

# VALUE-BASED PROVIDERS' PAYMENT MODELS: UNDERSTANDING WHERE AND UNDER WHICH CONDITION THEY WORK



# **Value-based providers' payment models: understanding where and under which conditions they work**

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# Acknowledgements

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# Executive summary

Payment systems set incentives on how providers deliver care, and serve as a policy instrument to incentivise the redesign of health care systems, streamline financial incentives and improve patient care. In particular, bundled payment models can improve value through economies of scope and vertical integration and coordination. To have the desired effects, a change to a bundled payment model needs to be accompanied by strong governance arrangements, improvements in data collection and analysis, and in performance monitoring and reporting. This also calls for new investments, in particular in IT tools to streamline data collection and sharing among providers and payers, and in quality measurement.

To date, the success of bundled payment models is mixed, and ranges from no changes to standard delivery of care, or higher expenditures without quality improvements, to improved quality and lower health expenditures. As a large part of bundled payment models have been implemented in the United States, the uniqueness of the United States health system makes it difficult to assess the likely impact of implementing such payment models in other settings.

From the review of country experiences, bundled payments would be best suited to fund well-defined care pathways for specific conditions (e.g. hip and knee replacement) where care is delivered across multiple providers. As to incorporating measures of quality into the bundle payment model, the appropriate variables employed will vary by the clinical condition and the services bundled. Ideally, those appropriate variables would be scientifically sound, amenable to measurement and thus possibly subject to payment. In this context, robust evidence is needed to determine the role that performance targets may play in motivating providers to deliver high-quality, person-centered care.

Bundled payments do not offer a one-size-fits-all solution, and their design and implementation process is complex and driven by broader system objectives within a given setting. A number of key enablers should be considered in the design and implementation of bundled payment models:

*Align a switch to a bundled payment model with health policy objectives:*

- Identify the causal mechanisms that describe how the new payment model is expected to contribute to achieve stated policy objectives
- Facilitate a widespread recognition that care needs to be better organised

*Carefully choose the care bundle and its duration:*

- Choose bundles based on high cost variations for well-defined care pathways
- Include all providers in a bundle and formalise collaboration with and between organisations and sectors
- Ensure early physician leadership and engagement

*Set a fair prospective price that approximate the most efficient way of delivering care:*

- Adopt risk mitigation strategies for providers, including risk adjustment
- Incorporate quality measures into the payment model
- Ensure transparency of cost and quality data

*Establish systems of ongoing revision, monitoring and evaluation:*

- Ensure timely and integrated data collection
- Invest in health information systems
- Pilot and evaluate bundled payment models, and allow for sufficient time for implementing new payment models

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# Introduction

In most developed countries, policy makers have explored strategies to achieve better value in health care (value-based care) by enhancing quality and improving the health status of the population, while keeping health care spending affordable. Provider payment models are a key component of delivering value-based care (OECD 2016a; OECD and World Health Organization 2014). They provide a structure that sets incentives for providers to improve quality and increase efficiency in service delivery (Glied 2021). The “value”<sup>1</sup> of these payment models is mainly linked to their ability to control spending growth while improving quality of care through:

- enhancing efficiency in service delivery
- improving coordination of service delivery among providers
- supporting quality – in particular patient experience with care – and access
- being sustainable to payers and providers

In international experience, “value” is defined in very similar ways. However, the starting points and the relative importance of each of these objectives is different across countries.

In most OECD countries, providers are paid for the activity they perform (OECD 2016a; 2016b). They are generally paid per service (fee-for-service), or per patient (Diagnosis-related groups). Fee-for-service (FFS) schemes pay providers based on the distinct services that they provide. Payments are typically based on a schedule that lists the prices for individual services, with the definition of services based on established classification codes. Fees are typically set using a combination of a base rate and relative weights or relative value units, where the base rate defines the overall price level, and the relative weight the time intensity and medical complexity of a specific service compared to the time intensity and the medical complexity of an average service. In a diagnosis-related groups (DRG) system, providers are paid per patient treated. Patients are assigned to one diagnosis-related group, which should mirror the resource intensity of the patient’s treatment. Similar to FFS, a DRG generally consists of a base rate, that defines the overall price level, and a relative weight, that specifies the resource intensity of a DRG compared to an average treatment episode.

In comparison to FFS, DRGs help to contain costs by bundling all goods and services provided during a hospitalization into one joint payment. They represent a first step of bundling payments. However, they still set an incentive for overprovision of care. FFS payments incentivize providers to increase the number of services, whereas DRGs set an incentive to increase the number of patients treated, leading to higher activity and higher expenditures. Both schemes can result in excessive expenditure growth if not combined with strict budgeting mechanisms (OECD 2016a).

Traditional payment systems also contribute to care fragmentation as fee schedules do not provide any inherent incentive for providers to co-ordinate care, and generate a large number of billable transactions that can result in high administrative costs for health professionals. In addition to that, FFS and DRG payment schemes do not provide incentives to improve quality of care as providers are paid for the services they deliver, irrespective of the results obtained.

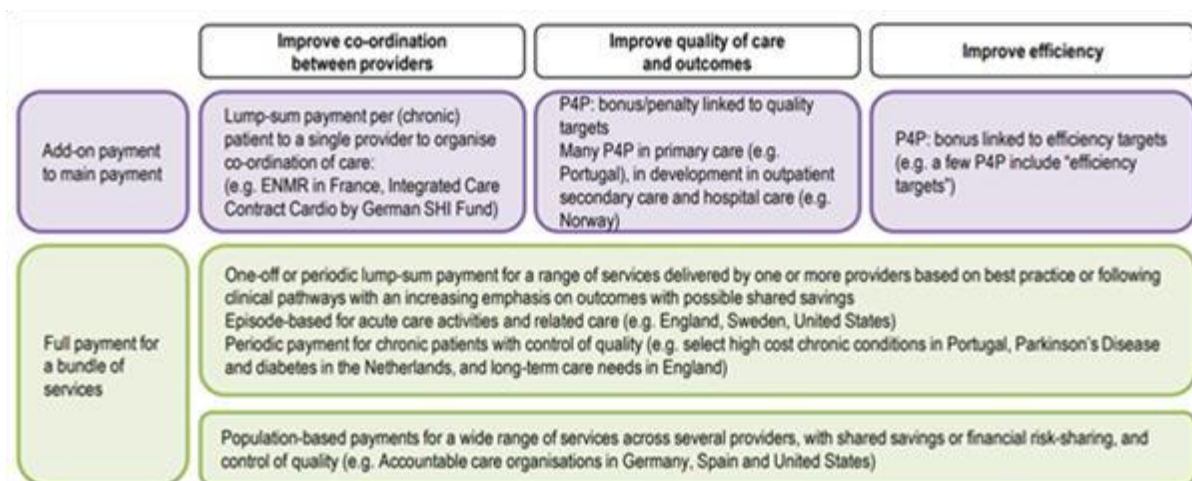
As a result, countries have moved beyond traditional payment systems to improve quality of care, to integrate providers and to contain health expenditures. There are two core strategies to do so (Figure 1). First, payments could be made in addition to the existing payment scheme (add-on payments). This allows policymakers to counteract deficiencies of existing payments. Add-on payments offer tailored interventions, which can be introduced to address specific issues of existing payment schemes. For example, policy

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<sup>1</sup> The definition of “value” to society of health care provision is beyond the scope of this paper. Therefore, this paper defines value only in the context of provider payment models.

makers can introduce add-on payments for a group of providers to co-ordinate care pathways for chronically ill patients, or offer financial incentives to providers that meet certain quality and efficiency targets, such as regular check-ups of diabetes patients, improvements in clinical targets, lower mortality rates, or more efficient spending. Second, countries can opt for a more fundamental change and replace their existing payment system by alternative payments. For example, policy makers can pay a single provider or a group of providers for a bundle of services, which replaces all payments that would have been made to providers under the pre-existing payment scheme. In contrast to add-on payments, which are intended to counteract specific deficiencies of existing payment schemes, bundled payments could be designed to improve co-ordination between providers, enhance quality of care, increase provider accountability, and improve efficiency by also discouraging the use of low value care.

