



2.3. Medical imaging for spine (QA-6)

2.3.1. Documentation sheet

Description	Number of examinations (X-ray, CT scan and MRI) by 100 000 insured population per year
Calculation	Numerator: Number of examinations (X-ray, CT scan and MRI) x 100 000 Denominator: insured population
Rationale	Low back pain (LBP) is a considerable public health problem which combines high frequency, healthcare consumption and societal cost. In Belgium, 21% of the 15 years old and over declared to have suffered from low back disorder or other chronic back defect in the past 12 months (HIS 2013). Recent guidelines do not recommend imaging as a diagnosis tool for aspecific low back pain (acute and chronic) unless a cluster of specific symptoms (“red flags”) is observed ^{1,2} . Public awareness campaigns ^h over medical imaging are annual set up since 2010; see also guidelines for medical imaging from the Belgian Society of Radiology. ⁱ Use of three imaging techniques for spine have been used as proxy for low back pain examination: X-ray, computed tomography (CT scan) and magnetic resonance imaging (MRI).
Data source	- Document N 2007-2017 for cases and expenses of insured persons (who meet selection criteria) of which age, gender, preferred scheme and district are known - Document P 2015-2017 for numbers and expenses of insured persons (who meet selection criteria) per specialisation
Technical definitions	Selection of the following INAMI – INAMI – RIZIV billing codes (nomenclature): - 455394-455405, 455416-455420, 455475- 455486, 455534- 455545, 466395-466406, 466410-466421, 466476-466480, 466535-466546 (X rays) - 458835-458846, 458850-458861 (CT scan) - 459491-459502 (MRI)
Limitations	In certain specific cases (red flags), it may of course be necessary to prescribe spine imaging. By excluding patients with known orthopaedic problems, we focus more (but impossibly exclusively) on non-specific back pain, so that we can make a better assessment of possible overuse of imaging in these patients. MRI and CT scan codes regarding spine examination are not specific to the lumbar spine. The indicator is thus a proxy.
International comparability	N.A., but the number of MRI units and CT scanners in EU-15 has been added as reference.
Dimension	Appropriateness, safety, efficiency
Related performance indicators	Radiation rate (see HSPA 2015 ³)
Keywords	Medical imaging, spine, medical radiation

^h <https://www.pasderayonssansraisons.be/>

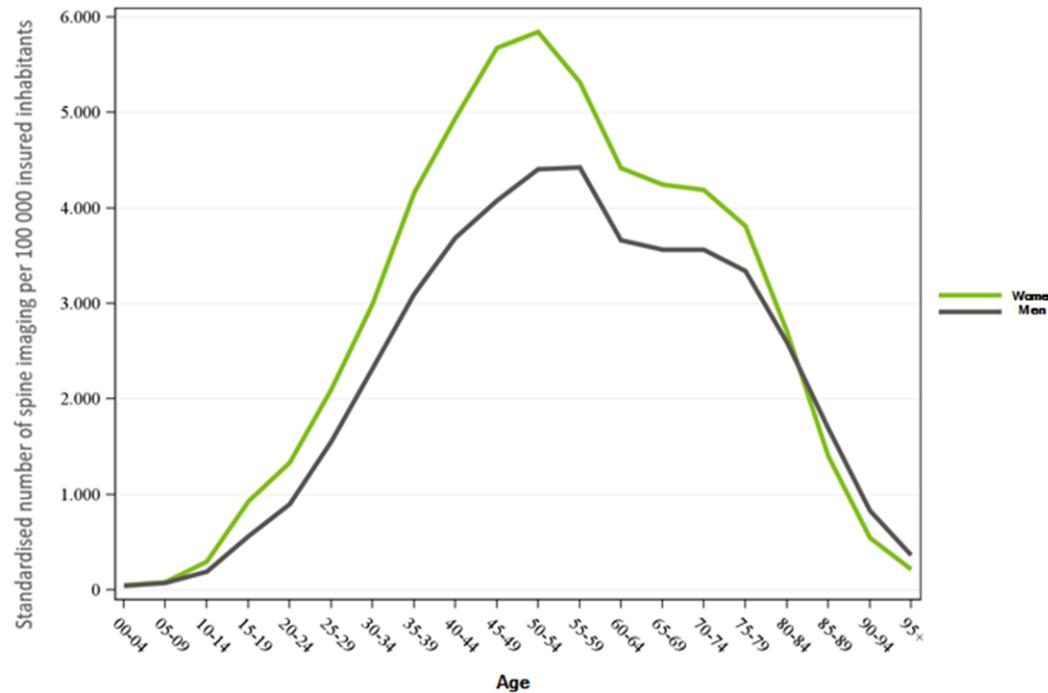
ⁱ <https://www.health.belgium.be/en/node/27827>



