

Assessment of the unit costs in imaging acts: the example of MRI and CT-scan acts in France

Vasilescu L., Faller M., Allou A
Real-World Insights, IQVIA, Paris La Défense, France

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Introduction

The current trend of sustained growth in medical imaging in France requires a precise methodology in order to determine the actual unit cost of medical imaging examinations and more precisely of Computed Tomography (CT) and Magnetic Resonance Imaging (MRI). This analysis evaluates the costs from the perspective of the French National Insurance System, in order to better inform health economic modeling of French healthcare resource consumption.

Method

Evaluation of CT and MRI costs for the French National Health Insurance (NHI) follows specific rules. It is based on the calculation of 2 parts: the “technical package” for the depreciation and operation of the machines and the tariffs for the “intellectual activity” (sources: list of technical acts covered by the National Health Insurance in effect at the time of the analysis^{1,2}) of the interpreting radiologist. Those tariffs are determined depending on the number of exams performed each year on a certain MRI or CT unit compared to a reference activity, as well as the class of the CT machine or the type of the MRI machine and whether or not the machine is depreciated or not. No transportation costs were calculated for this analysis.

A conservative hypothesis was considered concerning the baseline mean activity level of CT-scans & MRI : 6,700 and 4,750 exams respectively per year and per machine. Indeed, most of the CT-scans machines are class III and it is assumed that most of the MRI machines are 1.5 Tesla (which represent approximately 4,900 exams per year and per machine).

Step 1: calculation of the number of acts per machine in 2016 from the panoramas of the DREES, 2018 (Table 1).

Step 2: calculation of the technical package (Table 2). Full and reduced tariffs were extracted from the French official price list¹ for the year 2018. Since tariffs depend on the region considered for MRI exams, an average of all regional tariffs was used. The reference activity (6,700 for the CT-scan and 4,750 for the MRI) and the threshold by type of machine (11,000 for CT-scan and 8,000 for MRI) were taken into account, as well as if the machine was depreciated or not.

Step 3: calculation of the intellectual activity (Table 3). Tariffs were extracted from the French official price list of acts². Tariffs are differentiated by number of segments. Mainly, two types of acts can usually be performed for MRI examination.

Step 4: calculation of total reimbursed costs for CT scan and MRI. The reimbursement rate of the French NHI is 100% for the intellectual activity tariff and 70 % for the technical package tariff of imaging acts. A flat rate contribution of 1 € (not reimbursed by the French NHI) was also applied for each act performed.

Results

In France, it has been estimated that there were 721 CT-scan and 525 MRI in 2016. The volume of acts performed on these machines can be estimated at 7.2 and 2.6 million respectively. From a National Health Insurance perspective, the CT-scan total unit cost (2 segments) can be estimated at €102.66 and the MRI unit cost at €193.47. Even though different methodologies can be used, cross-countries comparison indicates that France is among the countries where the cost of imaging in section is the lowest.

1. Journal Officiel De La République Française – 29 juin 2018 ; NOR : SSAU1817832S

2. Classification Commune des Actes Médicaux v54.10

3. Panoramas de la DREES - Les établissements de santé - édition 2018

Limits

The depreciation of a CT was assumed to be achieved after 10 years instead of 7 years. This conservative assumption was made because of the lack of data concerning the age profile of machines in France between 1 and 7 years. It was also assumed that a large majority of the CT machines are class III. Moreover, the costs of contrast agents and costs for storage of results were not considered in this analysis. We expect a limited impact of these parameters on unit cost per CT scan or MRI.

Table 1: Number of acts per device in France (DREES 2018)

2016		Scanner	MRI
Number of devices		721	525
Number of exams (in million)	Inhospital	3.2	0.6
	External consultations	4.0	2.0
Number of exams per device		9,986	4,952