**Figure 1. Framework of payment system interventions to achieve value-based care**



Source: OECD 2016a.

This paper reviews how OECD countries employ providers' payment models to improve value in their health care systems, and investigates two main pricing components. First, it looks at base payments (bundled payments), which define the overall incentive structure of a health care system. Second, it explores ways to make payments conditional on quality of care by using add-on and incremental payments. Programmes that aim at controlling spending (e.g., budgeting instruments, such as price caps) or at providing financial incentives to shift care to less costly settings (e.g., Best Practice Tariffs for day care surgeries) are beyond the scope of this paper.

Following the COVID-19 pandemic, countries are revisiting their payment systems to assess whether they are still fit for purpose (Box 1). A systematic review of COVID-19 related changes in payment models to also make health systems more resilient to shocks is, however, beyond the scope of this report.



### Box 1. Providers' payment models and health systems resilience

The outbreak of the COVID-19 pandemic has demonstrated the vulnerability of health care systems to external shocks and underlined the need to revisit payment systems. The pandemic led to severe distortions in the delivery of care. Some providers recorded sudden drops of patient visits, e.g. for screening and prevention, and elective surgeries, whereas others faced surges in Intensive Care Units. This led to financial stress for providers, and put healthcare systems under pressure to reorganise the delivery of care, and to increase capacities, where needed. Countries have operated with an array of support mechanisms to respond to the health crisis, such as add-on payments, relief funds, and changes of the entire payment system (OECD, 2021; Waitzberg et al., 2021). England, for example, has suspended its traditional payment scheme, which pays hospitals for the activity they perform, and moved to block grants with a guaranteed minimum income to provide financial stability to providers (NHS England and Improvement, 2020). Other countries, such as Germany and the United States have introduced add-on payments to compensate providers for losses incurred (Waitzberg et al., 2021). It is unclear whether these financial support mechanisms are sufficient to absorb the shock of the COVID19 pandemic, and whether they sufficiently account for differences in the way providers were affected, with smaller, and rural providers being more vulnerable to financial shocks (Khullar, Bond and Schpero, 2020<sup>[1]</sup>); (Cutler, Nikpay and Huckman, 2020<sup>[2]</sup>).

Traditional payment systems offer only limited resilience. The impact of the pandemic on providers was particularly severe in countries that pay providers for the activity they perform, and where financial support mechanisms did not sufficiently alleviate the impact of the pandemic (Waitzberg et al., 2021). While activity-based payment systems might incentivise providers to quickly adapt new ways to delivery care, such as telemedicine, and to increase their activity after the pandemic to make up for losses (Waitzberg et al., 2021; Ringel, Predmore and Damberg, 2021), they might also lead to a preferential treatment of profitable patients over those in greater medical need. In addition to that, activity-based payment systems might offer providers less flexibility to adapt to shocks and to invest in better resilience than payment systems that are activity-independent (Ringel, Predmore and Damberg, 2021).

This paper is organised as follows. First, it presents payment models that bundle services for one episode of care during a period of time (episode-based bundled payments), or of a group of providers without time limit (population-based bundled payments), and reviews countries experiences. Second, it discusses ways to include quality of care by adjusting prices based on quality criteria, or by issuing separate bonuses and/or penalties. Third, based on country experiences reviewed in this paper, it identifies the key features of bundled payment models. In a fourth step, it reviews the results of bundled payments and programmes to improve value. This report concludes by formulating recommendations on how to design provider payment models to advance value-based care.

## Bundled payments

Bundled care refers to a model of care delivery that defines a package of care and services, generally for a particular condition, and generally pays for these services in a single payment, which may bundle multiple settings over time. Bundled payments include episode-based and population-based care and payment models.

Episode-based bundled payments<sup>2</sup> bundle the activities of different providers, such as a hospital and an outpatient physician, along one care pathway. Providers receive one comprehensive payment (joint price)

<sup>2</sup> In England, episode-based bundles refer to hospital care bundles as measured by Healthcare Resource Groups (HRGs).

per patient for the clinical care pathway. Population-based bundled payments cover the activities of a set of providers providing care for a given period. In a population-based model, a network of providers generally receives a joint payment per patient, which is enrolled in the population-based network, per month or per year.

Bundled payments financially link providers and make them accountable for providing care to one patient, or a set of patients. They foster cooperation and coordination and reduce unnecessary procedures, such as double consultations (Jacobs et al. 2015). Furthermore, bundled payments can reduce unnecessary variation by streamlining care pathways. Finally, bundled care and payment models fix the price for a given set of services, reducing the transaction costs to the payer for monitoring, co-ordinating and paying for what would otherwise be an array of individual services.

### ***Episode-based bundled payments: an overview***

Episode-based bundled payments combine diagnostic and treatment services that are related to one clinical pathway irrespective of the sector in which they are provided. For example, an episode-based bundled payment could combine diagnostics prior to a surgery, the surgery itself, and post-surgical treatments after hospital discharge. Countries have introduced episode-based bundled payments for a variety of conditions (Table 1), such as chronic conditions (e.g., the Netherlands and the United States), or surgical interventions (e.g., France, Norway and the United States). In episode-based bundled payments for surgeries, a provider, or a group of providers receive a joint price per patient treated. In bundled payments for chronic conditions, providers receive a budget, which covers all condition-related services within a given period of time, such as one year.

Episode-based bundled payments range from 30 days (e.g., the United States) to one year (e.g., Norway). Countries differ on whether they use one joint price per medical pathway, or more. For example, Norway offers two different bundled payments for hip replacements depending on co-morbidities (with or without complex co-morbidities). In France, four different tariffs for hip replacements based on hospital ownership (public hospitals formerly under global budget scheme versus private hospitals formerly paid on a fee-for-service basis) and estimated patient pathway have been set. Countries also adjust prices to reflect differences in costs not directly captured by the payment model. France adjusts tariffs based on 9 to 12 different criteria, such as age, co-morbidities, socio-economic characteristics and convalescent care after surgery.

**Table 1. Overview of episode-based bundled payments for providers in selected OECD countries**

Country	France	The Netherlands	Norway	United Kingdom	United States	United States	United States
Name	Episode de soins	Ketenzorg	Tjenesteforløpsgruppe	Maternity pathway Bundled Payments	Oncology Care Model	Bundled Payment for Care Improvement (BPCI)	BPCI Advanced
Region	Nationwide	Nationwide	Nationwide	England	National	National	National
Period	Since 2018	Since 2009	Since 2020	Since 2013	Since 2016	2018-23	2018-23
Dominant sector	Inpatient	Outpatient (GPs)	Inpatient	Inpatient and midwifery	Outpatient	Inpatient	Inpatient
Participation	Voluntary	Voluntary	Mandatory	Voluntary*	Voluntary	Voluntary	Voluntary
Conditions	3: Hip, knee replacement, colon cancer	3: Diabetes Type 2, COPD/Asthma Vascular Risk Management	6 conditions	1 Condition	1 (Various types of cancer)	Model 2-4: 48 Conditions	34 Conditions
Timeframe	45 days pre – to 90/180 days post surgery	1 year	1 month to 1 year	From first antenatal appointment to up to 8 weeks after birth	Six months	Depends	30/60/90 days post surgery
Payment scheme	Joint tariff	Global budget	Joint tariff	Joint tariff	Monthly payment	Depends	Joint tariff
Payment intervals	Per case, prospective*	Quarterly, prospective	Per case, retrospective	Per case, prospective	Per month, retrospective	Per case, depends	Per case, retrospective
Prices	4 defined base prices, risk-adjustment	Freely negotiated prices	Different prices for medical complexity	3 prices for antenatal, birth, postnatal care, Supplementary payment for specific conditions	Defined prices, risk adjustment	Defined prices, risk adjustment	Defined prices, risk adjustment

Note: \*Currently retrospective. Prospective in its final phase, \*Mandatory until 2019/20.

Source: France: (Ministère des affaires sociales et de la santé and Assurance Maladie 2019c, 2019a, 2019b); The Netherlands: (Struijs et al. 2012; Bakker et al. 2012; Nederlandse Zorgautoriteit 2020, 2021); Norway: (Helsedirektoratet 2019; Mjåset et al. 2020; Osnes-Ringen und Hanssen 2019); United States: (Centers for Medicare & Medicaid Services 2021b).

