4.2. Medical technologies

New medical technologies are improving diagnosis and treatment, but they are also increasing health spending. This section presents data on the availability and use of two diagnostic technologies: computed tomography (CT) scanners and magnetic resonance imaging (MRI) units. CT scanners and MRI units help physicians diagnose a range of conditions by producing images of internal organs and structures of the body. Unlike conventional radiography and CT scanning, MRI exams do not expose patients to ionising radiation.

The availability of CT scanners and MRI units has increased rapidly in most OECD countries over the past two decades. 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). Greece, Iceland, Italy and Korea also had significantly more MRI and CT scanners per capita than the OECD average. The number of MRI units and CT scanners per population was the lowest in Mexico, Hungary and Israel.

There is no general guideline or benchmark regarding the ideal number of CT scanners or MRI units per population. However, if there are too few units, this may lead to access problems in terms of geographic proximity or waiting times. If there are too many, this may result in an overuse of these costly diagnostic procedures, with little if any benefits for patients.

Data on the use of these diagnostic scanners are available for a smaller group of countries, excluding Japan. Based on this more limited country coverage, the number of MRI exams per capita is highest in the United States and Greece, followed by Turkey and Germany (Figure 4.2.3). In the United States, the (absolute) number of MRI exams has doubled between 2000 and 2011. In Turkey, it has grown even more rapidly, doubling over a three-year period only (from 2008 to 2011). The number of CT exams is highest in Greece and the United States (Figure 4.2.4).

In Greece, most CT and MRI scanners are installed in privately-owned diagnostic centres, and only a minority are found in public hospitals. While there are no guidelines regarding the use of CT and MRI scanners in Greece (Paris et al., 2010), since late 2010, a ministerial decree has established certain criteria concerning the purchase of imaging equipment in the private sector (*Official Gazette*, No. 1918/10, December 2010). One of the main criteria is based on a minimum threshold of population density (30 000 population per CT scanner and 40 000 per MRI). These regulations do not apply to the public sector.

In the United States, evidence suggests that there is an overuse of CT and MRI examinations. Between 1997 and 2006, the number of scans in the United States increased rapidly while the occurrence of illnesses remained constant (Smith-Bindman et al., 2008). Furthermore, payment incentives allow doctors to benefit from exam referrals which also increase 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 have found no conclusive evidence of such benefits (Baker et al., 2008).

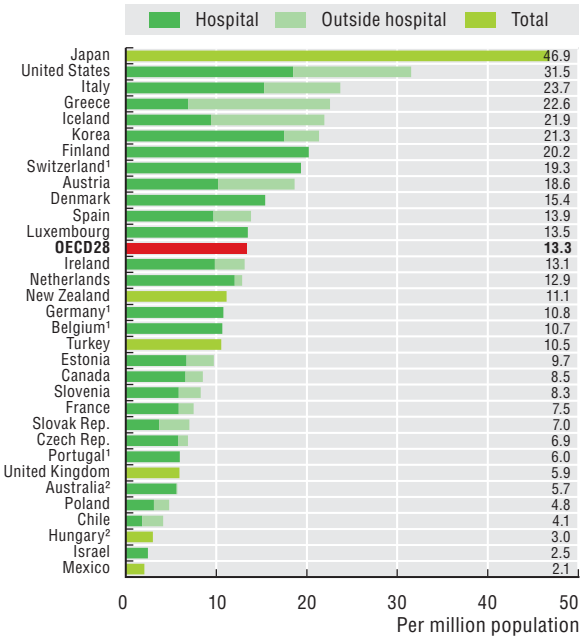
Clinical guidelines have been developed in some OECD countries to promote a more rational use of such diagnostic technologies (OECD, 2010b). In the United Kingdom, since the creation of the Diagnostic Advisory Committee by the National Institute for Health and Clinical Excellence (NICE), a number of guidelines have been issued on the appropriate use of MRI and CT exams for different purposes (NICE, 2012). In Australia, clinicians may use Diagnostic Imaging Pathways to guide their choice of the most appropriate diagnostic examinations in the correct sequence for a wide range of clinical scenarios. The objective is to increase the number of appropriate examinations and reduce unnecessary examinations which may expose patients to risk without benefits (Government of Western Australia, 2013).

Definition and comparability

For MRI units and CT scanners, the numbers of equipment per million population are reported. MRI exams and CT exams relate to the number of exams per 1 000 population. In most countries, the data cover equipment installed both in hospitals and the ambulatory sector.

However, there is only partial coverage for some countries. CT scanners and MRI units outside hospitals are not included in some countries (Belgium, Germany and Portugal). For the United Kingdom, the data only include equipment in the public sector. For Australia and Hungary, the number of MRI units and CT scanners includes only those eligible for public reimbursement (in 1999 in Australia, 60% of total MRI units were eligible for reimbursement under Medicare, the universal public health system). Also for Australia, MRI and CT exams only include those for private patients in or out of hospitals. MRI and CT exams for Denmark and Ireland only cover public hospitals, while Korea, the Netherlands and New Zealand only include publicly financed exams.

