3 Health care providers have varying incentives to contain the cost of Tc-99m

Nuclear medicine (NM) providers receive prospectively set payments for their services, which cover service bundles of varying breadths. Outpatient providers are typically paid fee-for-service (FFS). The breadth of bundling increases with the provider size and hospitals are often paid for broad service bundles, such as diagnosis-related groups, or through global budgets. The cost of Tc-99m is included in these payments in all countries, with some exceptions in Belgium, Germany, Japan, and in the United States. Because payments are set prospectively and providers bear financial risk related to differences between payments and their costs, providers have an incentive to control input costs, including the cost of Tc-99m. Such incentives are stronger where payments are low and where providers have little scope to substitute activities. Thus, increases in Tc-99m prices may be difficult to absorb for small providers who rely exclusively on NM scans for revenue and whose FFS payments are not responsive to input costs. Hospitals with a wide range of activities may be able absorb increases more easily. But provider payments are revised regularly in most countries, allowing providers to negotiate increases if costs increase. Australia and France are exceptions, where fees have not been updated for several years.

3.1. Introduction

This Chapter identifies the types of health care providers that deliver nuclear medicine (NM) diagnostic services (Section 3.2); describes the mechanisms through which the main third-party payers of health care or insurance schemes pay providers for such services and how providers fund the purchase of Tc-99m-based radiopharmaceuticals (Section 3.3); and outlines the financial incentives for providers that arise from payment mechanisms (Section 3.4).

Section 3.3 on provider payment mechanisms first provides an overview across all countries in Sub-Sections 3.3.1 and 0. This is followed by a more detailed description in Sub-Section 3.3.3 of provider payment in a sub-set of countries with the highest volume of NM diagnostic services: the United States, Germany, Canada, France, Japan, the United Kingdom (England only), Australia and Belgium (refer to Chapter 2 for the volume of NM diagnostic service by country).

The main data source for this Chapter is the survey on "Health Care Provider Payment for Nuclear Medicine Diagnostic Services" conducted by the OECD Health Division between April and August 2018 and it covers 17 countries that responded to the survey (see Annex C for details on the survey). Unless other sources are cited, all country-specific information presented in this Chapter is based on survey responses. For the ten countries with a high volume of NM diagnostic activity listed above, data from survey responses were complemented by data retrieved from publicly available sources, including peer-reviewed and grey literature, identified in desk research by the OECD Health Division.

Although no survey response was submitted by the United States, the United States is also covered because it represents more than 50% of the total volume of Tc-99m-based scans across all countries in scope; all information on the United States is based on public sources. For Canada, information is presented by province or territory because health care provision is decentralised and mainly a responsibility of provinces and territories (see Section 3.3.3); only the provinces and territories that submitted a survey response are covered. Despite being in the top 10 of countries in terms of NM diagnostic activity (see Chapter 2), Italy and Spain are not covered because they did not submit a survey response. The level of detail in the information presented depends on survey responses and public availability of data.

3.2. Three main health care provider types deliver nuclear medicine diagnostic services

Nuclear medicine (NM) diagnostic services that use Tc-99m are provided by three main types of health care providers:

1. Office-based physicians, including physicians practicing solo or in group practices who are specialised in nuclear medicine or physicians of other specialities who are authorised to conduct NM diagnostic procedures;
2. Other types of out-patient providers, in particular larger diagnostic centres or radiological clinics that provide a range of diagnostic services including nuclear medicine and other imaging modalities but also specialised clinics, such as cancer treatment centres; and,
3. Hospitals that provide NM diagnostic services to inpatients and outpatients.

Physician offices and other outpatient providers deliver NM diagnostic services in 7 and 11 of 18 countries respectively. Hospitals, on the other hand, provide NM diagnostics in all 18 countries for which data were available. Table 3.2 summarises the provider types by country.

Table 3.1. Types of health care providers delivering NM diagnostics by country

In countries that responded to the OECD Health Division survey and the United States.

Country	Specialist offices	Other outpatient providers	Hospitals
Australia	1	1	1
Belgium	0	0	1
Canada[1]	1	1	1
Alberta	1	1	1
Br Columbia	0	0	1
Manitoba	0	1	1
Newfoundland	0	0	1
Nova Scotia	0	0	1
Czech Republic	0	1	1
Denmark	0	0	1
Germany	1	0	1
France	1	1	1
Japan	1	1	1
Latvia	0	1	1
Lithuania	0	1	1
Luxembourg	0	0	1
Netherlands	0	1	1
Poland	0	1	1
Slovenia	0	0	1
Sweden	0	0	1
Switzerland	1	1	1
United Kingdom (England)	0	0	1
United States	1	1	1
Total number of countries	**7**	**11**	**18**

Notes: Covers all countries that responded to the OECD Health Division survey.
1. In Canada, information is broken down by province or territory because the delivery of health care is an autonomous responsibility of provincial and territorial governments.
Source: Author based on OECD Health Division survey.

While the mode of operation varies between providers in the same country and between countries, the general range of activities and the way they are performed follow similar patterns. As an example, a local outpatient provider and a major university hospital would likely perform the same types of scans in similar ways but the range of different scans performed, and their respective proportions of total activity, may significantly differ.

In countries from which such data are available, the share of services provided in an outpatient setting exceeds the inpatient share. For example, based on data sources described in Annex B, Tc-99m-based NM diagnostic scans performed on an outpatient-basis represent approximately 80% of all scans in Germany and 90% in England.

3.3. Provider payment mechanisms and attendant financial incentives vary by provider type

Through generating financial incentives, mechanisms to pay health care providers are a key policy lever for countries to drive health system performance and they generally vary by provider type. Over time,

payment has generally moved from retrospective "reimbursement" of provider costs towards prospective payment mechanisms that have shifted some financial risk to providers. This Section provides a brief summary of the main types of provider payment mechanisms for NM diagnostics services and attendant financial incentives for providers. For further information on provider payment mechanisms in general and a more detailed discussion of national policies in OECD countries, readers can refer to prior OECD publications (OECD, 2016[1]; OECD, 2016[2]; Paris, Devaux and Wei, 2010[3]).

3.3.1. There are three main payment mechanisms for NM diagnostic services

In many OECD countries a large proportion of health care is funded through pre-paid insurance contributions or from tax revenue and patients therefore do not bear the full cost of care at point of service. This can create incentives for patients to consume and for providers to deliver services in excess of what may be necessary because patients do not face the full marginal cost of their service consumption. This is referred to as *moral hazard* in the literature on insurance markets. Funds that flow from the population to providers are pooled by intermediaries, such as governments, social insurance funds or private health insurers, also referred to as *third-party payers* or *payers*. Payers are responsible for allocating funds to providers and aim to create financial incentives that are conducive to achieving health system goals, in particular service provision that is appropriate for patient needs.

To contain costs and improve the quality of care, payers generally attempt to taper financial incentives for providers to increase the volume of services provided. While there is little doubt that providers act in the best interest of their patients, it has been shown that they also respond to financial incentives (OECD, 2016[2]). Financial incentives for providers can be modulated by two mechanisms, both of which can shift some financial risk between payers and providers:

1. The prospective setting and changing of payment rates, or prices, for predefined sets of services rather than reimbursing providers retrospectively for all costs incurred; and,
2. Changing the breadth of the bundle of services covered by a single prospectively set payment.

Nowadays, the vast majority of payment mechanisms used in health systems of OECD countries is based on prospective prices or budgets. The breadth of these service bundles covered by prospective payments varies and various payment mechanisms can be meaningfully analysed in terms of the degree of bundling, and thus the level of risk borne by providers - the broader the bundle of services covered by a payment, the greater the risk to the provider (OECD, 2016[2]). Payers therefore adapt payment mechanisms not only to modulate incentives but also according to the size of provider organisations and their ability to bear risk.

For example, a predetermined price can be paid for a specified NM diagnostic scan such as a myocardial perfusion study, covering a bundle of all associated cost items including the physician time, use of premises, the gamma camera, and other overheads as well as the Tc-99m-based product used. In this case, the provider only bears risk related to the cost of inputs required for the scan because any additional service rendered by the provider will attract an additional payment. However if, for example, a myocardial perfusion study is performed as part of an inpatient stay at a hospital, a predetermined price based on the diagnosis and expected treatment protocol may apply to the entire patient stay, covering all cost items associated with the stay, including not only the diagnostic scan but also patient accommodation and all treatments and services received by the patient during the stay. This presents a greater financial risk to the provider because additional services provided, or a length of patient stay that exceeded expectations, would not attract additional payment.

The following three broad types of provider payment mechanisms are used for NM diagnostic services (in ascending order according to the degree of bundling):

1. Fee-for-service (FFS): activity-based payment of a price for each unit of service delivered. Service units and corresponding prices are defined prospectively in fee schedules. Fee schedules may directly associate a monetary amount with each service or take the form of resource-based relative

value scales (RBRVS) that are then converted to a monetary amount based on conversion factors that may vary between geographic areas (see Box 3.1). Service units are usually defined narrowly, for example a single physician/patient consultation or the scan of a specific organ using a specific imaging modality.

2. Case-based payments (also referred to as Diagnosis-related Groups or DRGs): activity-based payment for an entire patient case, usually for hospitals only and most commonly used for inpatients. Patient cases are classified into groups based on diagnoses and resource use (DRGs), which cover entire episodes of diagnoses and treatments with relatively homogenous levels of resource use. DRGs and their prices are defined prospectively, often based on historical data on patient cases and related resource use (see Box 3.1).
3. Global budgets: Prospective lump-sum payment covering a range of services and time period independent of the actual volume of services provided, usually for hospitals only.

Box 3.1. Resource-based Relative Value Scales (RBRVS) and DRG cost weights

The monetary amounts paid to providers under FFS or DRG mechanisms are often determined by multiplying a base rate by a factor that reflects the relative prices of all services or DRGs. This is based on the principle that services that are more expensive to produce should attract higher payments.