### **Episode-based bundled payment: country case studies**

The United States Medicare health insurance programme currently runs the Bundled Payments for Care Improvement Advanced (BPCI Advanced) model<sup>3</sup>. Providers receive a single retrospective bundled payment for 32 clinical episodes (29 inpatient and three outpatient clinical episodes), which begins at inpatient stay or outpatient procedure for 90 days starting on the day of discharge or the completion of the outpatient procedure. Payment is tied to performance on quality measures, and payments based on target

<sup>3</sup> In the US, bundled payments models have been also used for commercially insured populations (see for example Whaley et al. 2021) and for Medicaid beneficiaries (Medicaid and CHIP Payment and Access Commission 2021).

prices are provided in advance. Retrospective reconciliation is done with actual Medicare FFS expenditures for a clinical episode, which results in a positive or a negative balance based on the target price and adjusted for quality. Positive balances are returned to the participating facilities, and negative balances must be repaid.

This programme builds upon experiences of a set of pilot projects developed by the Centers for Medicare and Medicaid (CMS) Innovation Center. The CMS Innovation Center experimented with four broader bundled episode payment models, the voluntary bundled payments for care improvement (BPCI) models, from 2013 to 2016/8 (Table 2).

**Table 2. Key elements of episode-based bundled payment programmes in the United States**

	Bundled payment for care improvement (BPCI)				Oncology Care Model	Comprehensive Care for Joint Replacement	BPCI Advanced
	Model 1	Model 2	Model 3	Model 4			
Period	2013-2016	2013 - 2018	2013 – 2018	2013 – 2018	2016 - 2021	2018 - 2023	2018 - 2023
Bundling	Acute care hospital stay only	Acute & post-acute care 30/60/90 days	Post-acute care only 30/60/90 days	Inpatient stay plus 30-day readmission	Inpatient stay plus 30/60/90 days	Monthly service payment	Inpatient stay plus 90 days
Timing	Retrospective	Retrospective	Retrospective	Prospective	Prospective	Retrospective	Retrospective
Payment conciliation	No	Yes	Yes	Yes	Yes	Yes	Yes
Quality	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Centers for Medicare and Medicaid Services (<https://innovation.cms.gov/innovation-models/>).

The four models of the BPCI programme differ in the number of conditions, the degree of bundling and the calculation of prices, with Model 1 being closest to the status quo, and Model 4 representing the most comprehensive change to how services are normally paid for. In Model 1, providers are paid on a fee-for-service basis. Bundled payments combine physician costs and treatment costs, which are normally billed separately, to one joint price. Bundled payments only cover all services provided over the course of the acute care hospital stay. In Model 2 and 4, providers could choose from a set of 48 conditions. All models use different lengths of bundles. Model 1 uses the shortest duration and defines all activities that are part of one acute care hospital stay, as one bundle. Model 2 to 4 range beyond that, with a bundled payment ranging from the inpatient stay (starting with the patient's hospital admission) to 30-90 days after patient discharge.

Models also differ in the way prices are set. Model 1-3 paid providers retrospectively, whereas Model 4 paid them prospectively. Model 2 and 3 used "reconciliation payments". In both models, providers were paid on a fee-for-service basis. CMS used a target price and compared the total provider costs for the respective episodes of care against this target price. Providers whose costs were higher than the target price, had to make repayments to CMS. In Model 4, CMS made a single, prospectively determined bundled payment to the hospital that encompassed all services furnished by the hospital, physicians and other practitioners during the episode of care, which lasted the entire inpatient stay. Physicians and other practitioners were paid by the hospital out of the bundled payment.

Besides these four models, the CMS Innovation Center has introduced two specific models for specific conditions, the CMS mandatory Comprehensive Care for Joint Replacement (CJR) model and the Oncology Care Model (OCM). In contrast to all other bundled payment programmes, the CJR model is mandatory and covers two types of joint replacement – hip and knee. Episodes cover the inpatient stay (beginning with the admission) to up to 90 days post-discharge. The payment system is similar to Model 2 and 3 of the BPCI programme. All providers and suppliers are paid under the usual payment system rules and procedures of the Medicare programme. At the end of a performance year, total actual spending for the episode is compared to the Medicare target episode price (see Annex A) for the responsible hospital. Depending on the participant hospital's quality and expenditures, the hospital may receive an additional payment from Medicare or be required to repay Medicare for a portion of the episode spending. The OCM differs from other bundled payment programmes by paying a monthly rate of USD 160 per beneficiary participating in the programme to providers. In exchange, providers have to maintain defined structures and perform certain services, such as 24/7 patient access to an appropriate clinician who has real-time access to the patient's medical records, core functions of patient navigation, and a documented Care Plan for every patient based on recommendations of the Institute of Medicine. Episodes are limited to a duration of up to six months. Providers can qualify for additional, pay-for-performance-related payments (Centers for Medicare & Medicaid Services 2021e).

Prior to the BPCI Models, the United States had tested bundled payments in its Medicare Acute Care Episode (ACE) demonstration from 2009 to 2012. The ACE was an early, small scale, voluntary episode based payment programme for participants (Value-Based Care Centers) in Texas, Oklahoma, New Mexico, and Colorado. It covered 28 cardiac and 9 orthopaedic inpatient surgical services and procedures. These elective procedures were selected because volume has historically been high, there was sufficient marketplace competition to ensure interested demonstration applicants, the services were easy to specify and quality metrics were available for them. Bundled payments covered all services, including physician services, pertaining to the inpatient stay for Medicare fee-for-service beneficiaries. The sites had to meet procedure volume thresholds and have established quality improvement mechanisms (Centers for Medicare & Medicaid Services 2021d).

The Maternity Pathway Payment System by the English National Health Service (NHS) replaced FFS arrangements for birth and block grants for community midwifery services, and was first introduced in 2013. The scheme involves a single prospective national price provided to a NHS commissioner, which pays providers for an integrated package of care offered to all pregnant women and their newborns. The pathway consists of three integrated packages of care covering the antenatal, birth, and postnatal phases (Department of Health, 2016). The price is based on the mean cost of care and allows for different levels of payment depending on the risk and complexity profile of the woman. Her risk and complexity profile is determined prospectively within the first few booking appointments. The price for the antenatal and postnatal phase is split into standard, intermediate, and intensive pathways, while the price for the birth episode has seven payment levels: six related to clinical complexity, and one specifically for home births (NHS England and NHS Improvement 2021). A new patient level activity dataset for maternity care was also introduced.

Following the United States experience, Norway has introduced bundled payments (*tjenesteforløp*) for six conditions in 2019: hip replacement, knee replacement, skin conditions, dialysis, rheumatologic conditions, gastrointestinal disorders and neurological conditions (Helsedirektoratet 2019; Helse- og omsorgsdepartementet 2019). Episode-based bundled payments span one month or one year and cover all costs including inpatient, outpatient costs and home treatments (Mjåset et al. 2020; Helsedirektoratet 2019). Prices are set by the Norwegian Directorate of Health based on DRGs and outpatient tariffs data gathered from providers (Helsedirektoratet 2021).

France piloted bundled payments (*épisodes de soins*) for hip replacement, knee replacements and colon cancer in 2018 as part of a larger effort to develop and test new ways of paying providers (Ministère des solidarités et de la santé 2018). Payments cover disease-related services from 45 prior to the intervention

to 90 or 180 days after the intervention depending on the condition (Ministère des affaires sociales et de la santé and Assurance Maladie 2019a, 2019b, 2019c). Payments consist of one of four base tariffs, depending on where the surgery takes place, and 9-12 adjustment parameters, including age, comorbidities, and socio-economic status among others. Payments are issued to care groups consisting of in- and outpatient providers. The real costs of care groups are benchmarked against expected costs. Provider groups whose costs range above the expected costs incur losses, while provider groups whose costs range below make profits. Profits have to be shared among providers, with minimum shares being defined. Losses are borne entirely by the leading provider, generally a hospital. Quality of care is assessed using a points-based score of up to 100 points for process and outcome measures, such as type of discharge, complication rates, and patient-reported experiences. The project is rolled out in three phases. In its final phase, providers can receive a penalty of up to 3%, and a bonus of up to 10% of total payment (Ministère des Solidarités et la Santé, 2019a, 2019b, 2019c).