2.3.2. Results

General practitioners are prescribing 45% of the imaging for spine, with a median of 30 prescriptions per GP per year.⁴ There are more women (57.2%) than men (42.8%) who receive spine imaging and the most frequent age category is 50-54 years old (Figure 24). In 2017, there were 10 620 images taken for spine for 100 000 insured population; the proportion is higher in Wallonia (12 314 /100 000) than in Brussels (9436 /100 000) and Flanders (9944 /100 000).

Figure 24 – Spine imaging: age distribution for women and men (2015-2017)

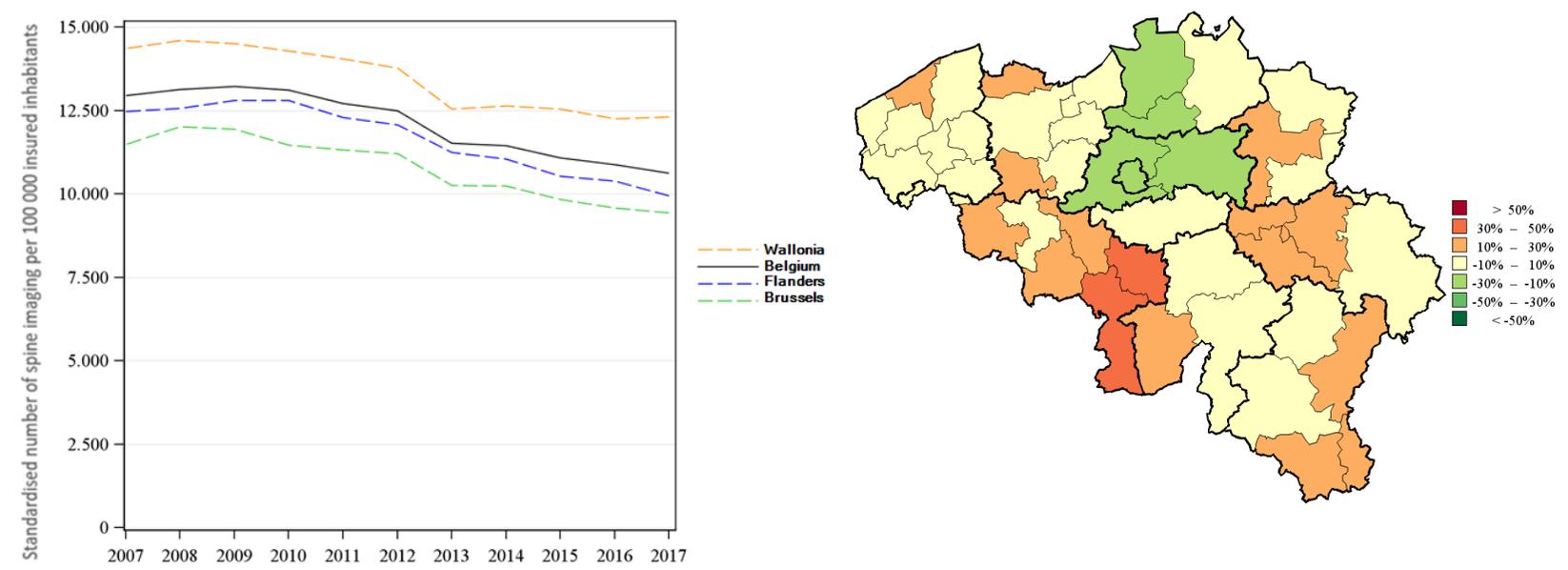


Source: INAMI – RIZIV



The global trend for the consumption of spine imaging is decreasing (-2% per year over the period 2007-2017) with stronger decline from 2012 to 2013. Regional trends are similar except for the stabilisation since 2013 in Wallonia, but Brussels and Flanders have less spine imaging than Wallonia altogether (Figure 25).