In DRG systems, the multiplication factor is often referred to as *cost weight.* It is equal to one for the average inpatient case treated by hospitals, referred to as the *base case*. All DRGs are associated with a cost weight that is higher or lower than 1, representing their prices relative to the base case. Cost weights are usually computed based on historical cost data submitted by a sample of hospitals or all hospitals in a jurisdiction, for example using the mean cost by DRG or some other parameter in the cost distribution across hospitals. Base rates may be set based on a variety of factors, such as overall resource constraints or overall policy goals related to provider funding, and can be uniform across a jurisdiction or vary locally to reflect differences in the prices of production factors, such as labour and buildings. Such mechanisms can create a form of cost-based competition among hospitals, also referred to as *yardstick competition*, because hospitals retain any surplus between DRG payments and their *actual* costs associated with each DRG and therefore have an incentive to reduce costs. As hospitals reduce costs of a given DRG and their cost data is used as the basis of subsequent iterations of cost weights, the respective DRG cost weight decreases over time.

RBRVS that underlie FFS payments work in a similar way except that the process to set relative prices is not always data-driven. Relative prices and base rates can be the results of a negotiation process between health care providers and payers.

Retrospective reimbursement by payers of actual costs incurred by providers may only be used in some cases, for instance for some services paid by Medicaid in the United States (see Section 3.3.3) or where payers reimburse providers for the cost of medicines or other material, including radiopharmaceuticals.

A more general discussion of provider payment and price-setting mechanisms can be found in Barber, Lorenzoni and Ong (2019[4]).

Office-based physicians and other non-hospital outpatient providers are always paid FFS, while hospitals are paid through a mixture of FFS, DRGs and global budgets. Table 3.2 shows which payment mechanism is used for each of provider type that delivers NM diagnostic services in each country.

Table 3.2. Payment mechanisms for NM diagnostics by provider type and country

In countries that responded to the OECD Health Division survey and the United States.

Country	Specialist offices	Other Outpatient Providers	Hospital outpatients / day cases	Hospital inpatients
Australia[1]	FFS	FFS	Global budgets (FFS)	Global budgets (FFS)
Belgium			FFS	FFS
Canada[2]				
Alberta[3]	*FFS*	*FFS*	*FFS* *Global budgets*	*FFS* *Global budgets*
Br Columbia			*FFS*	*Global budgets*
Manitoba		*FFS*	*Global budgets*	*Global budgets*
Newfoundland			*Global budgets*	*Global budgets*
Nova Scotia			*Global budgets*	*Global budgets*
Czech Republic		FFS	FFS	FFS
Denmark			DRGs	DRGs
France	FFS		FFS	DRGs
Germany	FFS		FFS DRGs	DRGs
Japan	FFS	FFS	FFS	FFS
Latvia		FFS	FFS	DRGs
Lithuania		FFS	FFS	DRGs
Luxembourg			FFS *Global budgets*	FFS *Global budgets*
Netherlands		DRGs	DRGs	DRGs
Poland		n/d	FFS	DRGs
Slovenia			FFS	*Global budgets*
Sweden			*Global budgets*	*Global budgets*
Switzerland	FFS	FFS	FFS	DRGs
United Kingdom (England)			FFS	DRGs
United States	See Table 3.4			

Notes: Payment for hospital services may vary between inpatients and patients treated as day cases or outpatient departments and are therefore presented in separate columns.
1. Public hospitals in Australia are generally funded by states and territories for all activity except "private" physician practice on hospital premises. Physicians engaging in private practice in hospitals are paid FFS or on a per-session basis and their services can be eligible for Medicare subsidies (see Section 3.3.3).
2. In Canada, information is broken down by province or territory because the delivery of health care is an autonomous responsibility of provincial and territorial governments.
3. Physicians are paid FFS for NM diagnostic services but hospital cover all costs from global budgets.
Source: Author based on OECD Health Division survey.

3.3.2. Most countries do not compensate providers directly for the actual cost of Tc-99m

In most countries, providers fund the cost of Tc-99m from broader provider payments described in Section 3.3.1, such as FFS payments for the diagnostic procedure, payments for DRGs or global hospital budgets. Among the 16 countries that responded to the OECD Health Division survey, only payers in Belgium, Germany and Japan make payments to providers that are unbundled from the service and to cover specifically the cost of Tc-99m used in each procedure. In these three countries, unbundled payments are only made in addition to FFS payments; no unbundled payments for Tc-99m are made in

addition to DRG-based payments to hospitals in Germany. In the United States, office-based specialists receive additional payments for Tc-99m for procedures paid FFS by Medicare based on the Resource-based Relative Value Scale (RBRVS) (see Section 3.3.3). In Luxembourg, the cost of Tc-99m is funded from hospital pharmacy budgets; while this is unbundled from payments for services, but budgets are not specific to Tc-99m.

In Belgium, hospitals currently receive an unbundled payment of EUR 18.59 per procedure in which Tc-99m is used in addition to EUR 18.59 for each cold kit used. This amount is the same regardless of the type of scan performed, the amount of activity in the dose and the specific Tc-99m-based cold kit product used (INAMI, 2018[5]).

In Germany, outpatient providers that are paid FFS based on the national uniform value scale (EBM) receive unbundled payments for the cost of Tc-99m. Prices are defined by type of scan and type of Tc-99m-based product used. In the current version of the EBM, payments range from EUR 1.50 when using Tc-99m pertechnetate in a thyroid scan to EUR 382 when using Tc-99m-labeled antibodies in a scan of bone marrow or to localise inflammations (KBV, 2018[6]). A full list of unbundled Tc-99m payments in the current version of the EBM is provided in Annex D.

In Japan, all providers receive FFS payments and additional unbundled payments specific to each Tc-99m product and manufacturer. Prices are either defined by patient dose or by the amount of radioactivity. A full list of unbundled Tc-99m payments in the current version of the national fee schedule is provided in Annex D.

Table 3.3 shows the provider types to which unbundled payments are made as well as the types of unbundled payment in the Belgium, Germany, Japan, the United States as well as Luxembourg. Further details on provider payment mechanisms and on setting unbundled payments for Tc-99m in these three countries are provided in Section 3.3.3.

Table 3.3. Unbundled payments specific to Tc-99m by provider type and country

Country	Specialist offices	Other Outpatient Providers	Hospital inpatients	Hospital outpatients / day cases
Belgium	n/a	n/a	Isotope-specific	Isotope-specific
Germany	Procedure- and isotope-specific	n/a	None	None
Japan	Product-specific	Product-specific	Product-specific	Product-specific
Luxembourg			Global pharmacy budget	Global pharmacy budget
United States	Medicare reimbursement of invoice price	None	None	None

Source: Author based on OECD Health Division survey and public information for the United States.

3.3.3. Country Details

This Section provides more detailed descriptions of provider payment in each of the 17 countries in the final scope of this report. Collectively, the eight countries with the highest volume of Tc-99m-based diagnostic scans (the United States, Germany, Canada, France, Japan, Australia, the United Kingdom (England only) and Belgium) are estimated to account for 88% of the volume of Tc-99m-based scans performed across the countries included in the initial scope of this study (see Chapter 2). There is a country-specific Section below for each of these eight countries, in descending order based on the estimated annual volume of Tc-99m-based scans. A final Section summarises information on provider payment for NM diagnostic services in the remaining nine countries in the final scope.

United States

Compared to most other OECD countries, health insurance coverage in the United States is fragmented. The majority of nuclear medicine (NM) diagnostic services are delivered in outpatient settings (SNMMI, personal communication). Provider payment mechanisms cannot be summarised easily – they depend not only on the type of service and the type of provider but also on the payer and the insurance coverage scheme operated by the payer. Table 3.4 summarises the main provider payment mechanisms employed by the main groups of payers. The Sections below provide a general overview of health insurance in the United States and short descriptions of how providers are paid under Medicare and Medicaid, the two main publicly funded coverage schemes.

Despite a large private insurance market, a large portion of health care the United States is funded publicly: in 2015, approximately 50% of total health expenditure was funded publicly (OECD, 2017[7]). Private health insurance accounted for another 35% of health expenditure and out-of-pocket payments for 11% (ibid.). In the same year, 61% of the population was covered by private insurance, while Medicare and Medicaid covered about 17% and 22% of the population respectively; 9% of the population were uninsured (Cuckler et al., 2018[8]).[1] Uninsured persons pay providers directly or may receive care at no cost from charity (Rice et al., 2013[9]). While prices for uninsured persons vary on a case-to-case basis, they are often based on provider price lists and can far exceed the prices paid by public or private payers (ibid.).

Medicare and Medicaid are the two main public health coverage schemes, collectively accounting for about 40% of health expenditure (Cuckler et al., 2018[8]). Medicare covers the disabled and elderly (those aged 65 years and older), and Medicaid covers people with incomes below a state-specific poverty threshold, defined as a percentage of the federal poverty guidelines issued by the United States Department of Health and Human Services (HHS).[2] Other publicly funded coverage schemes include, for example, the Children's Health Insurance Program, or coverage for the armed forces by the Department of Defence and for war veterans by the Department of Veterans Affairs (Cuckler et al., 2018[8]). Federal funds available to public coverage schemes are based on annual budgets, proposed by the United States President and Congressional budget resolutions that can amend and ultimately approve the budget (Rice et al., 2013[9]). While Medicare is mainly funded by the federal budget, including premiums paid by beneficiaries, state governments co-finance Medicaid (ibid.).