In 2010, the Netherlands introduced bundled payments (Ketenzorg) for three chronic conditions to improve the integration of care and reduce health care expenditure following three years of experimentation (Struijs et al. 2012) (Karimi et al. 2021). The programme covers Diabetes Mellitus Type 2, COPD/Asthma, and Vascular Risk Management. Health insurance funds pay a joint price for a bundle of care in annual intervals to a group of providers (Zorggroep, “care group”), which consist predominantly of GPs (Struijs et al. 2011, Karimi et al. 2021). Care groups and insurance funds negotiate the content and reimbursement of bundled payments (Segment 2A) (Nederlandse Zorgautoriteit 2020), and can negotiate additional payments for the organisation and infrastructure. Prices are calculated annually, and care groups are paid a fixed price of up to EUR 27 (Vascular Risk Management), EUR 51 (COPD/Asthma) and EUR 65 (Diabetes Mellitus Type 2) per patient and quarter to cover costs associated mainly with care organisation and management, information technology and general practitioner care (Nederlandse Zorgautoriteit 2021). In addition to Diabetes Mellitus Type 2, CPD/Asthma and Vascular Risk Management, providers and insurance funds can experiment with bundled payments for additional conditions, such as depression, elderly care, and pharmaceuticals. Insurance funds and providers can negotiate on financial incentives for meeting predefined outcome indicators (Segment 3). However, insurance funds and providers make limited use of this opportunity (Struijs et al. 2012). In 2019, total expenditures for bundled care programmes amounted to EUR 496 million. Expenditures for DMP2, Vascular Risk Management and COPD/Asthma represented 73 % (EUR 360 million). Pay-for-performance elements amounted to only EUR 0.9 million, representing a sharp drop from EUR 9 million in 2015 (Zorginstituut Nederland 2021).

The Australian Health Care Home (HCH) trial aimed at providing co-ordinated care, management and support for people with chronic and complex health conditions. A HCH is a general practice that co-ordinates a person’s care, with support from other workers within and outside the practice, such as nurses and specialists. The trial began on 1 October 2017 and ended on 30 June 2021. It had several innovative features:

- Based on practices’ electronic records, participants are selected as individuals having at least one chronic condition and being at high risk of hospitalisation in the next 12 months. Then they are assigned to one of three complexity tiers.
- HCH receive monthly bundled payments for providing care to participants. Payments related to patients’ chronic conditions are based on participant’s tier and vary between AUD 609 (the lowest level of patient complexity) and AUD 1851 (the highest level of patient complexity) per annum. □ All participants must have a shared care plan.

Bundled services include shared care plan development, regular reviews, comprehensive health assessment, making referral to allied health providers or specialists, tele-health services and monitoring, standard consultations related to an enrolled patient’s chronic and complex conditions and after-hours advice and care. Services provided by allied health, specialists, pathology and radiology providers are not included in the bundle and are funded through FFS (Australian Government Department of Health, 2020).

As of 30 June 2020, about 9000 people and 120 practices were participating in the trial. Practices received a one-off grant of 11 000 AUS \$ to implement HCH.

In early 2015, the Ministry of Health and Long-Term Care (MOHLTC) of the Canadian province of Ontario launched an Integrated Funding Model (IFM) initiative (Embuldeniya et al. 2021). The goal of the IFM initiative was to test innovative approaches to integrate care and funding over a patient's episode of care beginning in acute care and including home/community care post-discharge. Six pilot projects were selected by the MOHLTC. Three projects covered a 60 days bundle of care for chronic obstructive pulmonary disease and congestive heart failure, one project targeted 60 days bundled care for urinary tract infection and cellulitis, one project stroke (104 days bundle) and one project cardiac surgery (30 days bundle). All projects identified an inpatient hospitalization as the index event (the urinary tract infection and cellulitis project also allowed the index event to be an emergency department visit) (Walker et al. 2019a). Around 7000 patients were enrolled between October 2015 and March 2018. Programs were given a single pre-specified payment set as the provincial average acute and post-acute cost for each specified condition in the year prior to implementation. All acute inpatient care and post-acute nursing, rehabilitation and personal support care services were included, whereas physician payments and medications were not included as financed through separate MOHLTC programmes.

### Population-based payments: bundling across providers and over time

Population-based bundled payment models make a network of providers accountable for providing care to a larger population group. This represents a larger degree of integration than episode-based payments, which bundle care along the clinical pathway of one patient. Population-based bundled payments set incentives to increase efficiency and cost control while promoting integrated care and co-ordination among providers.

In population-based bundled payments, a network of providers generally receives a fixed payment per beneficiary. Payments are typically adjusted for age, sex, and health status to account for differences in costs, and can include quality-related adjustments to set additional incentives for enhancing quality of care. Depending on the programme, population-based programmes offer providers flexibility on how and where to spend its financial resources. Population-based programmes often come with a set of target indicators to incentivise providers to offer timely, sustainable and high-quality care.

### ***Population-based payments: country case studies***

The United States have introduced several population-based programmes, with Accountable Care Organizations (ACO) ranking among the most prominent examples. ACO are part of the Medicare Shared Savings Program (MSSP), which was established by the Patient Protection and Affordable Care Act of 2010, and is a permanent part of the Medicare programme. By 2020, the United States had 517 ACOs with 11.2 million assigned beneficiaries.

The MSSP offers providers and suppliers (e.g. physicians, hospitals and others involved in patient care) an opportunity to create an ACO<sup>4</sup>. The ACO model is designed to reward providers financially for working together, sharing information and co-ordinating care, especially for high-risk and high-cost chronically-ill patients. ACOs agree to be held accountable for the quality, cost and experience with care of an assigned

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<sup>4</sup> ACOs are groups of providers such as physicians and hospitals. The group must include primary care providers because beneficiaries are assigned to ACOs based on their use of primary care services. Other providers such as specialists and hospitals can be included but are not required. Unlike MA plans, ACOs do not need to have a network that provides all Medicare services. This is because Medicare beneficiaries who are assigned to ACOs can, like any other fee-for-service (FFS) beneficiary, go to any provider who accepts Medicare.

Medicare FFS beneficiary population,<sup>5</sup> and have to provide care to at least 5 000 beneficiaries. Providers in ACOs generally continue to be paid their normal FFS rates by Medicare. In addition to these payments, ACO providers have the opportunity to earn bonus payments if, at the end of the year, actual total spending for the ACO's assigned beneficiaries is lower than the set target spending. An ACO that has chosen to enter a two-sided risk arrangement is also at risk of losses if actual total spending for its assigned beneficiaries is greater than the spending target. The MSSP offers different participation options (tracks) that allow ACOs to assume various levels of risk. Since July 2019, the MSSP offers two tracks, the basic and enhanced track. Within the basic track there are 5 levels (A through E) with increasing risk levels. Generally, ACOs in the basic track must move up one level each year until they reach the highest level of risk (Level E). The highest level of risk reward is the enhanced track, in which ACOs are only eligible to share up to 75 percent of savings; losses are shared at a rate of one minus the final sharing rate between 40 percent and 75 percent.

