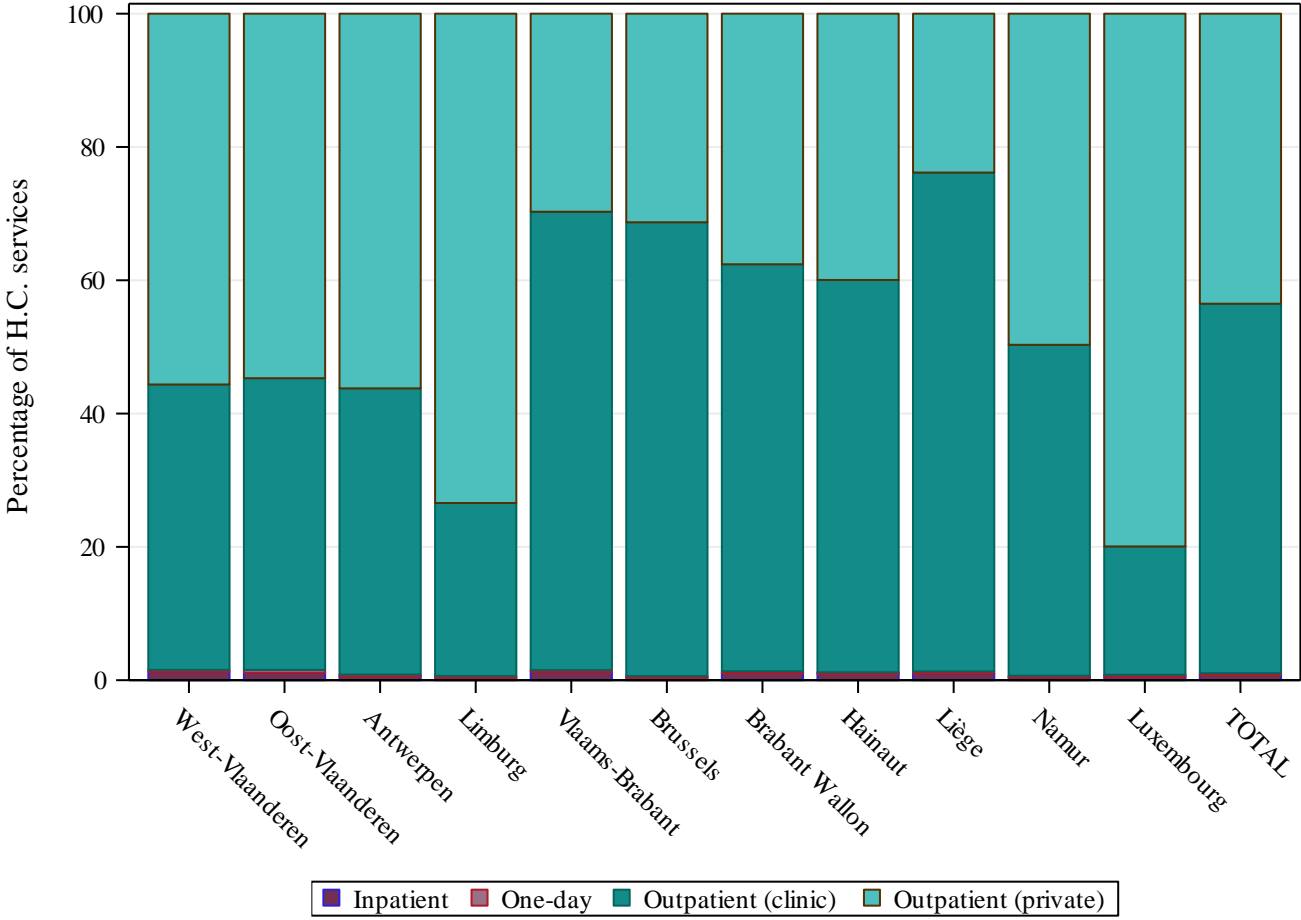


Care Settings	
Outpatient (private)	43.5%
Outpatient (polyclinic)	55.4%
(Day) Hospital	0.2%
Hospital (stay)	0.9%

In addition to the chapter on standardised inpatient and outpatient use rates (see page 16), the analysis of patient care settings can be refined by identifying the outpatient (private and polyclinic) and inpatient (day or standard hospitalisation) sub-sectors.

These analyses are carried out over the year **2019** using the following databases: Documents P, ADH and SHA.

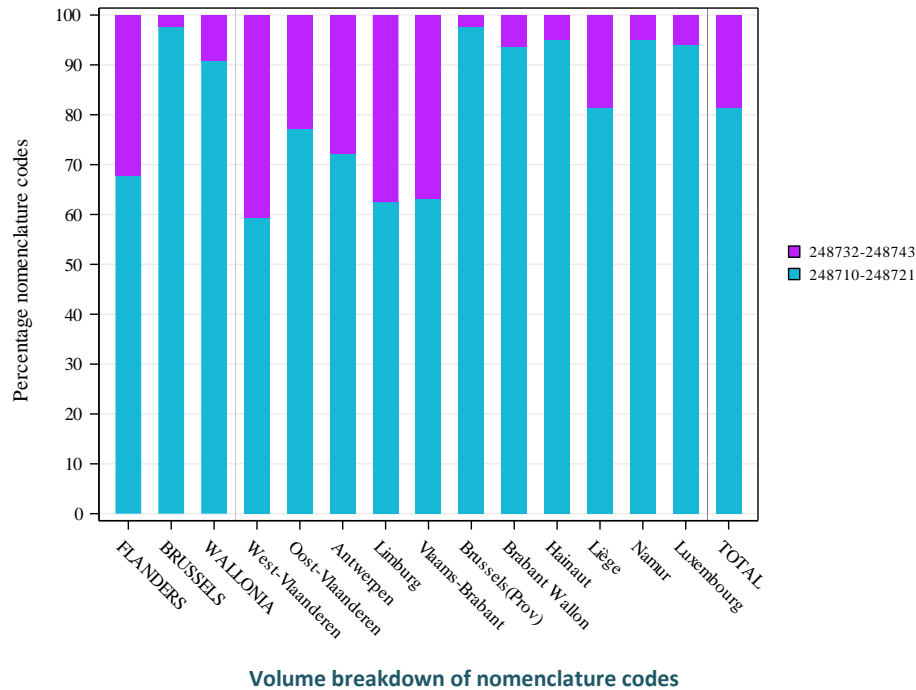
Values « **n.a.** » are indicated if the data were not available at the time of this report.



Distribution of patient care settings by province (2019)

D. Coding variations and practice alternatives

➔ Variations in coding:



Outpatient	Inpatient	Label
248710	248721	Examen fonctionnel détaillé de la motilité oculaire dans le strabisme concomitant ou les hétérophories au synoptophore ou appareil similaire (ne peut être porté en compte que deux fois par an)
248732	248743	Examen fonctionnel détaillé de la motilité oculaire dans le strabisme paralytique (test de Lancaster ou similaire) + graphique

Significance	By region	By province
Use of Nomenclature codes ⁷	***	***

⁷The calculation of significance is carried out here by comparing the geographical differences in the use of the different nomenclature codes to code the practice.

The **asterisks** represent the level of statistical significance of the observed data with the following values: * Value threshold of $p \leq 0,05$ / ** Value threshold of $p \leq 0,01$ / *** Value threshold of $p \leq 0,001$. **NS** and **NA** respectively indicate that the variations are not significant or not applicable.