Table 3.4. Provider payment mechanisms in the United States by payer

	Office-based specialists and other outpatient providers	Hospital outpatient services	Hospital inpatient services
Medicare	FFS, capitation	OPPS: FFS, APC	IPPS: DRGs
Medicaid	FFS, capitation	FFS, cost reimbursement, variations of Medicare OPPS	DRGs, per-diems, capitation, cost reimbursement
Private insurers	FFS, capitation, salaries	No data	DRGs, FFS, per diems
Uninsured persons	Transaction-specific	Transaction-specific	Transaction-specific

Note: Procedural groups in the Medicare hospital Outpatient Prospective Payment System (OPPS) are referred to as Ambulatory Payment Classification (APC) and can apply to broader DRG-like service bundles or more narrowly defined services or procedures. IPPS stands for Medicare hospital Inpatient Prospective Payment System

Source: Adapted by the Author from Rice et al. (2013[9]).

Medicare and Medicaid

Medicare coverage has three main parts: Part A covers inpatient hospital stays, care in skilled nursing facilities, hospice care, and some home health care; Part B covers certain doctors' services, outpatient care, medical supplies and preventive services; and Part D adds prescription medicine coverage.[3] Part C is offered by private payers approved by Medicare as a combined alternative to Parts A and B and usually also Part D. Medicaid coverage and provider payment mechanisms are specific to each state. Provider payments by Medicare and Medicaid are either direct through claims processing contractors (under Medicare Parts A and B and Medicaid FFS – as described below) or indirect through other payers and health coverage schemes that may provide managed care.

Medicare Part B pays physicians on a fee-for-service (FFS) basis, based on the Resource-based Relative Value Scale (RBRVS). Fees are updated annually by the Centres for Medicare & Medicaid Services (CMS) (Rice et al., 2013[9]). Fees are calculated by multiplying the relative value units associated with each service, reflecting reported costs of physician work, office expenses and professional insurance, with a "geographic practice cost index" for each cost component reflecting geographical differences in costs and a monetary "conversion factor", both determined by CMS. The conversion factor takes into account inflation for non-physician services and a number of different variables for physician services, with the overall goal of keeping spending within budget (ibid.). There is an annual notice and comment period when new fees are proposed (CMS, 2018[10]). Specialists can opt to either receive direct payment from Medicare (for all or selected services only) or receive payment from patients who claim reimbursement from Medicare (Rice et al., 2013[9]). In the former case, physicians accept RBRVS-based fees as full payment and Medicare generally pays 80% of the fee defined in the schedule with patients making a 20% co-payment. Only in the latter case can specialists bill more than the fee specified in the Medicare schedule (Rice et al., 2013[9]). Table 3.5 provides examples of NM diagnostic procedures and applicable services fees in the 2018 Medicare RBRVS.

The fees applicable for NM diagnostic services according to the RBRVS do not include costs of the radiopharmaceuticals used in the procedures. A separate payment is made through Medicare contractors to cover the cost of radiopharmaceuticals. Payment mechanisms are specific to Medicare contractors however payments are commonly based on actual prices invoiced by Mo-99/Tc-99m vendors to health care providers, or the reported wholesale acquisition cost. This is different from many other medicines covered under Medicare Part B, for which providers commonly receive payment based on the average sales prices calculated by CMS from submissions by manufacturers plus a statutorily mandated add-on of 6%. Payment rates based on average sales prices are updated quarterly (CMS, 2018[11]).

Medicare Part A payments for hospital services are based on a combination of DRGs and FFS (Rice et al., 2013[9]), although there are exceptions in some states to the national Medicare payment systems. Separate payment systems apply to inpatient stays and outpatient hospital services.

Inpatient services are paid through the Inpatient Prospective Payment System (IPPS) using DRGs (CMS and MLN, 2018[12]). No additional payments are made for radiopharmaceuticals (Lantheus, 2018[13]), although, in addition to various adjustments to DRG payments described below, "add-on" payments can be made temporarily for new and costly technology where DRG amounts are shown to be inadequate to cover costs (CMS, 2018[14]). DRG prices are determined by multiplying base rates for labour-related and non-labour shares of the service associated with a DRG by the cost weight of the DRG and adjusting the labour-related share for the wage index of the area where the hospital is located and the non-labour share for a cost of living factor (CMS and MLN, 2018[12]). Additional payments are made to hospitals with a high proportion of low-income patients in the population they treat, for providing medical education if the hospital is an approved teaching hospital, and for patient cases that are unusually costly. CMS update annually the cost weights for Medicare DRGs based on detailed billing data from all hospitals that claim Medicare payments and base rates (CMS and MLN, 2018[12]). Hospital accounting rules allow for significant top-down cost allocation (Raulinajtys-Grzybek, 2014[15]) and billing data does not provide micro-cost data. Base rates reflect operating and capital costs that efficient facilities are expected to incur in furnishing covered inpatient services (CMS and MLN, 2018[12]). Overall, CMS is required to maintain 'budget neutrality' in updating IPPS, meaning that updates to the payment system can change the relative prices of DRGs but must also ensure that hospital funding remains within an overall budget constraint.

Outpatient services by health care providers that are licensed as hospitals are paid by Medicare through the Hospital Outpatient Prospective Payment System (OPPS), which uses a combination of broader DRG-like service bundles and FFS payments for more narrowly defined services or procedures. There is a quarterly update process for OPPS by CMS, but the most significant changes, including prices, are made once a year (Guidi, 2010[16]). Prices are set at the level of Ambulatory Payment Classification (APC) groups, which may bundle several types of services. Similar to DRGs, each APC code is assigned a relative cost weight, based on CMS estimates of the costs associated with the services assigned to APCs using data from hospital claims (Guidi, 2010[16]). Payments for services are adjusted for geographic wage variations (Guidi, 2010[16]). CMS must also respect 'budget neutrality' in updating the OPPS. The cost of medicines can either be included in broader service bundles or attract a separate payment. Medicines whose costs exceed a threshold (USD 110 per day in 2017) have separate APC codes (MedPac, 2017[17]). In general, the cost of radiopharmaceuticals used in diagnostic NM services, including Tc-99m-based radiopharmaceuticals, is included in the APC payment rate while therapeutic radiopharmaceuticals attract a separate payment (SNMMI, 2017[18]; Lantheus, 2018[13]). However, each procedure using Tc-99m from non-high enriched uranium (HEU) attracts an additional payment of USD 10 to cover additional cost of producing Tc-99m from such sources and to incentivise the use of these materials (SNMMI, 2017[18]; Lantheus, 2018[13]). Table 3.5 provides examples of NM diagnostic procedures and applicable payment rates to hospitals in the 2018 Medicare OPPS.

Medicare Part C, also referred to as Medicare Advantage, covers the same services as Parts A and B, and optionally also Part D, but provider payments are made by private payers and health coverage schemes that receive risk-adjusted capitated funding from Medicare (Rice et al., 2013[9]). Enrolment is voluntary and replaces 'traditional' parts A and B (Rice et al., 2013[9]). Payers that receive Medicare Part C funding have some discretion as to how they pay providers on behalf of Medicare, and beneficiaries are often enrolled in managed care but payment mechanisms can also include FFS.

Medicaid may pay specialists directly FFS or make capitated payments to private managed care organisations, which in turn pay specialists either FFS or also through capitation (Rice et al., 2013[9]). The majority of Medicaid beneficiaries are enrolled in managed care. Payment mechanisms for specialist physicians vary by state but also include direct FFS payments for beneficiaries who are not enrolled in managed care (Rice et al., 2013[9]). Medicaid fees tend to be lower than those paid by Medicare (Rice et al., 2013[9]). Medicaid FFS payments are based on state-specific fee schedules, which usually also use a relative-value approach, i.e. with services requiring more inputs attracting higher fees (Rice et al., 2013[9]). Medicaid payments for hospital services vary by state and comprise DRGs, per-diem payments

and cost reimbursement (Rice et al., 2013[9]). Medicaid managed care programmes operate a similar model as Medicare Part C, whereby Medicaid state agencies pay a capitated amount per insured person to insurers that provide a specified benefit package, which includes inpatient services (Rice et al., 2013[9]).

Table 3.5. Selected NM diagnostic services and Medicare payment rates 2018

All prices in USD.

CPT Code	Description	RBRVS fee for non-hospital providers	OPPS payment for hospitals
78700	Kidney imaging morphology	181.80	349.42
78305	Bone and/or joint imaging; multiple areas	297.00	349.42
78306	Bone and/or joint imaging; whole body	320.40	349.42
78453	Myocardial perfusion imaging, planar (including qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); single study, at rest or stress (exercise or pharmacologic)	320.76	1 202.60
78606	Brain imaging, minimum 4 static views; with vascular flow	347.76	453.05
78451	Myocardial perfusion imaging, tomographic (SPECT) (including attenuation correction, qualitative or quantitative wall motion, ejection fraction by first pass or gated technique, additional quantification, when performed); single study, at rest or stress (exercise or pharmacologic)	359.28	1 202.60
Q9969	Non-HEU Tc-99m add-on per study dose Tc-99m from non-high enriched uranium source, full cost recovery add-on, per study dose	n/a	10.00

Note: RBRVS payment rates do not reflect adjustments for the geographic practice cost index. OPPS payments include cost of radiopharmaceuticals, except the USD 10 add-on for Tc-99m from non-HEU sources, RBRVS fees do not include cost of radiopharmaceuticals.
Source: Author based on United States Society of Nuclear Medicine and Molecular Imaging (SNMMI, 2017[18]; SNMMI, 2017[19]).

Private insurers

The private insurance market is fragmented, and coverage and provider payment mechanisms vary significantly between states and among individual payers (Rice et al., 2013[9]). Private payers pay specialists FFS, salaries or capitated rates. Hospital services are paid through FFS, DRGs or per-diems. Insurers may negotiate discounts on prices set by hospitals or employ Medicare DRGs but may assign different prices by DRG. Similarly, private insurers may use the Medicare RBRVS fee schedule as a basis for payment for physician services but assign different prices based on negotiations (ibid.). The contents of the contractual arrangements between providers and private insurers are not in the public domain. However, there is evidence that the prices private payers pay providers vary widely between individual payers (Clemens, Gottlieb and Molnár, 2017[20]; IFHP, 2016[21]; Reinhardt, 2011[22]). Prior studies of provider payment in general also found that prices paid by private payers significantly exceed provider costs and Medicare payment rates (Cooper et al., 2015[23]; Selden et al., 2015[24]).