All models in both the basic and enhanced tracks allow ACOs to choose between prospective and retrospective assignment each year. An ACO's choice between prospective and retrospective assignment is a choice of the time period used to assign beneficiaries to the ACO. If an ACO selects prospective assignment, then services performed during the 12-month period ending September 30 prior to the performance year are used for assignment. If an ACO selects retrospective assignment, then services performed during the performance year are used for assignment<sup>6</sup>. To determine the target spending for an ACO's assigned beneficiaries during the performance year (the "benchmark"), CMS computes the total spending for beneficiaries who would have been assigned to the ACO during a baseline period (Medicare Payment Advisory Commission 2020). In the MSSP programme, the baseline period covers the three years prior to the start of an ACO's contract. Spending is averaged over the three-year baseline period, with more recent expenditures receiving more weight. That historical spending for the ACO's beneficiaries is then blended with the average regional spending for FFS beneficiaries in the ACO's market who would have been eligible for assignment to an ACO. Spending is inflation-adjusted based on trends in FFS spending. At the end of the year, actual expenditures for the ACO's assigned beneficiaries are compared with the spending benchmark, and savings or losses are computed. If there are savings (that is, actual expenditures are less than the benchmark), those savings are shared between the Medicare programme and the ACO at a defined shared savings rate. For example, in the MSSP, ACOs can receive bonus payments of up to 75 percent of savings. For ACOs with a two-sided risk arrangement, additional expenditures are shared between the programme and the ACO if they are greater than the benchmark. Gains and losses are quality-adjusted. Higher quality translates into greater shares of savings, or smaller share of additional costs for ACOs in a two-sided risk arrangement. As of January 2020, 325 MSSP ACOs had opted for a one-sided risk arrangement compared to 192 in a two-sided risk arrangement.

The Next Generation ACO Model goes beyond that and uses stronger incentives than the Shared Savings programme. It started in 2016 and counted 41 ACOs in 2020. This model allows these provider groups to assume higher levels of financial risk and reward than are available under the Shared Savings Program. The goal of the model is to test whether strong financial incentives for ACOs, coupled with tools to support

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<sup>5</sup> CMS attributes beneficiaries to ACOs based on fairly complex claims analyses, which vary based on the type of ACO, but generally reflect beneficiaries' link to a primary care practice affiliated with an ACO. By and large, beneficiaries do not actively select (or enrol in) an ACO; rather, they are informed of their attribution by their provider and can opt-out if they do not wish their data to be shared with other providers. Beneficiaries are free to seek services from any provider who will see them, so there is no "lock-in" from the beneficiary's standpoint and they have no obligation or financial incentive to stay within the ACO and its network of providers.

<sup>6</sup> Beneficiaries have the opportunity to designate a primary care provider as responsible for co-ordinating their overall care. This voluntary assignment occurs prospectively, and takes precedence over both prospective and retrospective assignments.



better patient engagement and care management, can improve health outcomes and lower expenditures for Original Medicare FFS beneficiaries.

Building on lessons learned from initiatives involving Medicare ACOs, such as the Medicare Shared Savings Program and the Next Generation ACO Model, the Global and Professional Direct Contracting (GPDC) Model creates opportunities for a broad range of organizations to participate with CMS in testing the next evolution of risk-sharing arrangements to produce value and high quality health care. Under GPDC, there are three types of Direct Contracting Entities (DCEs) with different characteristics and operational parameters: standard DCEs, that is DCEs composed of organizations that generally have experience serving Medicare FFS beneficiaries; new entrant DCEs, that is DCEs composed of organizations that have not traditionally provided services to a Medicare FFS population; high needs population DCEs, which are DCEs that serve Medicare FFS beneficiaries with complex needs, including dually (Medicaid and Medicare) eligible beneficiaries (Centers for Medicare & Medicaid Services, 2021f).

DCEs will receive a capitated payment that depends on the risk arrangement option and capitation payment mechanism selected by the DCE. The two risk arrangement options that a DCE may choose from are the Global Option and the Professional Option. The former is a full risk option with 100 percent Shared Savings/Shared Losses, whereas the latter is a lower-risk option with 50 percent Shared Savings/Shared Losses. All DCEs must also have a Capitation Payment Mechanism. Under Total Care Capitation, the capitated payment to the DCE applies to all Medicare Part A & B services to beneficiaries. Under Primary Care Capitation (PCC), the capitated payment to the DCE applies to primary care Part A & B services to beneficiaries. Under the Advanced Payment Option (available only to DCEs that select the PCC payment), the supplemental payment to the DCE applies to the subset of services to beneficiaries not covered by PCC (RTI International 2021a).

Besides ACOs, the United States also offers population-based bundled payment programmes with an explicit focus on the elderly. The Program of All-Inclusive Care for the Elderly (PACE) attempts to help nursing home eligible seniors avoid institutional care by providing them with a mix of co-ordinated acute and long-term care services in the community. It was established as a permanent Medicare and Medicaid benefit by the Balanced Budget Act of 1997. Enrolment in PACE is voluntary and PACE is optional for states. Individuals, who are 55 or older, certified by their state of residence as being eligible for nursing homes, and live in the service area of a PACE programme, are eligible to enrol in PACE. PACE programmes are centred around the adult day health centre, where participants receive medical and social services and an interdisciplinary team comprising physicians, nurse practitioners, social workers, nutritionists, therapists, personal care attendant, and drivers. In November 2021, 30 states had PACE programmes with close to 52 500 individuals participating (Integrated Care and Resource Center 2021).

PACE organizations receive two capitation payments per month for their dually eligible enrollees and assume full financial risk for all the health care services that beneficiaries use. The Medicare portion of the capitated payment is derived from a formula that reflects the high frailty level of PACE beneficiaries. The Medicaid payment is negotiated between the PACE provider and the state's Medicaid agency. CMS does not directly account for the functional status in the risk adjustment model used to set payment rates to Medicare Advantage plans. However, it does make an additional payment adjustment, known as the "frailty adjustment", for plans that disproportionately enrol beneficiaries with functional limitations— including the PACE organizations. To implement this adjustment, CMS adds a fixed amount to the risk score of each community-residing beneficiary in a given plan to reflect the higher average costs of caring for beneficiaries with functional limitations. Adjustments are calculated in two steps. CMS first estimates frailty adjustment factors based on functional status information for Medicare FFS beneficiaries based on a survey. Second, it applies these factors to a given plan based on functional status information from the Health Outcome Survey (United States Government Accountability Office, 2018b).

France has introduced the *Expérimentation d'une incitation à une prise en charge partagée (IPEP)* and the *Expérimentation d'un paiement en équipe de professionnels de santé en ville (PEPS)* in 2018, which are based on the United States ACOs model. The IPEP refers to additional payments to standard delivery

of care. A group of providers, which has to serve at least 5 000 inhabitants, receive additional, quality adjusted payments (Ministère des solidarités et de la santé and Assurance Maladie 2019). Payments are adjusted based on patient characteristics, such as age, gender, socio-economic status, and geographic characteristics, such as access to health providers and the deprivation of a given region. Gains are assessed by comparing the national average expenditures and the actual expenditures of the provider group. The provider group receives 50 % of these gains (if any). The IPEP piloted in 2019 with 18 groups and is voluntary. They received additional support of EUR 10 000 to EUR 30 000 to set up the project.

The PEPS replaces the traditional reimbursement by an annual budget for a group of providers (Ministère des solidarités et de la santé 2021). A group has to consist of at least three General Practitioners and one nurse, who treat at least 250 patients. The global budget is adjusted based on three parameters. First, it is risk-adjusted based on patient characteristics, such as age, gender and chronic diseases. Second, it is activity-adjusted and reduced if activities fall below 85 % of the national median and augmented if it exceeds 115 % of the national median. Third, it is adjusted based on the economic level of a given region. If the degree of deprivation exceeds 25 %, the budget is augmented by up to 20 %. To date, the programme has been developed for three patient populations: patients with Diabetes Mellitus Type 1 and 2, patients aged 50 to 64 who have been diagnosed with a neurodegenerative disease, and patients irrespective of specific conditions. The PEPS started 2019 with 21 participating groups. They received support of EUR 12 000 to set up the programme.

## Integrating quality of care in payment models

Traditional payment models do not link directly payments to quality of care. Several countries have introduced means to integrate quality of care into their payment systems, and follow two different strategies to do so. First, countries adjust the base rate, for example by paying a higher rate for achieving pre-defined quality targets (e.g., Best Practice Tariffs in England), or by suspending payments for adverse events (e.g., sentinel events in Australia). This rewards providers on a per-patient basis. Second, countries assess the overall quality based on a joint score and award a bonus or penalty for the provider's overall performance at the end of a given period (e.g., Hospital-Value Based Purchasing in the United States).