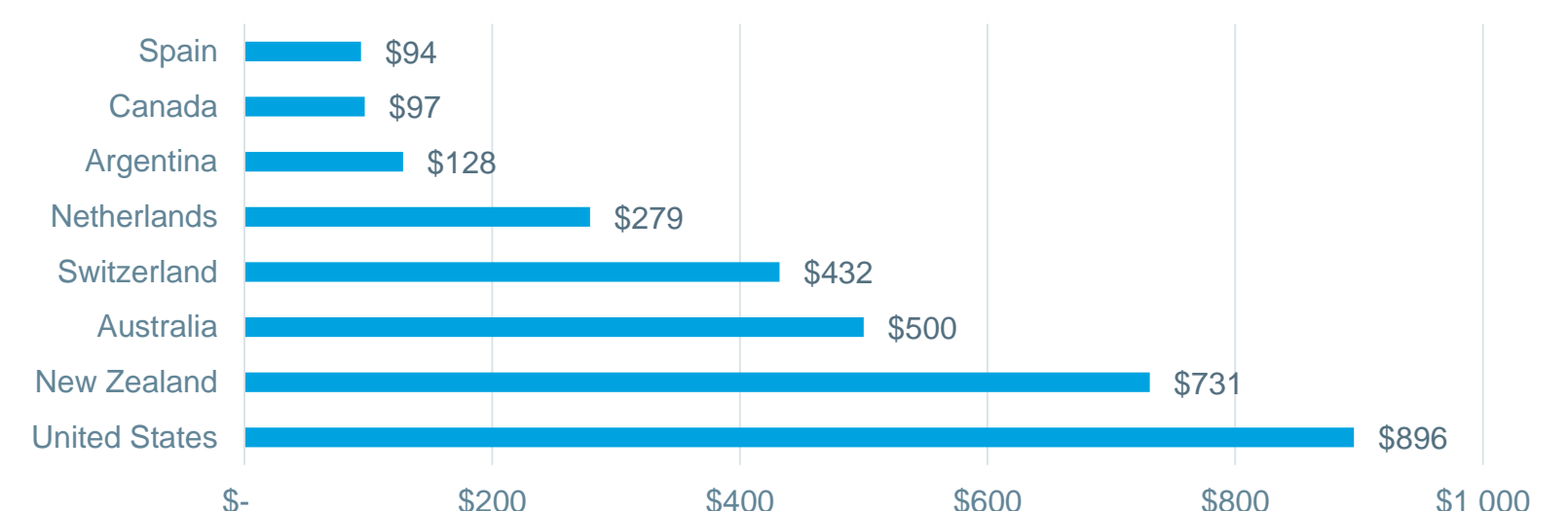
Table 2: Average technical package (weighted amortized / unamortized ; full / reduced tariff)

	Activity ≤ reference activity	Activity > reference activity ≤ threshold	Total
CT-scan	€86.29	€54.68	€75.88
MRI	€154.57	€69.00	€151.07

Table 3: Tariff for intellectual activity

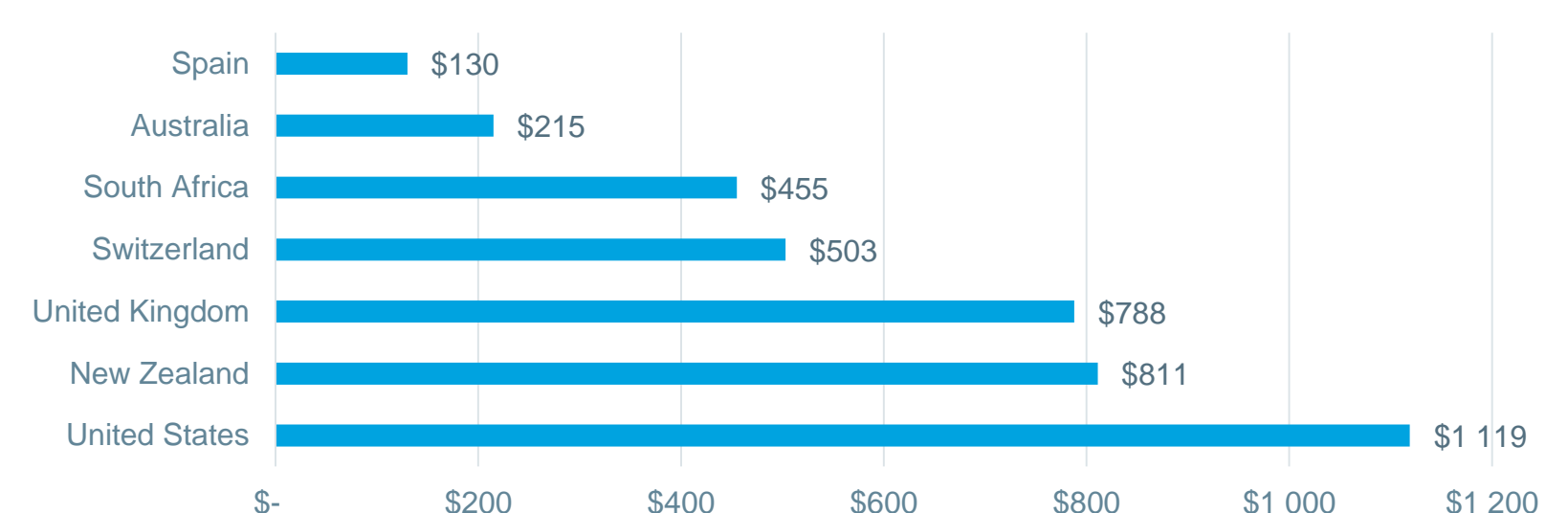
Imaging type	Tariff		
	1 segment	2 segments	3 segments
CT-scan	€25.27	€50.54	€75.81
MRI	€62.00		

Figure 1: Average prices of an abdominal CT scan in selected countries in 2013 (in US dollars)



Source: International Federation of Health Plans

Figure 2: Average prices of a MRI in selected countries in 2015 (in US dollars)



Source: Statistica.com