Canada

Funding and delivery of health care in Canada are highly decentralised and mainly a responsibility of provinces and territories. The federal government only has responsibility in specific aspects of health care, such as regulation and safety of medicines and funding and delivery of health services for eligible First Nations people and Inuit, members of the Canadian armed forces, veterans, inmates in federal penitentiaries and eligible refugee claimants (Marchildon, 2013[25]). In addition, the federal government also funds a portion of government health expenditures in provinces and territories through the Canada Health Transfer (ibid.). Publicly funded coverage of services, however, is similar across provinces and broadly defined by the Canada Health Act, which states that residents are entitled to medically necessary hospital, diagnostic and physician services (Allin and Rudoler, 2017[26]; Marchildon, 2013[25]).

While it is not possible to summarise provider payment for all of Canada, fee-for-service (FFS) payment for physician services is common across all provinces, including for specialists working in hospitals, and hospitals often receive global budgets directly from the provincial government or regional health authorities (RHAs) (ibid.). Specialists are mainly self-employed and commonly work in hospitals (Allin and Rudoler, 2017[26]). Hospitals are either integrated into RHAs that are funded by provinces and hold a budget for their operations or contract with RHAs, in which case they may also have global budgets or receive activity-based funding (Allin and Rudoler, 2017[26]; Marchildon, 2013[25]). Global budgets are often based on historical spending and high level adjustments irrespective of the number of patients treated or projected demand for services (Sutherland et al., 2013[27]). Initiatives to shift hospital payment mechanisms towards activity-based funding, such as payment by DRG, have been underway for some time in Alberta, British Columbia and Ontario (ibid.).

The types of providers that deliver nuclear medicine (NM) diagnostic services and corresponding provider payment mechanisms are therefore specific to provinces and territories.

Alberta

Office-based specialists, diagnostic centres and radiological clinics as well as hospitals provide NM diagnostic services in Alberta and all physician services are paid fee-for-service (FFS) by Alberta Health Services, the single health authority of the province responsible for delivery of health care on behalf of the provincial ministry of health. Hospitals have an operational budget for diagnostic imaging, which covers all costs of NM diagnostic services, physician fees and radiopharmaceuticals but also overhead, costs of other staff and equipment.

Physician fees are regulated in the Alberta Schedule of Medical Benefits and physicians can only bill the exact fees determined in the schedule. There is no defined interval for updates to the schedule and it is updated as required. The current schedule is applicable since 1 April 2017 (Alberta Health, 2017[28]).

British Columbia

Hospitals provide nuclear medicine (NM) diagnostic services in British Columbia and services are paid on a fee-for-service (FFS) basis for outpatients while global hospital budgets cover services for inpatients. FFS payments and hospital budgets cover the entire cost of NM diagnostic services, including the cost of radiopharmaceuticals and other service components, such as physician time. Only hospitals are permitted to bill the Medical Services Plan (MSP), the main health insurance scheme funded by the government of British Columbia for its residents, and physicians are paid by hospitals.

Fees for outpatient services are regulated in the Payment Schedule revised and published annually by the British Columbia Medical Services Commission (MSC) under the master agreement between the government of British Columbia and the MSC and the British Columbia Medical Association. The MSC Payment Schedule is also the binding catalogue of services for which providers can bill the MSP. Providers can only bill the exact amount determined in the schedule. Annual revisions take into account the cost of overhead and staff and an allocation of capital equipment costs.

The current MSC Payment Schedule is valid for the calendar year of 2018. Although it lists a number of separate items for administration of radiopharmaceuticals (e.g. item no. 09896 for lumbar administration of radionuclide, attracting a fee of CAD 32.61), no separate payments are made to cover the costs of radiopharmaceuticals. The service-related fee specified in the schedule also covers the cost of the radiopharmaceuticals used. Service fees range from CAD 73.80 for a thyroid scan using Tc-99m pertechnetate (item no. 09825) to CAD 1 387.10 for tumour imaging with a metabolic or biological imaging agent (item no. 09826).

Manitoba

Diagnostic centres and radiological clinics as well as hospitals provide NM diagnostics services in Manitoba. Diagnostic centres and radiological clinics are paid fee-for-service (FFS) while all hospital activity is covered by global budgets.

Service fees are regulated in contracts that are valid for up to 5 years and providers can only bill the exact amount determined in the regulation. The current fee schedule applies since 2014. Data on actual costs are generally not considered when setting fees.

Neither diagnostic centres and radiological clinics nor hospitals receive additional payments to cover the cost of radiopharmaceuticals. The service fees and global budgets also cover the cost of Tc-99m.

Newfoundland and Labrador and Nova Scotia

Hospitals provide nuclear medicine (NM) diagnostic services in Newfoundland and Labrador and all hospital activity (in- and outpatient) is covered by global budgets. Hospitals receive no additional payments to cover the cost of radiopharmaceuticals. Budgets also cover the cost of Tc-99m. In Newfoundland and Labrador budgets are allocated by RHAs while there is a single health authority in Nova Scotia.

Japan

Office-based specialists, diagnostic centres and radiological clinics as well as hospitals provide NM diagnostics services in Japan and all providers are paid fee-for-service (FFS). Providers receive separate payments for radiopharmaceuticals. Service fees and payments for radiopharmaceuticals are regulated by a national fee schedule, which serves as a binding catalogue of goods and services for which providers can bill social health insurance (SHI) and also defines strict billing conditions that must be met for a listed service to be paid by SHI (Ikegami, 2014[29]). Adherence to billing conditions is routinely audited in processing provider payment (ibid.). Providers are not permitted to charge prices in excess of the fees set in the national schedule.

The national fee schedule, which sets prices and billing conditions for medical services, medicines and devices for all providers, is revised every other year in a two-step process (Ikegami, 2014[29]):

1. The Minister of Finance and the Minister of Health, Labour and Welfare set an overall price increase or decrease for all goods and services in the fee schedule based on the macro-economic and budgetary context and the effect of non-price factors (such as increases in demand for services due to demographic changes or shifts towards the use of more expensive goods and services). This effectively determines an overall budget. The overall budget decision also takes into account separately the market prices of medicines and devices that are listed in the schedule and determines an overall price increase or decrease for services. The Ministry of Health, Labour and Welfare (MHLW) elicits market prices of medicines and devices in a survey, which are often below the corresponding payments made to providers per the fee schedule because of competition among vendors of medicines and devices, and estimates overall savings that can be achieved by aligning payments to providers in the schedule with prevailing market prices. Savings from price reductions of medicines can be reallocated to services to determine the overall price change for services.
2. A micro-level review of each item listed in the fee schedule, including prices and billing conditions. The Minister of HLW is ultimately responsible for setting fees in consultation with the Central Social Insurance Medical Council, an advisory panel to the MHLW, but the process includes negotiations between provider representations and the MHLW. While for medicines and devices, payments to providers are mainly aligned with market prices, updates to services fee aim to achieve expenditure control by reducing fees for items whose volumes have increased rapidly and/or can be delivered

at lower costs; to maintain appropriate and equitable margins across providers; and to incentivise providers for provision of certain services by listing new items or raising applicable fees.

The MHLW actively uses the national fee schedule as a policy lever – prices are increased or reduced to incentivise providers and improve quality of care (OECD, 2015[30]). While FFS payment is generally associated with incentives for providers to increase activities, low fee levels and billing conditions are actively used by the Japanese Government as mechanisms to constrain activity and health care expenditure (Ikegami, 2014[29]; OECD, 2015[30]). Price adjustments for medicines in the overall step 1 of the bi-annual fee revision have been negative between 1990 and 2012 while for medical services, price adjustments were negative in the 2002 and 2006 revisions, with increases below 2% since 2008 (ibid).

Fees for procedures using new technology are set based on fees for existing procedures that are similar to the new one. When there is evidence that the new technology is more effective than any of the existing procedures, the new procedure will attract a higher fee and vice versa. When no comparable procedure exists, the fee for the procedure using new technology can be set based on cost-related factors.

In addition to price adjustments, billing conditions play a key role in constraining activity and expenditure and are used to ensure use that is considered appropriate. For example, when Positron Emission Tomography (PET) was first listed in the national schedule, billing conditions restricted use to patients who had a confirmed diagnosis of cancer, precluding its use for screening (Ikegami, 2014[29]).

For NM diagnostics, fee negotiations can take into account overhead and fixed costs, staff costs and the cost of capital equipment. The current fee schedule is effective since 1 April 2018 and contains four NM diagnostic services. Fees are uniform for all provider types and range from JPY 13 000 for a series of static scintigrams of a body part to JPY 22 000 for a series of scintigrams of the whole body. A SPECT scan attracts a fee of JPY 18 000. Providers receive separate payment for radiopharmaceuticals listed in the national fee schedule. The national schedule lists all reimbursable radiopharmaceutical products and their manufactures as well as prices that are payable to providers, depending on the product either by patient dose or by the amount of radioactivity of the generator.

Germany

Office-based specialists and hospitals provide nuclear medicine (NM) diagnostic services in Germany are paid through separate mechanisms by social health insurance (SHI). Services that are not paid by SHI are not covered in this Section. SHI and government transfers fund approximately 80% of all health expenditure in Germany (OECD, 2018[31]). A minority of the population is covered by private insurance instead of SHI.

