

## 4. HEALTH CARE ACTIVITIES

### 4.2. Medical technologies (supply and use)

The diffusion of modern medical technologies is one main driver of rising health expenditure across OECD countries. This section presents data on the availability and intensity of use of two diagnostic technologies – computed tomography (CT) scanners and magnetic resonance imaging (MRI) units.

CT (or CAT, for computed axial tomography) scanners and MRI units help physicians diagnose a range of conditions by producing cross-sectional views of the inside of the body being scanned. Unlike conventional radiography and CT scanning, newer imaging technology used in MRI units do not expose patients to ionising radiation. The size and population density of a country is one of the factors affecting the number of equipment needed to respond to the demand.

The availability of CT scanners and MRI units has increased rapidly in most OECD countries over the past 15 years. Japan has, by far, the highest number of MRI and CT scanners per capita, followed by the United States for MRI units and by Australia for CT scanners (Figures 4.2.1 and 4.2.2). Some analysts attributed the rapid increase in MRI units in Japan, at least partly, to the lack of formal assessment of effectiveness or efficiency in purchasing decisions (Hisashige, 1992). At the other end of the scale, not surprisingly given their high cost, the number of MRI units and CT scanners were the lowest in Mexico and Hungary.

Data on the use of MRI and CT scanners are available for a smaller group of countries. Based on this more limited country coverage, the number of CT examinations ranges from highs of 228 scans per 1 000 population in the United States, followed by Luxembourg with 177 scans, to lows of 45 scans per 1 000 in France, although the figures in France and Australia do not include CT exams in public hospitals, thereby resulting in an under-estimation. The United States also has the highest number of MRI examinations per capita (Figures 4.2.3 and 4.2.4).

In the United States, some evidence suggests that there is a high risk of overuse of CT and MRI examinations. Between 1997 and 2006, the number of scans in the United States have increased dramatically while the occurrence of illnesses have remained constant (Smith-Bindman *et al.*, 2008). Furthermore, to the extent that payment incentives allow doctors to benefit from exam referrals, this also increases the likelihood of overuse. Many studies have attempted to assess tangible medical benefits of the substantial increase in CT and MRI examinations in the United States but found no conclusive evidence suggesting such benefits (Baker *et al.*, 2008).

Regarding the intensity of use of the equipment, as might be expected, there tends to be an inverse correlation between the availability of machines and the intensity of their use. In Hungary, Belgium and, to a lesser extent, the Czech Republic and Canada, fewer MRI units and CT scanners are associated with a more intensive use of each machine. Conversely, in the United States and Iceland, the high availability of MRI units and CT scanners is linked to less intensive use of each machine.

The inverted correlation between availability and intensity of use that is apparent in cross-country comparisons is less apparent when looking at trends in the number of new equipment installed and their utilisation rate in each country. In Canada, for instance, there has been an overall increase in both the availability and the intensity of use of MRI machines and CT scanners in recent years, indicating a substantial increase in the total number of exams. One explanation for the simultaneous increase in availability and intensity of use in Canada is that, in addition to a more intensive use of existing machines, the new machines serve regions that did not have access to the technology before (CIHI, 2008a).

#### Definition and deviations

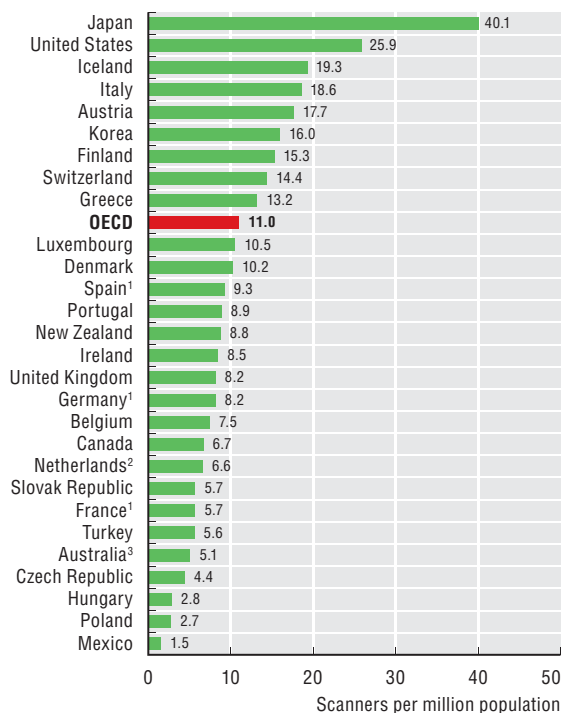
MRI units and CT scanners relate to the number of equipment per million population. MRI exams and CT exams relate to the number of exams which can be divided either by the population or by the number of machines. Data are normally collected from both the hospital and the ambulatory sector.