Figure 25 – Spine medical imaging: overall consumption (2007-2017) and relative variations around the national mean per district (2015-2017, standardised)



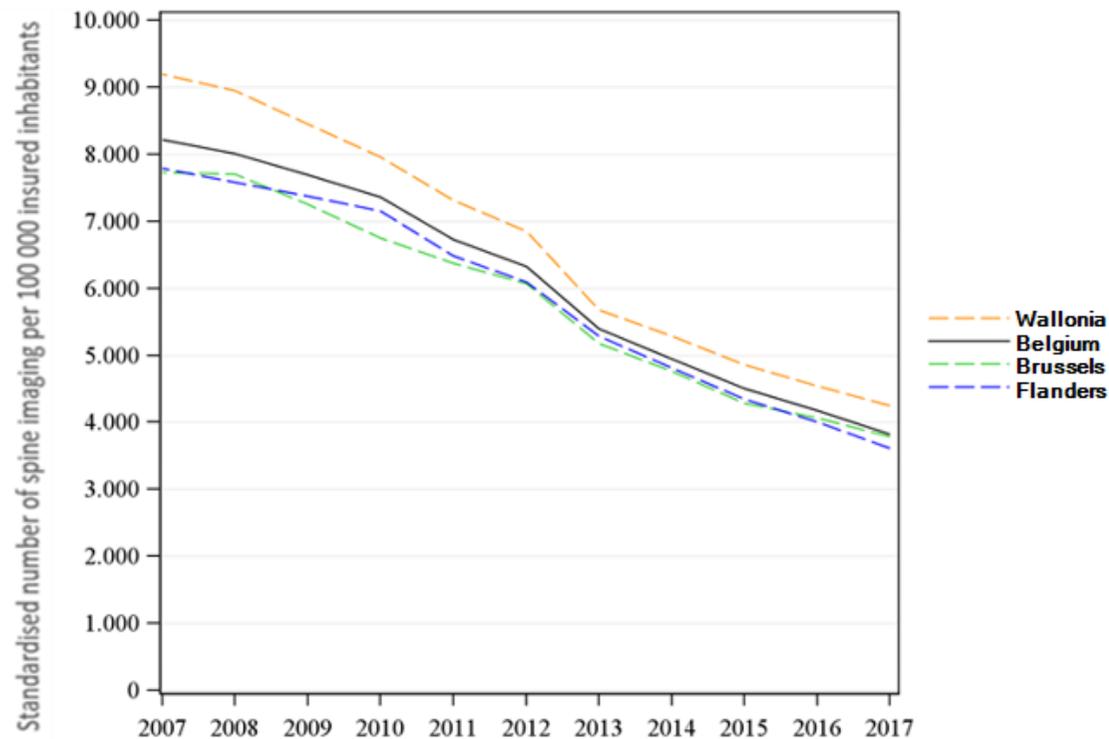
Source: INAMI - RIZIV



Looking separately at the three imaging techniques, it is obvious that the pattern is the same in the three regions for X-rays: the consumption has halved for spine X-rays over the period 2007-2017 (Figure 26, -7.35% per year), with Wallonia's rate a bit above the other regions. The trend for MRI is also similar for the three regions over the period 2007-2015 with a steady increase, that goes on for Flanders and Wallonia, but a decrease is

observed in Brussels after 2015; Flanders' consumption is more important than Brussels' and Wallonia's (Figure 27). CT scans rate is higher (and increasing) in Wallonia than in the other two regions where it is stable over the period 2007-2017, except for 2017 where a decrease is observed in Flanders (Figure 27).

