Diagnostic technologies

Technologies play an important role in medical diagnoses: from physical examination and results processing and sharing, to accessing patients' health records, to the review of clinical histories. However, new technologies can also drive up costs, and are commonly acknowledged to be one of the main causes of increases in health spending (Lorenzoni et al., 2019[20]). This section presents data on the availability and use of three diagnostic imaging technologies: computed tomography (CT), magnetic resonance imaging (MRI) and positron emission tomography (PET). CT and MRI examinations (exams) both show images of internal organs and tissues, while PET scans show other information and problems at the cellular level.

There is no general guideline or international benchmark regarding the ideal number of CT scanners, PET scanners or MRI units. Too few units may lead to access problems in terms of geographical proximity or waiting times, while too many may result in overuse of these costly diagnostic procedures, with little if any benefit for patients.

Availability of CT and PET scanners and MRI units has increased rapidly in most OECD countries over the past two decades. Japan has by far the highest number of CT scanners and MRI units, and the third highest number of PET scanners per capita. Australia has the next highest number of CT scanners; the United States the second highest numbers of MRI units and PET scanners; and Denmark the highest number of PET scanners per capita (Figure 5.21). The combined numbers of these three diagnostic technologies are also substantially higher than the OECD average in Austria, Germany, Greece, Iceland, Italy, Korea and Switzerland; and much lower than average in Colombia, Costa Rica, Hungary and Mexico.

Data on the use of diagnostic scanners are available for 30 OECD countries. Taken together, the use of CT, MRI and PET diagnostic scanners was highest in the United States, Austria and Iceland, all of which had a combined total of over 340 exams per 1 000 population in 2019 (Figure 5.22). The use of these three diagnostic exams was lowest in Poland, Finland and Chile.

Looking at selected trends over time, in Australia and Iceland the number of CT exams per population increased by approximately half over the past decade. The number of CT exams more than doubled in Finland, although from a lower base (Figure 5.23). In the United States, the number of MRI exams per population increased by one-third from 2009 to 2019, while in Australia, the number of MRI exams more than doubled (Figure 5.24).

There are large variations in the use of CT scanners and MRI units, not only across but also within countries – for example, in Belgium, recent analysis shows a 50% variation in the use of diagnostic exams of the spine across provinces in 2017, and this variation is even larger across smaller areas (INAMI/RIVIZ, 2019[21]).

Clinical guidelines exist in several OECD countries to promote more rational use of MRI and CT exams. Through the Choosing Wisely campaign, which began in the United States in 2012 and has since been emulated in a growing number of countries, some medical societies have identified cases when an MRI or CT exam is not necessary. For example, the Royal College of Physicians in the United Kingdom recommends, based on evidence from the National Institute for Health and Care Excellence (NICE), that patients with low back pain or suspected migraine do not routinely need an imaging test (Choosing Wisely UK, 2018[22]).

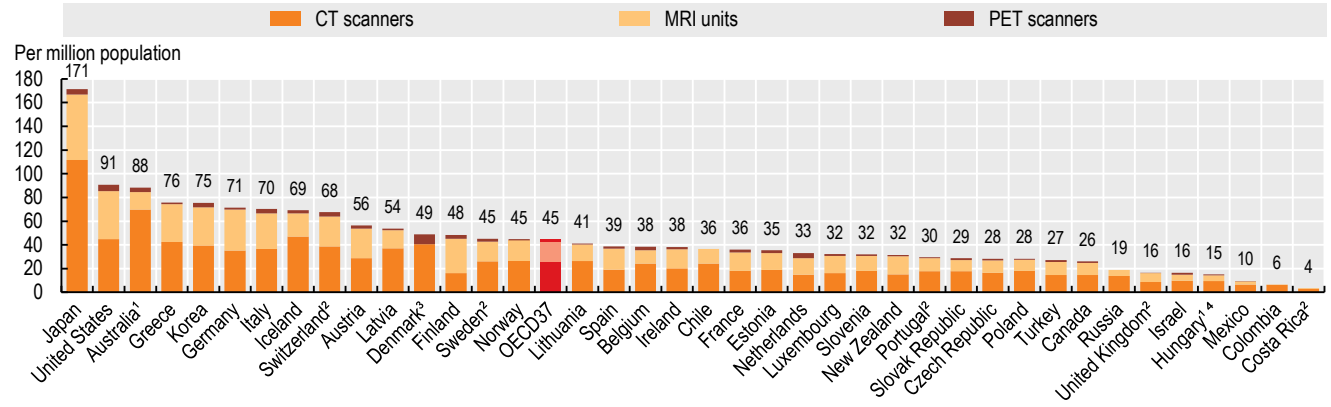
Despite the general upward trend in the use of diagnostic technologies over time, the latest data from 2020 show marked drops across most OECD countries with comparable data. Such reductions were due to the COVID-19 pandemic forcing health providers to delay or cancel diagnosis exams. Numbers of CT and MRI exams fell in 2020 compared to 2019 across five of six OECD countries (Finland, Iceland, Italy, Norway and the United States). The fall in the number of CT exams was over 30% in Finland and 20% in the United States. Numbers of MRI exams fell by over 30% in the United States and over 15% in Italy and Finland. Delays and reductions in diagnostic exams are likely to cause significant backlogs in care, with knock-on effects on people's health outcomes.