Specialist Offices

Office-based specialists are paid fee-for-service (FFS) by regional associations of health insurance-affiliated (SHI) physicians according to a national uniform value scale (EBM) and regional adjustments that ultimately determine service fees in absolute monetary terms. The EBM serves as the binding catalogue of services physicians can bill to SHI and sets the relative prices of most services in terms of points or, for some services, nationally uniform prices in terms of EUR. The EBM also defines national reference prices in EUR for all services based on a national reference valuation of each point. However, in negotiating annual remuneration contracts and regional fee schedules, state-level associations of sickness funds and physicians have some leeway to digress from national reference prices, in particular to reflect regional specificities in cost and supply structures (Kriedel, 2012[32]). Regional physician associations and regional associations of sickness funds negotiate the total aggregate budget for the vast majority of physician services taking into account, among other factors, trends in morbidity in the insured population (KBV, 2018[33]; Busse and Blümel, 2014[34]).

Physicians are paid quarterly by regional physician associations. Every quarter, regional physician associations first split their aggregate funding received from sickness funds between primary care and

specialists. The portion allocated to specialists is then allocated to each physician practice based on the total number of points associated with the services provided, as specified in the EBM, and prices defined in the regional fee schedule. In order not to exceed the quarterly funding available and taper incentives for physicians to increase activity, regional associations also define a physician practice-specific volume cap beyond which services that are not explicitly exempted from the cap are either paid at a reduced price or not paid at all (Busse and Blümel, 2014[34]).

For NM diagnostic services, fee negotiations can take into account overhead and fixed costs, costs for staff, costs of capital equipment and costs of procuring Tc-99m. The cost of Tc-99m is covered by a payment also determined in the EBM but that is separate from the service fee.

According to the 2018 version of the fee schedule for NM specialists (KBV, 2018[35]), physicians receive a fee per consultation plus additional fees for the diagnostic procedure depending on the organ system or anatomical area scanned, a modality-specific additional fee if the imaging modality is not a single-phase scintigraphy (e.g. SPECT, sequential scintigraphy) and a fee for the cost of the radiopharmaceutical used (also see Section 0). Based on the national reference value of a point in the EBM, the consultation fee is EUR 9.38 and fees for the diagnostic procedure range from EUR 43.15 for an examination of the thyroid gland to EUR 102.49 for a myocardial scintigraphy. Payments for the Tc-99m and related material (cold kits) are described in Section 0 and Annex D.

For an entire diagnostic service, for example, a simple thyroid scan can attract a total fee of EUR 54: sum of EUR 9.38 for the consultation, EUR 43.15 for the scan and EUR 1.50 for the Tc-99m-based radiopharmaceutical used. A cardiac stress test using dual- or multi-headed SPECT can attract a total fee of EUR 279: sum of EUR 9.38 for the consultation, EUR 98.77 for the scan, EUR 111.34 for the use of dual- or multi-headed SPECT and EUR 60 for the Tc-99m-based radiopharmaceutical used.

Hospitals

For inpatient care and selected day care procedures hospitals receive payments based on DRGs that cover an entire patient stay or treatment episode and no separate payments are made for nuclear medicine diagnostic procedures or radiopharmaceuticals. These case-based payments are determined by multiplying a DRG-specific ‘cost weight’ with a ‘base rate’ that is uniform for each federal state. Cost weights are determined using historic cost averages reported by hospitals, which are based on micro-cost data and some top-down cost allocations (Geissler et al., 2011[36]; InEK, 2016[37]). Both factors are updated annually but are determined in two separate processes:

1. The regional base rate is negotiated between regional hospital associations and insurers but must lie within +2.5% and -1.25% of a federal reference base rate and year-on-year increases cannot exceed the increase of the federal base rate. The federal base rate is agreed upon between the National Association of Statutory Health Insurance Funds (GKV-SV), private insurers and the National Association of Hospitals (DKG). Both negotiations broadly take into account factors such overall cost projections, including costs for salaries and equipment, and changes in the number and severity of cases. For further details, see (Busse and Blümel, 2014[34]; de Lagasnerie et al., 2015[38]).
2. The DRG catalogue and corresponding cost weights are agreed upon between the DKG, GKV-SV and private insurers, based on calculations by the Institute for the Payment System in Hospitals (InEK). To determine cost weights, InEK calculates average costs per DRG using data from a sample of hospitals that participate in a voluntary data-sharing programme (InEK, 2016[37]). Hospitals submit data according to standardised cost accounting guidelines, which require the reporting of micro-level cost data for some items but also allow for using allocation algorithms where detailed reporting is not feasible (ibid.). Given the data collection and calculation process, cost weights in any given year are based on data pertaining to two years earlier (Busse and Blümel, 2014[34]). For medicines, hospitals are only required to submit micro-level cost data, i.e. actual unit

purchase prices, for products whose prices exceed EUR 300 per patient case (InEK, 2016[37]). The cost of radioisotopes and radiopharmaceuticals per patient case may be below this threshold.

DRG payments are tapered in two main ways to attenuate the incentive for hospitals to increase volume but also to limit the financial risk for hospitals. First, each DRG includes a minimum and maximum length of patient stay, and payments are reduced for patient stays below the minimum and increased for stays longer than the maximum. Second, all hospitals negotiate annual revenue budgets with insurers, which determine a target volume in terms of the sum of cost weights associated with DRGs. Significantly reduced rates apply to services provided in excess of the volume provided in the prior year and volume provided in excess of the negotiated targets. Conversely, if volume remains below the targets, hospitals receive a partial payment for the difference between actual volume and the target (de Lagasnerie et al., 2015[38]).

Hospitals may receive additional payments on top of DRG-based payments for new technology if (1) a hospital wishing to employ and receive such payments for a new technology applies to InEK; (2) if the application is accepted, the hospital successfully negotiates such payments with the sickness funds; and (3) the technology can ultimately be included in regular DRGs (Geissler et al., 2011[36]). Other exceptional and additional payments can be agreed upon for services that incur high costs and cannot be integrated into a DRG.

The cost of a nuclear medicine diagnostic procedure, and the associated cost of the radiopharmaceutical, likely represent only a small portion of hospital payment based on a DRG. For example, according to annual national statistics on the volume of hospital procedures performed, the most common type of nuclear medicine procedure performed on hospital inpatients in 2015 was scintigraphy of the musculoskeletal system (Hellwig et al., 2017[39]). This procedure can be associated with various diagnoses and treatments and therefore various DRGs. The three most common DRGs associated with this procedure in 2015 attracted hospital payments (in 2018) of EUR 3 700 to 5 200; details are shown in Table 3.6.

Table 3.6. Top 3 DRGs associated with scintigraphy of the musculoskeletal system on inpatients in German hospitals

Based on the 2018 DRG catalogue.

DRG code and title	Mean length of stay (days)	Cost weight relative to base case	Federal reference base rate (EUR)	Hospital payment (EUR)
J07B – Minor interventions on the breast with lymph node excision or extremely severe or severe complications or co-morbidities with malignant neoplasm, without bilateral surgery, without intervention on the ovary	4.5	1.326	3 467.30	4 597.64
J23Z – Major interventions on the breast for malignant neoplasm without complex intervention, without specific intervention on the female genitalia for malignant neoplasm	6.0	1.496	3 467.30	5 187.08
E02C – Other procedures on the respiratory system, patient age >9 years, without specific intervention on the larynx or trachea, without moderate intervention, without extremely severe complications or comorbidities	5.8	1.067	3 467.30	3 699.61

Note: Hospital payments in this table are based on the federal reference base rate and assume a length of stay within the minimum and maximum.
Source: Author based on Reimbursement Institut (2018[40])

France

Office-based specialists, diagnostic centres and radiological clinics, specialised cancer centres and hospitals provide nuclear medicine (NM) diagnostic services in France and are paid through separate mechanisms by social health insurance (SHI). Services that are not paid by SHI are not covered in this Section. SHI and government transfers fund more than 80% of all health expenditure in France (OECD,

2018[31]), with private insurance mainly covering patient co-payments; SHI can therefore be assumed to cover nearly all NM activity in France.

NM diagnostic services paid fee-for-service (FFS) represent approximately 90% of all NM diagnostic services, including all services delivered by office-based specialists, diagnostic centres / radiological clinics and specialised cancer centres and some services delivered by hospitals (see below). NM diagnostic services that are part of hospital inpatient stays are generally paid through DRGs.

Specialist Offices and Other Outpatient Providers

Office-based specialists and all other NM diagnostic services delivered on an outpatient-bases are paid FFS and fees are negotiated between the National Association of Social Health Insurance Funds (UNCAM) and associations of relevant health professionals.

A new national medical service catalogue (CCAM) and applicable fees were established in 2005. In this complete overhaul of the service catalogue, fees were aligned with historic cost data as far as possible but where differences between new cost-based fees and prior fees were large, gradual convergence was negotiated. Since then, fees are partially updated as planned in the *medical conventions* signed between the national association of physicians and UNCAM for 5-year terms. However, both parties can request amendments to the convention during the 5-year interval if specific issues need to be addressed. In addition, where legislation allows, the head of UNCAM may trigger to renegotiation of fees with professionals who use large capital equipment and suggest revisions of fees for technical aspects of the service.

Physicians paid on a FFS-basis can either accept CCAM fees paid by SHI as full payment for their services (referred to as Sector 1), in return for paying reduced SHI contributions themselves, or set higher fees freely (Sector 2), with patients covering the difference between the CCAM fee paid by SHI and the physician fee. Most people have private complementary insurance that covers these differences. It is generally more common among specialists to opt for Sector 2 than among general practitioners. However, Sector 2 remuneration is uncommon among nuclear medicine specialists (l'Assurance Maladie, 2017[41]).

Table 3.7. Examples of outpatient NM diagnostic procedures and applicable fees in France

Based on CCAM fee schedule applicable since 14 July 2018.