Payment models differ in the design of financial incentives to improve quality. They use bonus payments, penalties, or a combination of both. Incentives are awarded based on the assessment at a given point in time (top-performer), or improvements over time, either compared to the provider's own performance, or other providers' performance over a previous period of time. Any of the payment methods can be combined with specific performance-based rewards or penalties to promote quality.

### ***Payments per patient/case***

England adjusts service prices to encourage health care providers to comply with best practices by offering higher payments per patients which were treated in accordance with pre-defined indicators (Best Practice Tariffs, BPTs) (NHS England and Improvement 2021). BPT focus on 50 procedures with the greatest potential impact (i.e., high volume care, significant unexplained variation in practice, or significant clinical impact of best practice on outcomes), strong evidence base for best practice, and clinical consensus of best practice. Regulated prices are adjusted upwards or downwards based on national average costs. The price differential between best practice and standard care should ensure that the anticipated costs of undertaking best practice are reimbursed, while creating an incentive for providers to shift from usual care to best practice. BPTs apply to all providers of NHS-funded care for hospital admissions related to 21 conditions.

Australia has introduced three programmes to penalize providers for adverse events. In 2017, Australia introduced zero tariffs for sentinel events. Providers do not receive any reimbursement for the patient, who has been subjected to a sentinel event. In 2021, the list comprised 10 different avoidable events (see

Annex E), which result in serious harm or death of the patient. In the following year, it added deductions for hospital-acquired conditions. Hospitals receive a lower price for episodes of acute care, where a hospital-acquired condition occurs (Independent Hospital Pricing Authority 2021a). Prices are risk-adjusted to account for a more frequent occurrence of hospital-acquired conditions among patients with more complicated conditions. In 2021, the list comprised 16 hospital-acquired conditions (see Annex E), such as pressure injury, venous thromboembolism, and cardiac complications (Australian Commission on Safety and Quality in Healthcare 2018; Independent Hospital Pricing Authority 2021a). Third, in 2021, Australia introduced a price deduction on avoidable hospital admission, which occurs within 2 to 90 days after discharge depending on the cause of readmission. The costs of the readmission are deducted from the payment for the reimbursement of the main hospital stay. Prices are risk-adjusted, meaning that hospitals receive a smaller deduction for readmissions of patients, who have a high risk for readmission than for patients with a smaller risk (Independent Hospital Pricing Authority 2021b).

In the United States, all states have non-payment policies for health care-acquired conditions such as retaining a foreign object surgery, stage III and IV pressure ulcers, and surgical or other invasive procedures performed on the wrong body part .

### ***Payments per provider/organisation***

In the United States, Medicare operates with several ways to integrate quality of care in their payment systems. Programmes are either an integral part of a bundled payment programme, or issued separately. In both cases, Medicare adjusts total payments based on quality of care score.

In episode-based and population-based bundled payment systems, Medicare adjusts total payments to providers based on quality of care parameters. All programmes follow a roughly similar structure. In the CJR model, the United States awards smaller discounts for hospitals with better quality outcomes. Quality of care is assessed based on indicators: two quality measures – the total hip arthroplasty and/or total knee arthroplasty complications measure and the Hospital Consumer Assessment of Healthcare Providers and Systems survey measure - as well as successful submission of patient reported outcome data. Depending on whether a hospital is eligible for a reconciliation amount or responsible for a repayment to Medicare, the effective discount varies by the performance year and the participant hospital's quality category. Participant hospitals with composite quality scores that place them in the "Good" or "Excellent" quality categories will either receive a higher reconciliation payment or have less repayment responsibility at reconciliation due to their quality performance. In other words, the change in effective (or applicable) discount percentage experienced at reconciliation will provide a potential benefit to hospitals (Centers for Medicare and Medicaid Services, 2021g).

OCM adjusts performance-based payments for each performance period based on a range of quality measures (see Annex B). Participant performance across those quality measures is measured by achievements relative to benchmarks.

Awards to population-based bundled payments are designed in a similar way. ACOs must report quality data to CMS after the close of every performance year to be eligible to share in any earned shared savings and to avoid sharing losses at the maximum level. CMS measures every ACO's quality performance using standard methods. Quality measures span four domains: patient/caregiver experience, care coordination/patient safety, preventive health, and at-risk populations. Twenty-three measures are used for performance year 2020-21, of which seven are used only for pay-for-reporting (see Annex C). The total number of points earned in a domain is divided by the maximum possible number of points, generating a domain score. Each domain score is weighted at 25 percent of the total quality score. The total quality score is multiplied by the shared savings rate to find the final shared savings rate. That rate is used to determine the amount of shared savings the ACO receives, if any. In two-sided risk models, the final shared loss rate is one minus the final shared savings rate (with some limits), which means the higher the quality score, the lower the shared loss rate. Quality benchmarks are computed using Medicare claims

data, data from the Physician Quality Reporting System, quality data reported by ACOs and data on quality of care collected from the larger Medicare FFS population. ACOs can score additional points for significant quality improvement (in contrast to attaining specified levels of performance), up to four points in each domain. However, the total points earned cannot exceed the maximum number of points possible in the domain.

The Medicare GPDC Model includes the assessment of quality performance during each performance year (PY) using the following five quality measures (PY 2022) (RTI International 2021b):

- Risk-Standardized All-Condition Readmission, which measures how many hospital stays result in a readmission within 30 days after patient discharge;
- All-Cause Unplanned Admissions for Patients with Multiple Chronic Conditions, which measures unplanned hospital admissions among Medicare FFS beneficiaries 65 years of age and older with multiple chronic conditions;
- Days at Home for Patients with Complex, Chronic Conditions, which measures the number of days that adults with complex, chronic disease spend at home or in community settings and out of acute and post-acute care settings (this measure applies only to High Needs Population DCEs);
- Timely Follow-Up After Acute Exacerbations of Chronic Conditions, which is defined as the percentage of acute events related to one of six chronic conditions - hypertension, asthma, heart failure, coronary artery disease, chronic obstructive pulmonary disease, and diabetes - where follow-up care was received within the time frame recommended by clinical practice guidelines in a nonemergency outpatient setting (this measure applies to standard and new entrant DCEs only);
- Consumer Assessment of Healthcare Providers and Systems.

In each performance year, 5% of a DCE's financial benchmark (the Quality Withhold) will be held "at risk" and can be earned back, in part or full, subject to the DCE's performance on these five quality measures.

France adjusts episode-based payments to providers based on quality-related indicators. Providers can receive up to 100 points (Ministère des affaires sociales et de la santé and Assurance Maladie 2019b, 2019c, 2019a). Structure, process and outcome indicators, such as data submission, infection rates 3 months after surgery and patient-reported experience and outcome measures (PREMS/PROMS), are used to assess performance. Points are weighted based on a top-performer score and the provider group's improvement compared to the previous year. The programme withholds 2% of the projected expenditures, and redistributes them among all providers based on their quality score.

France uses a similar mechanism for the IPEP and PEPS. Providers participating in the IPEP receive a score of up to 100 points based on their performance in ten pre-defined indicators, and up to three indicators which they can choose on their own. Providers participating in PEPS are assessed based on seven indicators and an additional four indicators if providers treat diabetes patients. Indicators capture medical prescriptions, continuity of care, and patient outcomes, such as the number of patients receiving polymedication and the rate of potentially avoidable hospitalisations. In addition, in both programmes providers can gain up to 20 points based on PREMS/PROMS data. The indicators are weighted based on performance compared to pre-defined thresholds at the time of the assessment, and improvement over time.

Besides quality-based adjustments that are an integral part of an episode-based or population-based bundled payments system, countries have introduced three separate programmes that use pay for performance to reward the overall performance of hospitals. In the United States, the Hospital Value-Based Purchasing (HVBP) combines a withhold payment with bonus payments to penalise poor-performing hospitals and reward high-performing ones. The Hospital Readmission Reduction Program (HRRP) penalises hospitals with significantly high readmission rates for selected conditions. The Hospital-Acquired Conditions Program (HACP) penalises hospitals for adverse in-hospital events. All three programmes were introduced as part of the Affordable Care Act.