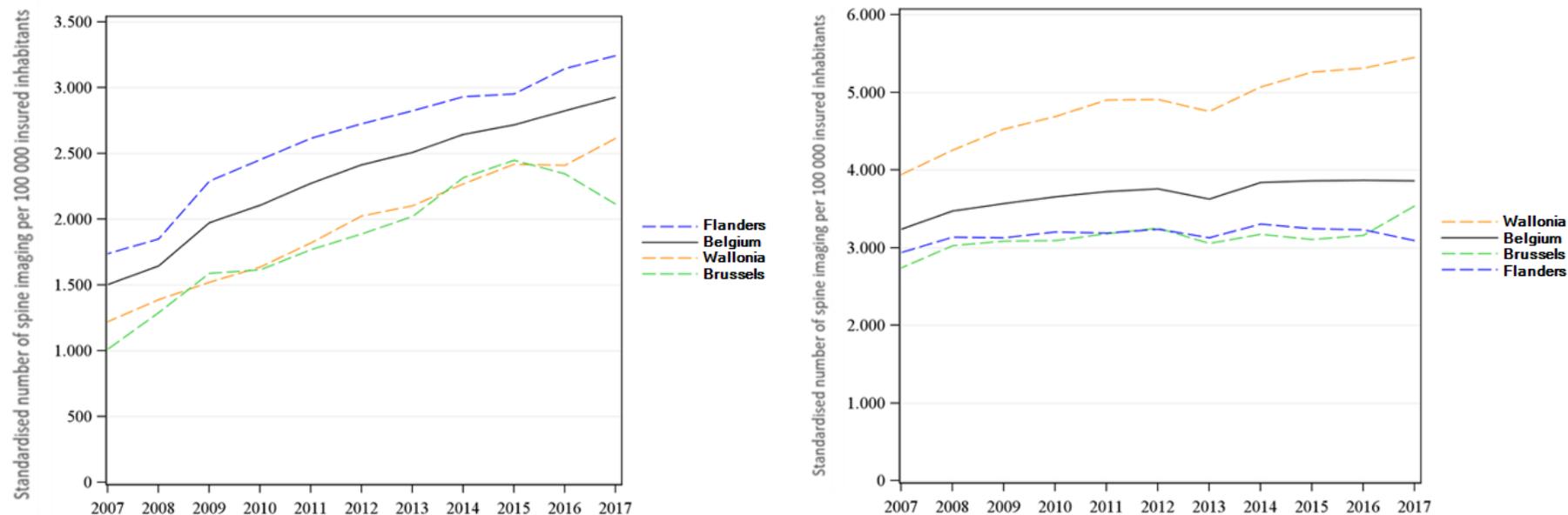
Figure 26 – Spine imaging consumption (X rays, 2007-2017)



Source: INAMI – RIZIV



Figure 27 – Spine imaging consumption (2007-2017): MRI (left) and CT scan (right)