4.2.1. MRI units, 2011 (or nearest year)

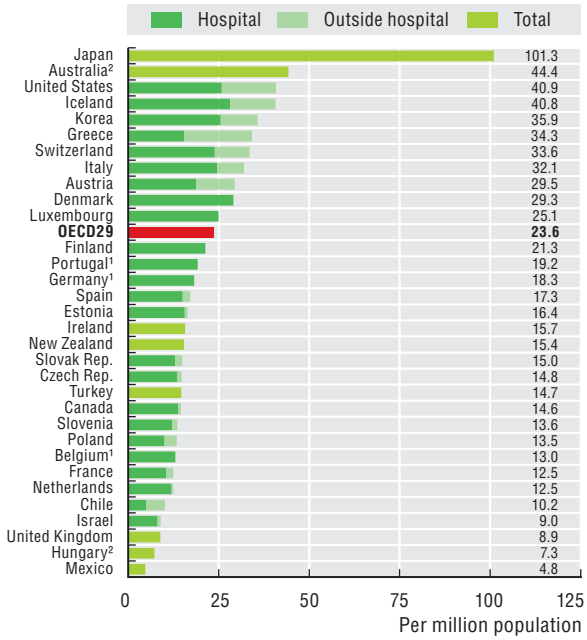


1. Equipement outside hospital not included.
2. Only equipment eligible for public reimbursement.

Source: OECD Health Statistics 2013, http://dx.doi.org/10.1787/health-data-en.

StatLink http://dx.doi.org/10.1787/888932917256

4.2.2. CT scanners, 2011 (or nearest year)

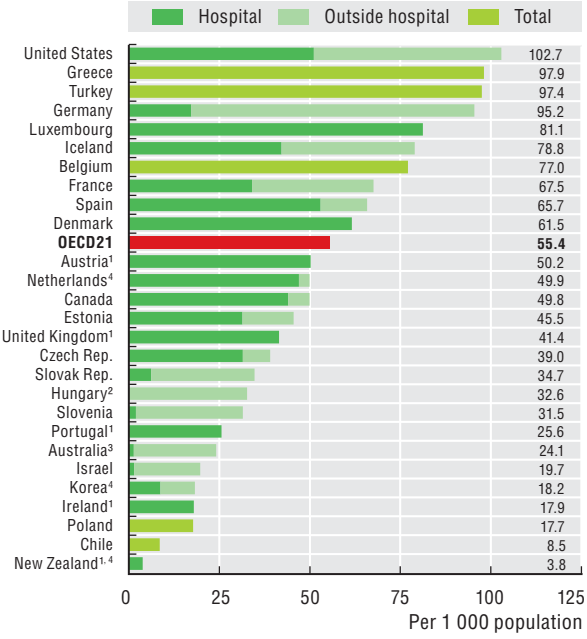


1. Equipement outside hospital not included.
2. Only equipment eligible for public reimbursement.

Source: OECD Health Statistics 2013, http://dx.doi.org/10.1787/health-data-en.

StatLink http://dx.doi.org/10.1787/888932917275

4.2.3. MRI exams, 2011 (or nearest year)

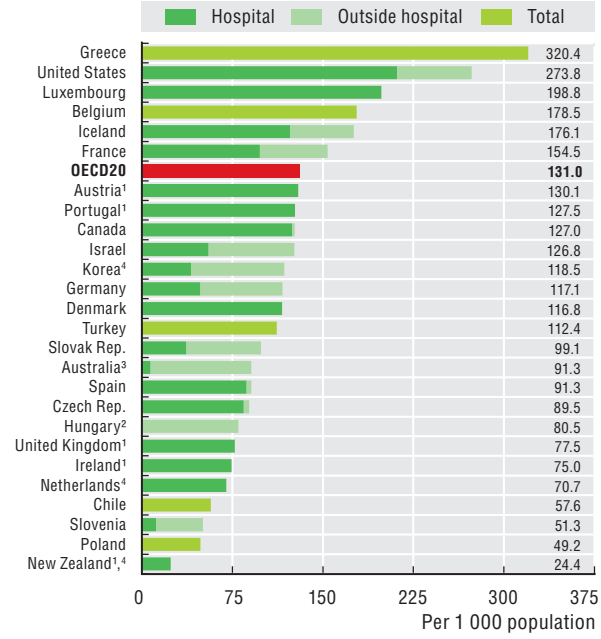


1. Exams outside hospital not included.
2. Exams in hospital not included.
3. Exams on public patients not included.
4. Exams privately-funded not included.

Source: OECD Health Statistics 2013, http://dx.doi.org/10.1787/health-data-en.

StatLink http://dx.doi.org/10.1787/888932917294

4.2.4. CT exams, 2011 (or nearest year)



1. Exams outside hospital not included.
2. Exams in hospital not included.
3. Exams on public patients not included.
4. Exams privately-funded not included.

Source: OECD Health Statistics 2013, http://dx.doi.org/10.1787/health-data-en.

StatLink http://dx.doi.org/10.1787/888932917313