CCAM Billing Code	Description	Fee (EUR)
FEQL006	Radio-isotopic search of blood in stool	53.06
KCQL003	Thyroid scintigraphy	109.70
PAQL002	Whole-body bone scintigraphy, multi-phase	251.39
DAQL009	Myocardial perfusion tomoscintigraphy (rest test), with myocardial perfusion tomoscintigraphy after exercise test or pharmacological test with electrocardiogram synchronisation	472.72
GFQL002	Pulmonary ventilation and perfusion exam	534.15
F	Additional fee for a scan performed on a Sunday or public holiday	19.06
G	Additional fee for a scan of a patient under 3 years of age	+25%
A	Additional fee for general or local anaesthesia in a patient under 4 years or over 80 years of age	23.00
S	Additional fee for emergency scan performed general practitioners or midwives or emergency therapeutic procedure performed under general or local anaesthesia by doctors of other specialties, between midnight and 08.00am	40.00

Source: Author based on l'Assurance Maladie (2018[42]).

Since the establishment of CCAM, fees for NM diagnostic services have generally been revised downwards. The latest version of the CCAM contains 109 procedure codes related to NM diagnostics, including five codes related to "complementary services" (such as image production without reinjection,

complementary to a standard procedure). For the same patient, no more than two procedures performed on the same day and in one session are paid, at 100% of the specified fee; additional procedures are not paid.

An additional fee per unit of service can be payable for procedures performed as part of emergencies out-of-hours or based on patient age (i.e. for young children and patients aged 80 and above receiving the scan under anaesthesia), per the conditions stated in the fee schedule.

The current fee schedule is applicable since 14 July 2018. Fees range from EUR 53 for a radio-isotopic search of blood in stool to EUR 534 for a pulmonary ventilation and perfusion exam (excluding possible additional fees for emergency procedures and procedures for children and the elderly). Table 3.7 shows examples of NM diagnostic procedures and applicable fees since 2018.

Hospitals

Hospitals receive FFS payments for outpatients and DRG-based payments for inpatient stays (referred to in France as GHS – *Groupe homogène de séjours*). Fees for outpatients are the same as those for office-based specialists described above, governed by the CCAM. For inpatient stays, no separate payments are made for nuclear medicine diagnostic procedures or radiopharmaceuticals in addition to payment for the DRG.

GHS prices public and private non-profit hospitals cover all costs associated with a patient stay while GHS for private for-profit hospitals exclude remuneration of doctors (Or and Bellanger, 2011[43]) (who are paid FFS based on the CCAM). Subject to a number of conditions, doctors are also allowed to engage in private practice on public hospital premises. In the latter case, doctors also receive FFS payments based on the CCAM but cede a portion of the fee to the hospital for use of hospital premises and equipment.

GHS prices are determined by allocating an overall annual budget for GHS payments according to cost weights of GHS based on historic cost data (Or and Bellanger, 2011[43]). A hospital-specific coefficient, based on each hospital's own historic cost data, is applied to smooth year-on-year fluctuations and a regional adjustment factor is also applied to hospitals in the metropolitan area of Paris and in French overseas territories to account for higher labour costs. The annual budget defines a target volume of hospital activity and is set by the Ministry of Health.

GHS payments are tapered according to minimum and maximum lengths of patient stay, and payments are reduced for patient stays below the minimum and increased for stays longer than the maximum (Or and Bellanger, 2011[43]). GHS prices are also reduced for all hospitals once the annual target volume of hospital services is reached (de Lagasnerie et al., 2015[38]).

Cost weights are updated annually by the National Agency for Hospital Information (ATIH) on the basis of cost data submitted by a sample of hospitals participating in a voluntary data sharing scheme, which account for approximately 13% of total hospital stays in France (Or and Bellanger, 2011[43]). Cost weights for a given year were calculated in the prior year based on data pertaining to two years earlier (Or and Bellanger, 2011[43]). Cost data are analysed separately for private for-profit hospitals from public and private non-profit hospitals and resulting GHS prices differ because they cover different cost categories.

Hospitals submitting cost data to ATIH follow common accounting rules defined by government decree, using mainly top-down cost allocation but also some bottom-up micro-costing. Participating hospitals must provide patient-level information on all procedures performed, and detailed cost data for certain medicines and medical devices, and blood and external laboratory tests as well as private physicians fees (Or and Bellanger, 2011[43]).

Hospitals receive additional payments on top of DRG-based payments for innovative and costly medicines and medical devices included in a national list (ATIH, 2018[44]). Prices of products in this list are regulated at the national level by the Economic Committee for Health Products (CEPS), which also regulates prices

of prescription medicines dispensed in the outpatient sector. No Tc-99m-based radiopharmaceuticals are currently included in the list (ibid.).

United Kingdom (England)

National Health Service (NHS) hospitals provide nearly all NM diagnostic services in England. Hospitals are generally paid by DRG, referred to as Health Care Resource Groups (HRGs) in England. The national HRG catalogue also includes service-specific HRG codes (locally referred to as "unbundled services"), which effectively represent a service-specific FFS payment. NHS England defines the HRG catalogue at a national level. Prices are set nationally by NHS Improvement or locally by NHS commissioners (referred to as Clinical Commissioning Groups), in cases where either no national prices apply or price variations are permitted by NHS England and NHS Improvement (NHS England and NHS Improvment, 2018[45]).

According to data provided by NHS England, 90% of NM diagnostic services are delivered to outpatients or day cases in NHS hospitals.[4] These services attract FFS payments based on service-specific HRGs and nationally set prices. Costs of the remaining 10% of procedures performed as part of inpatient stays is covered by the broader HRG associated with the inpatient stay.

The amounts hospitals receive for a given HRG with a national price are determined by multiplying the national price (locally referred to as "tariff") by a hospital-specific market forces factor (MFF) to reflect local prices of labour, land and buildings (NHS England and NHS Improvment, 2018[45]). Table 3.8 shows examples of HRGs for NM diagnostic services and corresponding prices for the financial years 2017 to 2019.

National prices are published annually or bi-annually by NHS Improvement. NHS Improvement periodically re-calculates national prices based on estimates of historic average costs by HRG or adjusts prices that applied in a prior year for inflation and expected efficiency gains (ibid.). Cost data are submitted by all NHS hospitals according to a national NHS Costing Manual; costs reflect a mixture of micro-cost data and allocations to each service from the general ledgers of hospitals. For example, prices applicable in the financial years 2017/18 to and 2018/19 are based on cost data pertaining to 2014/15 and various adjustments made to reflect the lag in cost data (ibid.).[5]

Table 3.8. Examples of NM diagnostic HRGs in England

Applicable for FYs 2017/18 and 2018/19; all prices in GBP, including the cost of reporting of results.

HRG code	HRG name	Tariff incl. cost of reporting	Cost of reporting	Min after MFF adj	Max after MFF adj
RN08A	Single Photon Emission Computed Tomography (SPECT), 19 years and over	133	26	133	173
RN13Z	Nuclear Medicine Infection Scan or White Cell Scan	380	53	380	493
RN15A	Multi-phased Nuclear Bone Scan, 19 years and over	181	19	181	235
RN18A	Lung Ventilation or Perfusion Scan, 19 years and over	214	19	214	278
RN20Z	Myocardial Perfusion Scan	133	26	133	173
RN21Z	Myocardial Perfusion Scan, Stress Only	190	26	190	247
RN25A	Renogram, 19 years and over	209	19	209	271
RN32A	Thyroid Scan, 19 years and over	143	19	143	186

Note: The market forces factor adjustment ranges from 1.0 for a hospital in Cornwall to 1.2976 for a hospital in central London.
Source: Author based on NHS England and NHS Improvement (2018[46])

Hospitals receive payments in addition to HRGs for high-cost drugs and devices. These apply to all drugs and devices catalogued in a list published by NHS England and NHS Improvement together with the HRG catalogue and national prices ((NHS England and NHS Improvement, 2018[46]). Radiopharmaceuticals are currently not part of this list.

Belgium

Hospitals provide nuclear medicine (NM) diagnostic services in Belgium and service are paid on a fee-for-service (FFS) basis. In general, hospitals receive funding through two separate mechanisms depending on the type of service they provide: while medical and "medico-technical" services (including diagnostic imaging procedures) are mainly paid FFS, patient accommodation, emergency services and nursing activities in day hospitalisations are covered by budgets (Gerkens and Merkur, 2010[47]). For inpatient services FFS payments are always made to hospitals (central invoicing by hospitals is mandatory by law for inpatients) while for outpatients central invoicing is not mandatory. In general, however, FFS payments for outpatient services are also made to hospitals and not to physicians. Physicians have individual contracts with hospitals that determine financial arrangements between both parties.

A uniform national fee schedule negotiated between sickness funds of the National Institute for Health- and Disability Insurance (RIZIV-INAMI) and the professional representations of physicians represents the binding catalogue of goods and services payable by compulsory health insurance and regulates the fees for medical services delivered by physicians to patients with compulsory health insurance, including by hospital-based specialists (ibid.). Physicians have some freedom to charge fees in excess of the what is specified in the national fee schedule, for example when treating inpatients who have requested accommodation in a single room or when the physician delivering the service is not bound by the collective agreement with RIVIZ-INAMI and the patient has been informed upfront (ibid.). Fees can cover all service costs or only the portion pertaining to the physician service; in the former case hospitals retain a part of the fee to cover costs of equipment and other staff while in the former case all non-physician costs are funded by the hospital from its budget (ibid.). While hospitals also have a pharmaceutical budget for inpatients, this budget excludes radiopharmaceuticals and other specified types of medicines (ibid.).

For NM diagnostic services, FFS payments to providers are broken down into two main components: (1) a payment for the medical procedure, the amount of which is dependent on the type of scan performed and (2) payments for the isotope used and, if applicable, the cold kit. The national fee schedule also lists all isotopes and radiopharmaceuticals covered by compulsory health insurance and the corresponding fees.