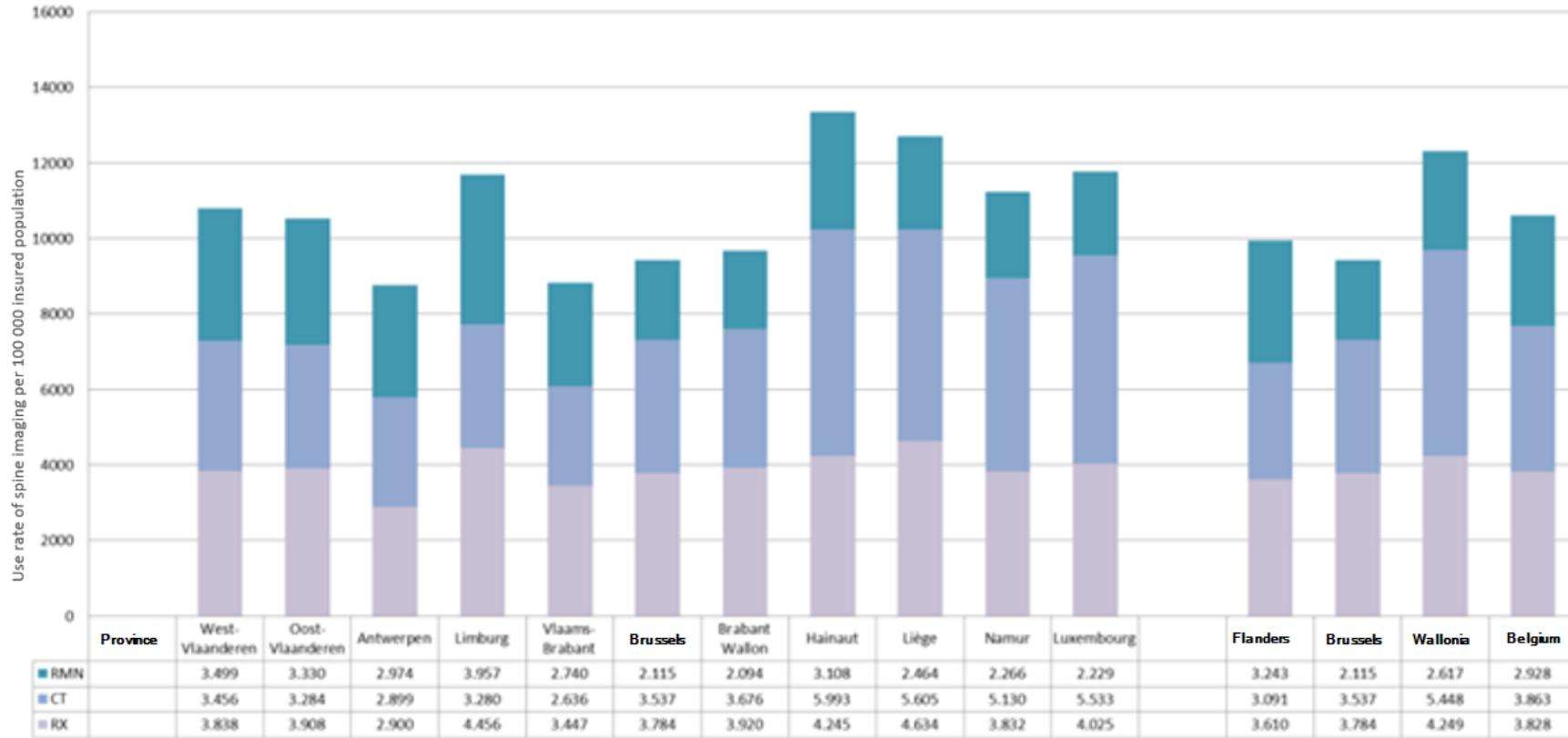


Source: INAMI – RIZIV

Figure 28 shows the distribution between the 3 imaging techniques by region and province for 2017: X-rays rate is somewhat higher in Wallonia, MRI rate is higher in Flanders (and lower in Brussels) and CT scans rate is higher in Wallonia. In 2017, the MRI imaging has decreased in Brussels for the first time, while the CT scan imaging has risen (it was stable before 2017).



Figure 28 – Rate of imaging spine use per 100 000 insured population) by region and by province (2017)



Source: INAMI – RIZIV



As complementary information, the number of CT scanners in hospitals and the number of MRI units per population have been compiled (Figure 29 and Figure 30) for available EU-15 countries and Belgium: since 2012^j, Belgium is a bit above the EU-15 ((23.1 CT scanners per million inhabitants and 20.5, respectively in 2016) while for MRI, Belgium has the same number of units since 2014 and a density which is now a bit below the EU-15 mean (12.6 MRI units per million inhabitants in Europe for 11.7 in Belgium in 2016. The

regional distribution is shown for MRI units in Figure 31: many units have been added in 2008, this might partly explain the steep rise observed between 2008 and 2009 in the consumption of MRI imaging (see Figure 32, left). CT scanner units per region figures are available in Figure 32: except for a rise in Flanders in 2014, the number of units is stable. Eighteen extra MRI units will be available in Belgian hospitals between 2021 and 2022, to limit the CT scanner use whenever is it possible.^k

^j It should be noted that due to limitations in the data collection, before 2013, the figures represent the number of hospitals with at least one CT scanner unit (per million inhabitants); from 2013 on, the figures represent the number of CT scans units per million inhabitants, as expected.

^k <https://www.maggiedeblock.be/akkoord-over-18-nieuwe-mri-toestellen/>



Figure 29 – Number of computed tomography scanners in hospitals per million inhabitants