However, data for some countries are under-estimated. Data on CT scanners and MRI units do not include those outside hospitals in some countries (Spain and Germany) or only a small number (France). For the United Kingdom, the data refer only to scanners in the public sector. For Australia, the number of MRI units (from 1999) includes only those eligible for reimbursement under Medicare, the universal public health system. In 1999, 60% of total MRI units were eligible for Medicare reimbursement. Also for Australia and France, data for CT and MRI exams refer only to utilization by out-patients and private in-patients (excluding those in public hospitals).

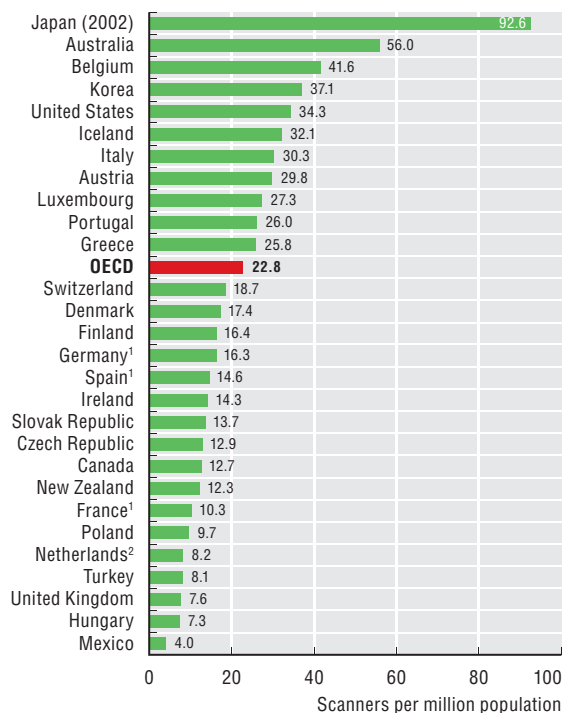
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### 4.2. Medical technologies (supply and use)

**4.2.1 Number of MRI units per million population, 2007 (or latest year available)**

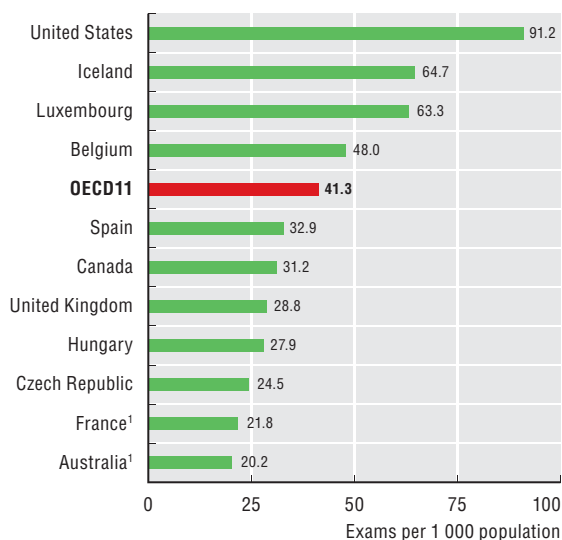


**4.2.2 Number of CT scanners per million population, 2007 (or latest year available)**

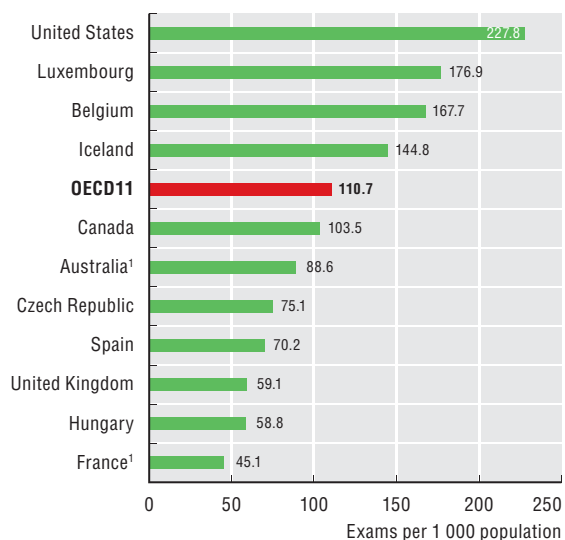


1. Only include equipment in hospitals (and a small number of equipment outside hospitals in France). 2. Only include the number of hospitals reporting to have at least one equipment. 3. Only MRI units eligible for reimbursement under Medicare.

**4.2.3 Number of MRI exams per 1 000 population, 2007 (or latest year available)**



**4.2.4 Number of CT exams per 1 000 population, 2007 (or latest year available)**



1. Only include exams for out-patients and private in-patients (excluding exams in public hospitals).

Source: OECD Health Data 2009.

StatLink  <http://dx.doi.org/10.1787/718421073122>



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