Under the HVBP programme, hospitals receive an annual score based on their performance in four domains ((1) safety, (2) clinical care, (3) efficiency and cost reduction, and (4) patient and caregiver-centred experience). Hospitals are assessed based their performance compared to their own performance at a previous period (improvement), and their performance compared to the scores of other hospitals (achievement). CMS uses the higher of the two scores to determine financial awards. The HRRP penalizes hospitals for significantly high 30-day readmission rates for six conditions: heart attack, heart failure, pneumonia, COPD, hip replacement, knee replacement and coronary bypass surgery. Hospitals with high readmission rates receive a reduction on their total Medicare reimbursement of up to 3 %. The HACP operates similar to the HRRP. Hospitals receive a penalty for significantly higher rates of hospital-acquired conditions, such as surgical site infections, hip fractures resulting from falls, or pressure sores. Performance is assessed using a composite score based on six measures of patient safety and health care-acquired infections. Patient safety is measured by the Agency for Healthcare Research and Quality Patient Safety Indicators<sup>7</sup>, and hospital-acquired conditions are measured by the Centers for Disease Control and Prevention measures of central line-associated bloodstream infections, catheter-associated urinary tract infections, surgical site infections, methicillin-resistant staphylococcus aureus and clostridium difficile. Hospitals with in the bottom quartile receive a payment reduction of 1 % on their Medicare reimbursement (around USD 350 million annually).

Besides these three programmes on inpatient safety, the United States Medicare health insurance programme has also introduced pay-for-performance measures for long-term care providers, such as the End-Stage Renal Disease Quality Initiative Program (ESRD QIP), the Skilled Nursing Facility Value-Based Program (SNF VBP) and the Home Health Value-Based Program (HHVBP). These programmes either use penalties alone, or a combination of penalties and rewards.

The ESRD QIP links a portion of payment directly to facilities' performance on quality of care measures. The ESRD QIP reduces payments to renal dialysis facilities that do not meet or exceed certain performance standards on applicable measures. The maximum payment reduction CMS can apply to any facility is 2 %. This reduction applies to all payments for services performed by the facility receiving the reduction during the applicable payment year. The ESRD QIP scores facilities on their performance according to the measures established for the relevant payment year (see Annex D). For clinical measures, CMS applies two scoring methods: achievement (comparing facility performance to a set of values derived from all facilities nationally) and improvement (comparing facility performance to the facility's individual performance during the prior year). For reporting measures, CMS assigns points based on whether a facility provided the required data. Similarly, the SNF VBP Program awards skilled nursing facilities (SNFs) with incentive payments based on the quality of care they provide to Medicare beneficiaries, as measured by performance on a measure of hospital readmissions. CMS withholds 2% of SNFs' Medicare fee-for-service (FFS) Part A payments to fund the programme. CMS redistributes 60% of the withhold to SNFs as incentive payments.

The HHVBP Model was introduced in January 2016 to test whether providing payment incentives for better quality care with greater efficiency would improve the quality and delivery of home health care services to Medicare beneficiaries. The HHVBP Model adjusts payments to Medicare-certified home health agencies (HHAs) on the basis of the quality of care provided, rather than the volume of services rendered. Payments are adjusted upwards or downward by up to 8% in 2022. Adjustments are determined based on a home

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<sup>7</sup> This composite indicator represents the weighted average of the observed-to-expected ratios for the following component indicators: pressure ulcer rate; iatrogenic pneumothorax rate; in-hospital fall with hip fracture rate; postoperative haemorrhage or hematoma rate; postoperative acute kidney injury requiring dialysis rate; postoperative respiratory failure rate; perioperative pulmonary embolism or deep vein thrombosis rate; postoperative sepsis rate; postoperative wound dehiscence rate; abdominopelvic accidental puncture or laceration rate (<https://qualityindicators.ahrq.gov/Downloads/Modules/PSI/V2021/TechSpecs/PSI%2090%20Patient%20Safety%20and%20Adverse%20Events%20Composite.pdf>).

health agency's quality performance measures relative to peers in its state and to their own past performance. Measures include unplanned acute care hospitalisation, emergency department use without hospitalisation, change in self-care, change in mobility and communication with patients (<https://innovation.cms.gov/data-and-reports/2021/hhvbp-fourthann-rpt>). The programme is active in nine states (Arizona, Florida, Iowa, Maryland, Massachusetts, Nebraska, North Carolina, Tennessee, and Washington) and applies to all Medicare-certified HHAs in these states (Centers for Medicare & Medicaid Services 2021c).

## Key design features of bundled care and payment models

Based on the country experiences reviewed in this paper, policy makers have several intervention points when designing bundled payment models. The following key features can guide this process.

- Deciding when a bundle starts and ends. Bundled payments can be designed around an episode of care with a distinct time frame, for example a bundle for screening for breast cancer might commence with a mammogram and finish with a diagnosis. An alternative form of bundling may be used for chronic conditions where time periods are less distinct. In this case, programmes can use longer time periods, such as six-monthly payments for patients with cancer receiving chemotherapy, and extend the bundle every six months if necessary.
- Deciding what to include in a bundle. It can be challenging to determine which services should go in a bundle. For longer term bundles for specific chronic conditions, it is particularly difficult to ensure all related care and ongoing patient costs are included in one bundled payment. If all care is not included, the resulting incomplete bundles can reinforce fragmented care for patients with multiple chronic conditions and create incentives to shift care and costs to providers outside of the care bundle.
- Setting prices. Programmes have to balance prices that are financially attractive to providers, while avoiding wasteful spending. If the price is too low, this may result in limited provider buy-in because providers face losses as financial risks are shifted to providers. At the other hand, prices that are higher than actual costs, might result in a waste of financial resources. Many programmes are benchmarked against average costs of the standard provision of care, and/or historic cost data. This can offer a starting point.
- Prospective versus retrospective payment. When implementing bundled payment models, payers and providers can choose two main strategies regarding the payment flow, namely a prospectively established price that is paid as one payment to the accountable entity; or upfront FFS payments to individual providers within the episode with a retrospective reconciliation period.
- Risk adjustment: It is important not to expose providers to risks that they cannot control – that is excessive financial risk. There are several approaches to mitigating excessive risk. High-risk and/or high-cost patients can be excluded from the bundled payment model and services paid on a FFS basis. Characteristics of high and low-cost bundles can be identified prospectively (before the bundle commenced) and the tariff or risk adjusted accordingly, for example a patient with a greater number of comorbidities prior to surgery may have a higher tariff than with no comorbidities. As an example, the CMS-Hierarchical Condition Categories prospective risk adjustment model is used in the GPDC model as a method for measuring the health risks of an enrollee population and modifying capitated payments to DCEs to reflect the predicted expenditures of that population.

Measurement of enrollee risks is achieved by models that predict expenditures based on enrollee demographic characteristics, medical diagnoses, and other individual information (RTI International 2021c). However, risk adjustment tools are susceptible to changes in coding practices to increase risk scores (Chernew et al. 2021). Financial risk can also be adjusted retrospectively after the bundle has commenced, for example a higher payment may be applied if the patient required specialist treatment, such as Intensive Care Unit.