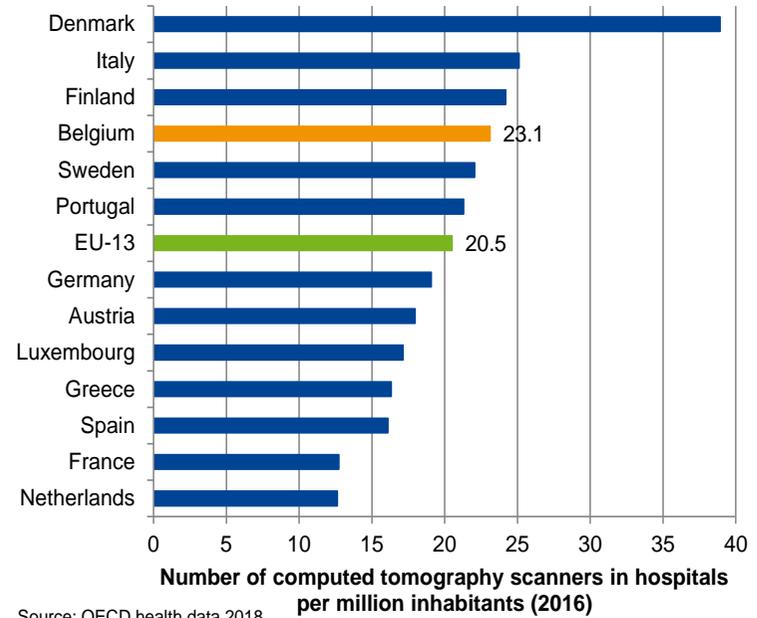
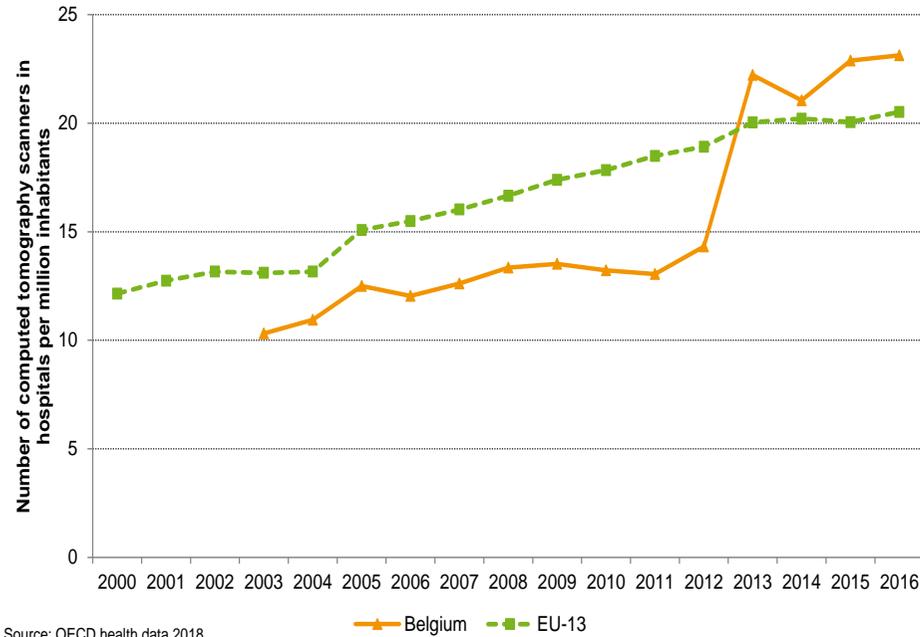
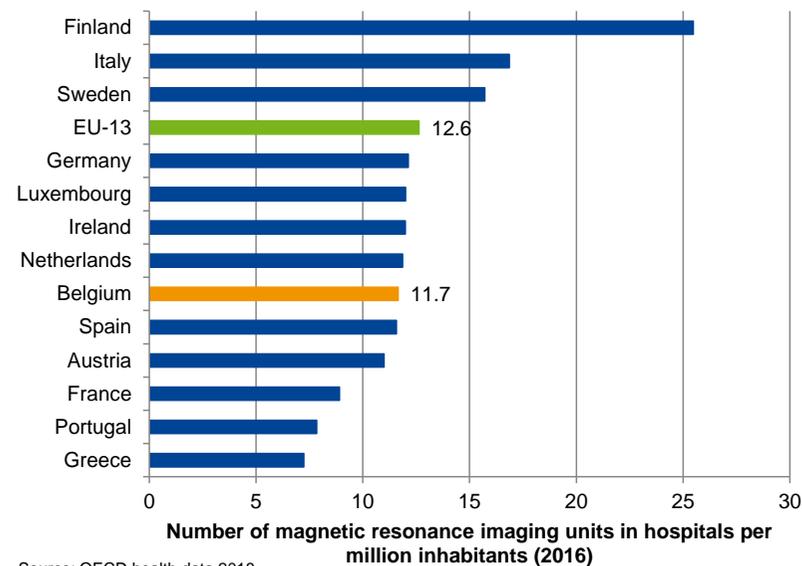