The fee schedule is updated on an ad-hoc basis, whenever deemed necessary. The current fee schedule is in force since June 2015. For all Tc-99m based radiopharmaceuticals, until May 2015, hospitals received a fixed fee of EUR 37.18 per procedure to cover the cost of Tc-99m and the cold kit in addition to the fee for the medical procedure; this amount had been unchanged for several years. With the June 2015 update of the fee schedule, this fee was split and hospitals now receive EUR 18.59 per procedure for the Tc-99m used and EUR 18.59 per cold kit used (INAMI, 2018[5]). For hospital outpatients, a part of the fee for diagnostic radiopharmaceuticals, including for Tc-99m, is funded from a patient co-payment, which is also defined by law (KCE, 2008[48]). The co-payment is defined as a percentage of the fee, currently either 15% (EUR 2.78) for preferential beneficiaries or 25% (EUR 4.64) for all other patients, and is subject to an overall cap.

Australia

Office-based specialists, diagnostic centres and radiological clinics and hospitals provide NM diagnostic services in Australia. Within public hospitals, some physicians engage in dual practice – i.e. on salaried basis (referred to as "seeing public patients") and on a private fee-for-service-basis (referred to as "seeing private patients"). Public hospitals are funded by state and territory governments, as well as by the

Australian Government. Hospitals generally have global budgets that cover all non-private practice; no detailed information on funding of NM diagnostic services is available for this part of hospital activity.

All providers other than public hospitals can determine their fees freely and their services can attract subsidies from Medicare, the main health coverage scheme funded by the Australian Government. Providers cover the entire cost of services, including the cost of Tc-99m, from MBS fees (see below) and patient out of pocket payments.

Medicare subsidises all medical services which have been assessed as safe, effective and cost effective and which are provided by eligible providers. A specified Medicare fee applies to each service item listed in a national service catalogue and fee schedule (MBS). The MBS fee "is that which is regarded as being reasonable on average for that service having regard to usual and reasonable variations in the time involved in performing the service on different occasions and to reasonable ranges of complexity and technical difficulty encountered" (Australian Government Department of Health, 2018, p. 28[49]). Services can be eligible for a subsidy of 75%, 85% or 100% of the fee and, where patients pay the full fee charged by the provider upfront and claim reimbursement of the subsidy from Medicare, patients are liable for the gap between the subsidy and the provider fee.[6] Providers can also opt to bill Medicare directly for eligible services (referred to as "bulk-billing"), in which case providers accept the applicable Medicare subsidy as full payment for the service and cannot charge higher fees (Australian Government Department of Health, 2018[49]).

Private health insurance is available to cover the 25% difference between the 75% Medicare subsidy and the total MBS fee (Australian Government Department of Health, 2018[49]). Some private health insurers may choose to cover above this amount, but this depends on the insurance cover and the type of gap arrangement in place with the provider. Medicare provides safety nets payments for the difference between subsidy and the 100% MBS fees once an annual threshold for such payments is reached ("Original Safety Net") and an "Extended Safety Net" for all out-of-pocket payments beyond an annual threshold (ibid.)

The 100% benefit only applies to primary care services while NM diagnostic services attract subsidies of 75% or 85% if patients pay upfront and claim reimbursement, depending on the setting in which the service is provided (ibid.):

- 75% for professional services provided as part of an episode of hospital treatment in private practice (i.e. not for "public patients"), and for professional services rendered as part of an episode of hospital-substitute treatment, or,
- 85% or the MBS fee less AUD 81.70 (amount indexed annually in November), whichever is the greater, for all other professional services; also for hospital services provided on the day of admission or discharge but before admission or after discharge (instead of 75% for services on any other day of the episode of hospital treatment).

A 95% subsidy applies when providers charge Medicare directly. Lower fees apply for scans conducted with capital equipment aged 10 years or more, except in remote areas. Lower fees also apply if there are multiple scans of the same patient on the same day.

Fees are revised when deemed necessary and are usually subject to an annual inflation adjustment. However, fees for diagnostic imaging, including NM, have been frozen for more than 10 years. The current MBS, valid since May 2018, includes 158 item codes related to NM diagnostic services (using Tc-99m and other isotopes) (Australian Government Department of Health, 2018[49]). Fees (100%) range from approximately AUD 60 for a dynamic blood flow study conducted with aged equipment to AUD 880 for an adrenal study; further examples of listed services and applicable fees are shown in Table 3.9.

Table 3.9. Examples of NM diagnostic services in the MBS

Applicable since 1 May 2018, all prices in AUD.

MBS Item	Description	Schedule Fee	75% Benefit	85% Benefit
61689	Dynamic blood flow study or regional blood volume quantitative study… (R) (NK)	59.45	44.60	50.55
61674	Oesophageal clearance study (R) (NK)	71.70	53.80	60.95
61473	Thyroid study including uptake measurement when undertaken (R)	175.40	131.55	149.10
61446	Localised bone or joint study, including when undertaken, blood flow, blood pool and repeat imaging on a separate occasion (R)	333.55	250.20	283.55
61302	Single stress or rest myocardial perfusion study – planar imaging(R)	448.85	336.65	381.55
61306	Combined stress and rest, stress and re-injection or rest and redistribution myocardial perfusion study, including delayed imaging or re-injection protocol on a … (R)	709.70	532.30	628.00
61484	Adrenal study (R)	880.85	660.65	799.15

Note: Suffix (R) denotes a "request requirement" (referral): Medicare benefits are payable for R-type services only if, prior to commencing the relevant service, the provider receives a signed and dated request from a requesting provider with a valid Medicare Provider number who determined the service was necessary. Suffix (NK) denotes services delivered with capital equipment aged 10 years or more, except in remote areas.
Source: Author based on Australian Government Department of Health (2018[49])

Other countries

Czech Republic: a FFS schedule determines payments for all provider types (radiological clinics, hospital in- and out-patient activity) and providers can only bill the exact amount determined in the fee schedule. Fees are updated annually, with the latest version applicable to 2018, but actual costs are not considered in setting fees. Service fees also cover the cost of Tc-99m and providers receive no unbundled payments for Tc-99m.

Denmark: hospitals the only providers, which receive DRG-based payments for in- and out-patient activity. Micro-cost data are considered in updating DRG prices. DRG payments also cover the cost of Tc-99m and hospitals receive no unbundled payments for Tc-99m.

Latvia: radiological clinic and hospital out-patient activity paid FFS. Fees updated annually taking into account actual cost of Tc-99m as well as overhead and fixed costs, staff costs and capital equipment costs. Providers have some freedom to bill above or below the regulated fee. Hospital inpatient activity paid by DRGs. Micro-cost data are not considered when updating DRG prices. Service fees and DRG payments also cover the cost of Tc-99m and providers receive no unbundled payments for Tc-99m.

Lithuania: All outpatient activity, including services delivered by diagnostic centres / radiological clinics and by hospitals to outpatients, are paid FFS. Fees are regulated in a fee schedule and providers can only bill the exact amount determined in the schedule. Fees are updated on an ad-hoc basis every 2-4 years and updates take into account actual costs of overhead, staff and Tc-99m. Hospital inpatient activity is paid through DRGs. DRG payment rates are based on cost allocations and micro-cost data is not considered when updating DRG-based payment rates. Service fees and DRG payments also cover the cost of Tc-99m and providers receive no unbundled payments for Tc-99m.

Luxembourg: Only hospitals provide NM diagnostic services. The hospital activity is paid by global budget and the medical activity on FFS-basis. However, fees only cover costs of provision of professional services and of the use of capital equipment. The cost of Tc-99m is covered by broader hospital pharmacy budgets, which are not set based on actual cost of Tc-99m.

Netherlands: all NM diagnostic services, including inpatient and outpatient scans provided by hospitals and scans provided by other types of outpatient providers, are paid through DRGs. DRG payment rates

are updated annually, based on negotiations between payers and providers. DRG payments also cover the cost of Tc-99m and providers receive no unbundled payments for Tc-99m.

Poland: radiological clinic and hospital out-patient activity is paid FFS. Fees updated on an ad-hoc and individual basis, taking into account actual costs of supply of Tc-99m and costs of all other items that are part of the service. Hospital in-patient activity paid by DRG. Service fees and DRG payments also cover the cost of Tc-99m and providers receive no unbundled payments for Tc-99m.

Slovenia: Only hospitals provide NM diagnostic services. Hospital in-patient activity is covered by global budgets. Hospital out-patient activity is paid FFS. Fees are regulated and hospitals can only bill the exact amount determined in the fee schedule. Fees are updated annually but actual cost data is not considered in updating fees. Service fees and hospital budgets also cover the cost of Tc-99m and hospitals receive no unbundled payments for Tc-99m.

Sweden: Only hospitals provide NM diagnostic services and all hospital activity is covered by global budgets. Hospital budgets also cover the cost of Tc-99m and no unbundled payments are made for Tc-99m.

Switzerland: All outpatient activity, including services provided by office-based specialists, diagnostic centres / radiological clinics and hospitals are paid FFS. Fees are regulated but providers have some freedom to bill above or below the regulated fee. Fees are updated on an ad-hoc basis and data on actual cost of overhead, staff, capital equipment and Tc-99m are considered in fee updates. Current fees cover the cost of Tc-99m based on a price assumption of CHF 1.70 per MBq. The cost of Tc-99m therefore only represents a minor part of the overall service costs, approximately CHF 9 for a bone scan or CHF 30 for a cardiac scan. Hospital inpatient activity is paid through DRGs, which are updated annually. DRG cost weights are based on data submitted by all Swiss hospitals. Hospitals are required to report micro-cost data for all medicines, implants and other material whose costs exceed CHF 1 000 (Holzer, 2012[50]). Service fees and DRG payments also cover the cost of Tc-99m and providers receive no unbundled payments for Tc-99m.

3.4. What financial incentives arise from these payment mechanisms?

In the countries described above, providers generally have a financial incentive to contain the cost of Tc-99m. This is because provider payments are almost exclusively based on prospectively set payment amounts or budgets from which providers have to fund their activity. The exception is where providers receive reimbursement of the *actual cost* of Tc-99m purchased, which is only the case in a subset of the NM diagnostic scans paid by Medicare and Medicaid in the United States.