Definition and comparability

The data in most countries cover CT scanners, MRI units and PET scanners installed both in hospitals and the ambulatory sector, but coverage is more limited in some countries. Costa Rica, Portugal, Sweden, Switzerland (for MRI units) and the United Kingdom report equipment available in hospitals only, while Hungary includes only devices installed outside hospitals. For Colombia, Costa Rica and the United Kingdom, the data only cover equipment in the public sector. For Australia and Hungary, the number of CT scanners, MRI units and PET scanners includes only those eligible for public reimbursement.

Similarly, CT, MRI and PET exams performed outside hospitals are not included in Portugal, Switzerland and the United Kingdom, while exams performed in hospitals are not covered in Norway. In Australia, the data only include exams for private patients (in or out of hospitals), while in Korea and the Netherlands they only include publicly financed exams.

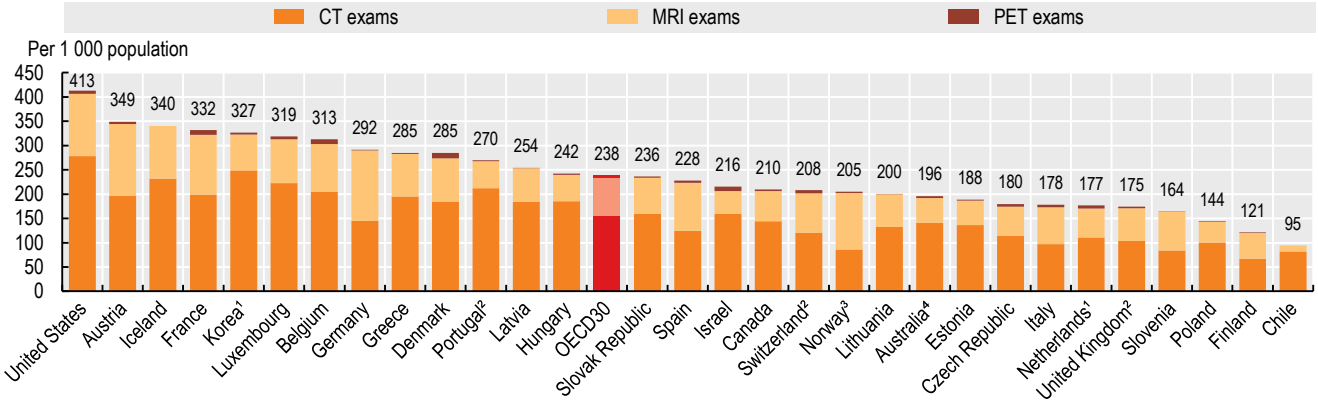
Figure 5.21. **CT scanners, MRI units and PET scanners, 2019 (or nearest year)**



1. Data include only equipment eligible for public reimbursement. 2. Data exclude equipment outside hospital (only for MRI units in Switzerland). 3. Data on MRI units are not available. 4. Data include only equipment outside hospitals.
Source: OECD Health Statistics 2021.

StatLink https://stat.link/lgfjst

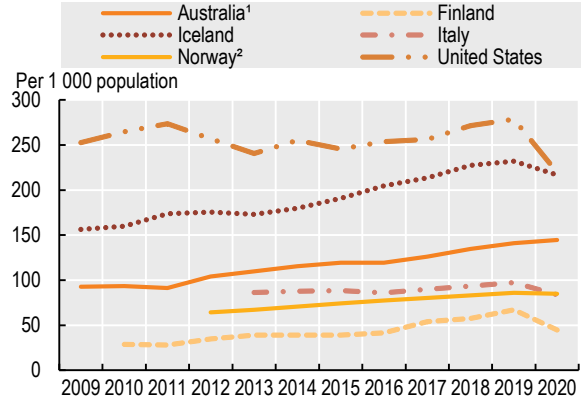
Figure 5.22. **CT, MRI and PET exams, 2019 (or nearest year)**



1. Privately funded exams are not included. 2. Exams outside hospitals are not included. 3. Only exams outside hospitals are included. 4. Exams on public patients are not included.
Source: OECD Health Statistics 2021.

StatLink https://stat.link/exfgtl

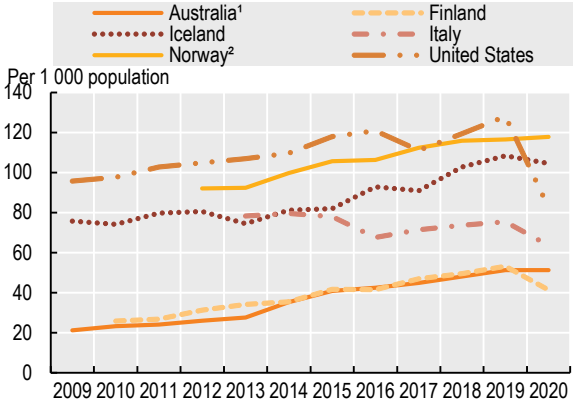
Figure 5.23. **Trends in CT exams, selected countries, 2009-20**



1. Exams on public patients are not included. 2. Only exams outside hospitals are included.
Source: OECD Health Statistics 2021.

StatLink https://stat.link/f73trj

Figure 5.24. Trends in MRI exams, selected countries, 2009-20



1. Exams on public patients are not included. 2. Only exams outside hospitals are included.
Source: OECD Health Statistics 2021.

StatLink https://stat.link/glptv4