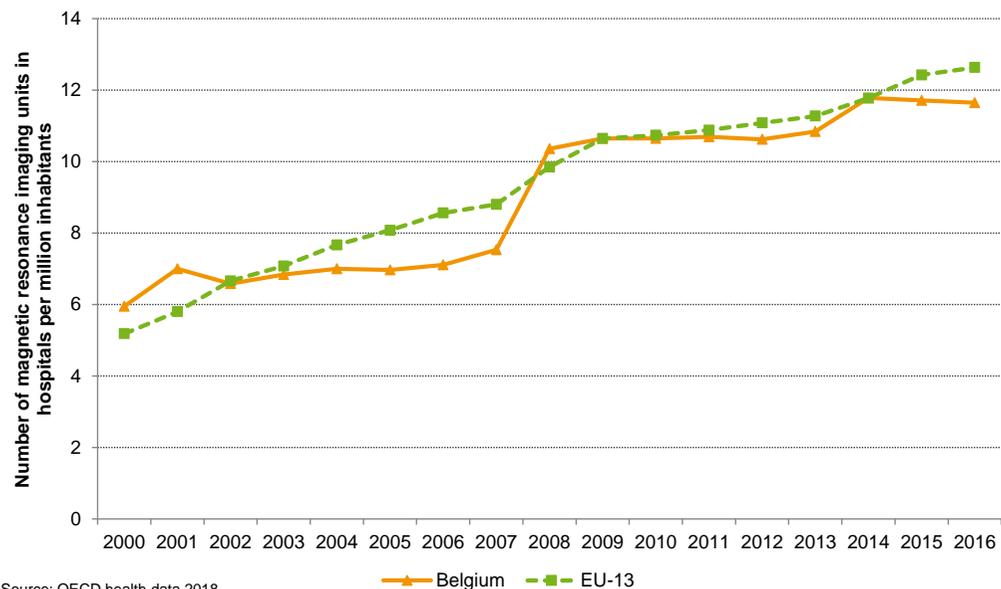
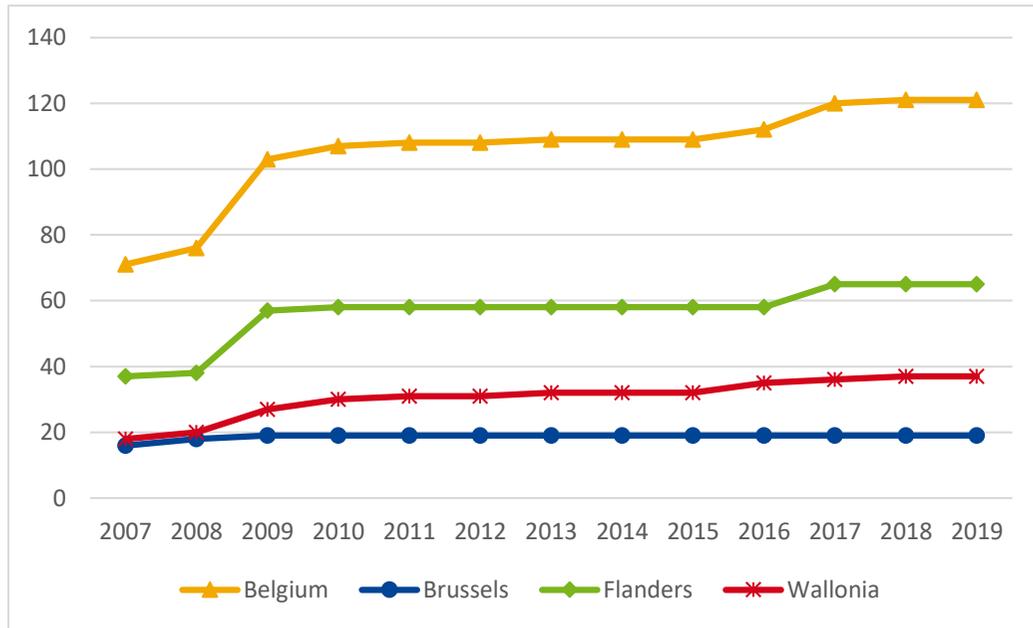