However, the strength of incentives to contain or reduce costs may vary significantly between different types of providers and payers and payment mechanisms that determine financial flows between them. The strength of incentives depends on various factors. These include the level of financial risk borne by providers, the extent to which payments to providers cover or exceed the costs of service provision actually incurred, and the ability of providers to substitute distinct activities and the supplies required to perform them. A greater ability to substitute gives providers more scope to cross-subsidise activities from various sources of income and adjust their cost structures. Where providers bear financial risk and payments for NM diagnostic services are lower than costs, providers either need to reduce their costs per unit of service or, where they can, substitute away from costly towards cheaper services or cross-subsidise NM activities from other sources of income.

All providers in Belgium and Japan as well as office-based specialists paid FFS in Germany and the United States (Medicare only) receive unbundled payments for Tc-99m (see Section 0). To the extent that these payments are sufficient to cover costs of purchasing Tc-99m, providers have a weak incentive to reduce costs.

Where providers receive no unbundled payment that specifically funds their purchases of Tc-99m, which is the case in most countries and provider settings (see Section 0), providers may have stronger incentives to reduce to cost of Tc-99m or substitute Tc-99m with less costly alternatives. The three payment mechanisms for NM diagnostic services are listed in Section 3.3.1 in ascending order according to the degree of bundling. The broader the service bundles for which providers are paid, the greater their financial risk and their incentives to substitute towards less costly activities and supplies. Providers bear the least risk when paid FFS, more risk when paid by case or DRG and the highest level of risk when receiving global budgets. More specifically:

1. FFS: Providers bear financial risk related to the use of resources, such as costs of physician time, capital or consumables, for each unit of service; providers bear no risk related to the number of patients or the severity of patient cases because each additional unit of service delivered attracts additional payment.
2. Case-based payments (DRGs): Providers bear greater financial risk related to resource use per case, because the payment covers a much broader bundle of services, including all diagnostic procedures, consultations, treatments and patient accommodation that are part of the case, and payment is based on expected resource use. Providers bear no risk related to the number of patients because each additional case will attract an additional payment. Providers bear some risk related to severity of patient case, to the extent that more severe cases with the same diagnoses that require more resources are not classified in a separate and more resource-intensive DRG.
3. Global budgets: Providers bear the highest level of risk, including risk related to the number of patients treated in the time period covered by the budget, the severity of patient cases and resource use for each patient case. Payment is independent of the actual volume and types of services provided, so additional service volume will not attract additional payment. This may lead to under-provision of services if budgets are insufficient.

In general, hospitals receiving global budgets have the strongest incentives to contain cost through constraining the number of services provided and their unit cost, while hospitals paid per DRG have a weaker cost containment incentive through controlling the unit cost of each DRG and providers paid FFS only have a weak incentive to contain the unit cost of each service (Geissler et al., 2011[51]).

However, even when providers are paid FFS, they can have strong incentives to contain unit costs of services if the fee is below the cost they incur. It is therefore not possible to fully understand provider incentives without comparing costs they incur with payments they receive. More generally, the frequency with which prospectively set prices are updated to align them with actual costs is another factor that determines financial incentives. Table 3.10 summarises the frequency of updates to service fees and DRG prices by country and provider type.

While it is not possible to evaluate financial incentives for providers to contain or reduce cost of Tc-99m in greater detail with the data available for this report, such incentives can be assumed to remain relatively weak. This is because data on provider payment presented in this Section and Tc-99m price data presented in Chapter 4 suggest that the cost of Tc-99m likely represents a relatively small portion of the broader provider payment for the diagnostic service, the DRG or the global budget. Where providers receive unbundled payments that specifically fund the cost of Tc-99m, providers have a weak incentive to reduce costs when such payments are sufficient to cover *actual* costs of purchasing Tc-99m, but may resist cost increases where such payments are insufficient. At the same time, data on the actual cost of purchasing Tc-99m is often not taken into account when setting prices of services. Provider payment is therefore also relatively unresponsive to increases in the cost of Tc-99m.

Table 3.10. Frequency of updates to provider payment (and latest update)

Information refers to the payment mechanism that covers the cost of Tc-99m (unbundled, FFS or DRG).

Country	Specialist offices	Other outpatient providers	Hospital inpatients	Hospital outpatients / day cases
Australia	Ad-hoc (2018[1])	Ad-hoc (2018[1])	n/a	n/a
Belgium	n/a	n/a	Ad-hoc (2015)	Ad-hoc (2015)
Canada				
Alberta	*Ad-hoc (2017)*	*Ad-hoc (2017)*	*Ad-hoc (2017)*	*Ad-hoc (2017)*
Br Columbia	*n/a*	*n/a*	*n/a*	*Annual (2017)*
Manitoba	*n/a*	*<5 years (2014)*	*n/a*	*n/a*
Newfoundland / Labrador	*n/a*	*n/a*	*n/a*	*n/a*
Nova Scotia	*n/a*	*n/a*	*n/a*	*n/a*
Czech Republic	n/a	Annual (2018)	Annual (2018)	Annual (2018)
Denmark	n/a	n/a	Annual (n/d)	Annual (n/d)
France	5 years, or Ad-hoc (2018)	5 years, or Ad-hoc (2018)	Annual (2018)	5 years, or Ad-hoc (2018)
Germany	Annual (2018)	n/d	Annual (2018)	Annual (2018)
Japan	Bi-annual (2018)	Bi-annual (2018)	Bi-annual (2018)	Bi-annual (2018)
Latvia	n/a	Annual (n/d)	n/d	Annual (n/d)
Lithuania	n/a	Ad-hoc (2017)	n/d	Ad-hoc (2017)
Luxembourg	n/a	n/a	Bi-annual (n/d)	Bi-annual (n/d)
Netherlands	n/a	Annual (2018)	Annual (2018)	Annual (2018)
Poland	n/a	Ad-hoc (n/d)	n/d	Ad-hoc (n/d)
Slovenia	n/a	n/a	n/a	Annual (2018)
Sweden	n/a	n/a	n/a	n/a
Switzerland	Ad-hoc (n/d)	Ad-hoc (n/d)	Annual (2018)	Ad-hoc (n/d)
United Kingdom (England)	n/a	n/a	Bi-annual (2017)	Bi-annual (2017)
United States[2]	Annual (2018)	Annual (2018)	Annual (2018)	Annual (2018)

Notes: 1. Refers to the latest update of the Australian MBS. Fees for NM diagnostic services have been frozen for more than 10 years.
2. Only refers to Medicare FFS, OPPS and IPPS, to which updates are made at least annually. Contracts between private health insurers and providers are not in the public domain.
n/a… not applicable because the provider type does not provide NM diagnostic scans in the country, n/d…no data available.
Source: Author based on OECD Health Division survey and public sources (Stephani et al., 2018[52]).

3.5. Conclusion

Office-based physicians, other types of outpatient providers (such as diagnostic centres and radiological clinics) and hospitals provide nuclear medicine (NM) diagnostic scans. In countries where data are available, outpatient scans represent the majority of all scans. All of these provider types receive prospectively set payments for such services, which cover service bundles of varying breadths. Outpatient providers are typically paid fee-for-service (FFS), i.e. a fixed fee that applies to the entire diagnostic service and covers all provider costs related to that service, including costs of physician time, capital equipment used and consumables, including Tc-99m. The breadth of bundling tends to increase with the provider size and hospitals are often paid for broad service bundles, such as all services related to a diagnosis-related group (DRG) or through global budgets. The cost of Tc-99m is included in these provider payments in all countries, except in Belgium, in Germany for outpatient providers paid FFS, in Japan and in the United States for specialists paid FFS by Medicare, the main publicly funded coverage scheme.

Because providers are paid prospectively set amounts and bear financial risk related to differences between payments and their costs, rather than being reimbursed for costs actually incurred, providers generally have an incentive to control input costs, including the cost of Tc-99m. Such incentives are stronger where payments are low relative to input costs and where providers have little scope to substitute activities towards more profitable ones, which can allow them to cross-subsidise activities that incur losses. Thus, increases in Tc-99m prices may be difficult to absorb for small providers, such as office-based NM specialists, who rely exclusively on NM scans for revenue and whose FFS payments are not responsive to input costs. Hospitals that generate revenue from a wide range of activities may be able absorb cost increases more easily. In most countries, outpatient provider fees are revised annually, allowing providers to negotiate payment increases if costs increase. However, there are exceptions, such as Australia and France, where fees have not been updated in several years.

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Notes

[1] Persons can be covered by more than one coverage scheme at the time. Therefore, the sum of these percentages do not add up to 100%.

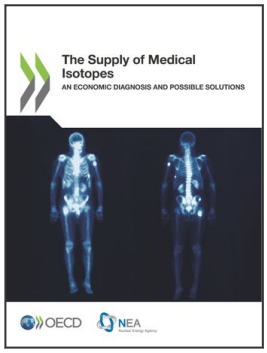
[2] In some states, single men are not covered by Medicare irrespective of their income relative to the federal poverty guidelines. In 2018, for example, the federal poverty guideline for a 1-person household was USD 12 140 in all states except Alaska and Hawaii (15 180 and 13 960 respectively) (HHS, 2018[53]).

[3] See https://www.medicare.gov/what-medicare-covers/your-medicare-coverage-choices/whats-medicare and https://www.hhs.gov/answers/medicare-and-medicaid/what-is-medicare-part-c/index.html

[4] NHS England response to OECD Health Division survey, based on national Diagnostic Imaging Dataset.

[5] In England, financial years run from 1 April to 31 March and do not coincide with calendar years.

[6] The extent of the gap is dependent on the service provider (i.e. public or private) because provider fees are set freely.



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