Figure 30 – Number of MRI units in hospitals per million inhabitants

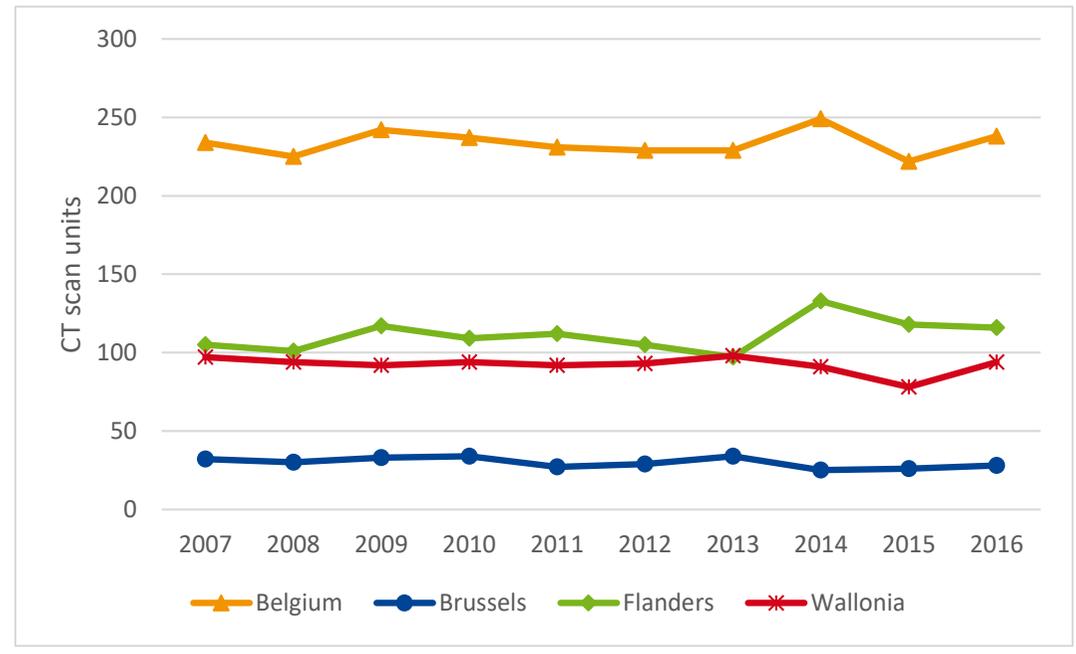


**Figure 31 – Number of MRI units in hospitals in Belgium (on 1 January, 2007-2019)**

Source: SPF SPSCAE – FOD VVVL



Figure 32 – Number of CT scanner units in hospital in Belgium (on 31 December, 2007-2016)



Source: SPF SPSCAE – FOD VVVL



Key points

Since 2010 recurring information campaign warns population about the problematic of medical radiation in Belgium.

The level of medical irradiation due to outdated examination¹ is estimated at 1.85 mSV by insured person, a level deemed too high; most of this irradiation comes from imaging for spine examination in case of low back pain, which is not recommended in most of the cases of aspecific pain. Improvement have been observed since 2010:

- **Global imaging of the spine decreased by 2% per year from 2007 to 2016**
- **X-rays imaging is declining by nearly 8% per year since 2015**
- **CT scan has stabilised since 2015**
- **MRI is still growing, but the rate is decreasing from 6.8% to 3.8% per year**
- **The overall radiation has decreased by 1% between 2015 and 2017**

Medical variations between regions remain high with high differences in utilisation rate, especially for CT scans, i.e. the irradiation level can vary by a factor of two from one district to another for spine imaging

References

1. Van Wambeke P, Desomer A, Ailliet L, Berquin A, Demoulin C, Depreitere B, et al. Low back pain and radicular pain: assessment and management Good Clinical Practice (GCP). Brussels: Belgian Health Care Knowledge Centre (KCE); 2017 05/2017. KCE Reports 287 (D/2017/10.273/36) Available from: https://kce.fgov.be/sites/default/files/page_documents/KCE_287_Low_back_pain_Report_0.pdf
2. NICE. Low back pain and sciatica in over 16s: assessment and management. National Institute for Health and Care Excellence; 2016. Available from: <https://www.nice.org.uk/guidance/NG59>
3. Vrijens F, Renard F, Camberlin C, Desomer A, Dubois C, Jonckheer P, et al. Performance of the Belgian Health System - Report 2015. Health Services Research (HSR). Brussels: Belgian Health Care Knowledge Centre (KCE); 2016. KCE Reports (259)
4. Appropriate care unit. Medical imaging (spine , medical irradiation). INAMI - RIZIV; 2018. Medical Practice Variations Available from: <https://www.healthybelgium.be/>

¹ <https://www.inami.fgov.be/SiteCollectionDocuments/imagerie-medicale-campagne-sensibilisation-brochure.pdf>