- Risk sharing. Bundled payment models may include risk corridors, either a one-sided or two-sided risk sharing arrangement between payers and providers. In one-sided risk arrangements, participants are eligible to receive a payment from the payer if the actual expenditures are less than the target price that has been pre-established. Under two-sided risk (which also includes the participant taking on downside risk in addition to one-sided risk), the participant may also be required to pay the payer if actual expenditures are greater than the pre-determined episode target price. Stop-loss and reinsurance arrangements also protect plans from losses beyond a specified threshold.
- Provider participation: Most bundled payment systems reviewed in this paper are voluntary. Providers, that are interested and eligible, can choose to participate in the model and leave it when they do not find it appropriate anymore. Only few programmes are mandatory, where eligible participants are required to participate in the model and do not have an option to leave the model. When participation is voluntary, evidence from the United States shows that providers may only join a payment model when they see a potential opportunity for financial gain (United States Government Accountability Office 2018). This selection bias in hospital participation may also be driven by private consulting firms (Berlin et al. 2021). The option to leave the programme allows providers to do so when their performance falls below national or regional benchmarks of the model. Furthermore, the voluntary participation of providers makes evaluations more difficult. For example, hospitals that participated in ACOs were found to be large and urban (Colla et al. 2016).
- Data requirements and information technology. Designing, pricing, monitoring and evaluating a care bundle requires detailed historical and current administrative data from multiple sources. Information technology investments are required to ensure this information is shared with providers in a timely manner. The availability of meaningful data and analytics to providers will increase operational transparency, improving feedback about performance and enabling participants to use data to make informed decisions and drive results (Center for Medicare and Medicaid Innovation, 2021).
- Deciding on a fund holder. A bundled payment involves a payer providing lump-sum compensation for a bundle of services that often crosses multiple care sectors and many providers. This may lead to uncertainty regarding which entity is best suited to hold and distribute funds, especially for bundles that involve services in multiple care settings such as acute and community settings. For population-based bundles, large organisations are needed to manage the payment. Those organisations should have mechanisms to allocate the broad population-based payment down to the different providers that care for the individual/patient. This also means that there should be mechanisms in place to determine who gets savings and how those savings are shared among providers.
- Testing and evaluation programmes before national roll-out. . The basic paradigm reflected in the United States Center for Medicare and Medicaid Innovation (CMMI)'s authorizing statute is that models should be "tested" on a temporary basis before being expanded into larger, permanent programmes. CMMI is permitted to modify or terminate a model during its implementation period if the model is not expected to improve quality without increasing spending, or is not expected to reduce spending without reducing quality, or is not expected to improve quality while reducing spending. CMMI's general practice has been to operate a model for about five years and then either abandon the approach or relaunch a revised version of the model under a new name. This allows CMMI to introduce second-generation models to continue operating, and apply lessons learned from a model that has hit the five-year mark but has not been deemed fit for expansion. It also allows CMMI to identify flaws with a model that can subsequently be addressed to produce a more successful model (Medicare Payment Advisory Commission 2021b). France rolls out its programmes EDS, IPEP and PEPS in three phases to refine the programme and monitor its effects. In each phase, providers participate on a voluntary basis and can opt out after each of the three

phases. The evaluation of all programmes is mandatory. This allows an evaluation of the impact of the programme relative to standard delivery of care.

## Evaluations of bundled payments

The success of value-based provider payment models is mixed and ranges from no changes to standard delivery of care, or higher expenditures without quality improvements, to improved quality and lower health expenditures (Rutledge et al. 2019). Evaluations differ based on what's included in the assessment. In the United States, when performance payments to providers are included, the savings linked to the introduction of innovative payment models are reduced (Center for Medicare and Medicaid Innovation, 2020). However, testing and experiences spill over to providers not participating in bundled payment models. Therefore, the increase in value linked to a switch to bundled payments may look smaller.

The following section provides some evidence on the impact of bundled payment models on value.

### ***Bundled payments might slow the growth of spending...***

In the United States, episode-based and population-based payments point at positive effects on slowing the growth of spending if compared to fee-for-service payments (Yee et al. 2020; Wilson et al. 2020). This suggests that payment models' incentives may have led provider organizations to induce changes in their behavior, also through investment in new care management infrastructure, provider education initiatives, or other strategies that affect the quantity and/or the mix of health care services delivered (Medicare Payment Advisory Commission 2021b).

The effect of bundled payments on expenditures for episode-based conditions differs strongly between conditions (Agarwal et al. 2020). In general, evaluations are more positive for joint replacements than for other conditions. Evaluations of both the mandatory CJR programme and the BPCI Advanced model identified net savings (Haas et al. 2019; Barnett et al. 2019; Agarwal et al. 2020; Lewin Group 2021), although the reduction in BPCI-A Medicare payment was small (Joynt Maddox et al. 2021). In the CJR programme, the total amount amounted to roughly 2 % compared to baseline payments (approx. USD 61.6 million) (Lewin Group 2020). Reductions in costs could largely be attributed to reductions in post-acute care. The BPCI for acute myocardial infarction, congestive heart failure, COPD and pneumonia, hospital participation were also associated with a decrease in total spending. This resulted largely from a substitution of skilled nursing facilities stays with home health services (Rolnick et al. 2020). However, for those bundles (and for sepsis) hospital participation was not associated with significant changes in Medicare payments, length of stay, hospital readmission or mortality (Joynt Maddox et al. 2018). Evaluations are mixed for other conditions, ranging from no cost savings to cost increases for spine surgery (Jubelt et al. 2017; Malik et al. 2019; Martin et al. 2018). To date, it remains inconclusive whether the BPCI programme realises gross savings. Models 2 and 3, which indicates cost reductions. However, Medicare incurred losses from the BPCI, after accounting for reconciliation payments and Medicare's decision to eliminate the repayment responsibility for participants, resulting in losses of 1.3% and 3.2 % for Model 3 (Centers for Medicare & Medicaid Services 2021a). Simultaneous inclusion in both ACOs (populationbased model) and BPCI (episode-based model), compared with inclusion in BPCI model alone, was associated with lower readmissions for medical and surgical episodes, and with lower institutional postacute care spending for medical episode only (Navathe et al. 2021).

Evaluations of episode-based payments from other countries are scarce. The introduction of episodebased payments in France and Norway has been too recent to allow for evaluations. Evaluations of episode-based bundled payments in the Netherlands pointed at higher costs associated with bundled payments compared to standard delivery of care (Karimi et al. 2021). Overall, the Ontario IFM pilot initiative had positive results based on the goals established by the MOHLTC, which is shorter length of stay, reduced emergency department visits and readmissions, lower average total costs and positive patient and



caregiver experience. Much of the positive results of this initiative may be attributable to the two largest projects, the Hamilton Niagara Haldimand Brant chronic obstructive pulmonary disease and congestive heart failure project and the Mississauga Halton cardiac surgery project (Walker K et al. 2019b). Based on the IFM initiative evaluation, it was recommended “*to go fast for surgery and go slow with medical conditions*” (Walker et al. 2019b).

Evaluations identified spill-over effects of the BPCI and CJR programmes on non-targeted patients, who were covered by insurances, such as commercial insurance or Medicare Advantage (Einav et al., 2021; Navathe et al., 2021). This suggests that payment reforms can incentivise hospitals to rethink processes of care in general.

Evaluations of population-based programmes largely point at no changes in costs to modest improvements and assessment depend on what’s included (Kaufman et al. 2019; Wilson et al. 2020). Assessments are heterogeneous. Reports indicate that ACOs achieved a lower spending growth of about one to two percentage points compared to standard delivery of care (Medicare Payment Advisory Commission 2019, 2021a). However, these results might not be stable once bonus payments and costs for new technology and infrastructure are taken into account (Kaufman et al. 2019). After 3 years of the MSSP, participation by physician groups was associated with savings for Medicare, whereas hospital-integrated ACOs did not produce savings (on average) (McWilliams et al. 2018). There is also some evidence that ACOs have reduced the use of low-value care and generated savings in use of post-acute care (Schwartz et al. 2015). Evaluations of its predecessor, the Medicare ACE Demonstration Program, indicated lower total 30-day post-acute care payments (Chen et al. 2018).

### **....and the effect on quality of care is mixed to positive...**

Overall, the BPCI did not have a negative impact the quality of care. It did not lead to an increase in unplanned readmissions, emergency department visits, and mortality, or a worsening of the functional status of beneficiaries (Centers for Medicare & Medicaid Services 2021b). The effect of episode-based payments on quality of care varies by condition. Evaluations were largely positive for joint replacements. They generally reported savings without worsening quality of care, or improvements in quality of care. The mandatory CJR model did not lead to significant increases in readmissions, emergency conditions and mortality (Haas et al. 2019; Barnett et al. 2019; Finkelstein et al. 2018; Li et al. 2021). The programme was also associated with a decrease in certain complications (Lewin Group 2020). Evaluations of bundled payments for other conditions are mixed. Results of bundled payments for spine surgery ranged from no changes in readmission rates (Jubelt et al. 2017; Jubelt et al. 2016) to increases in readmission rates (Martin et al. 2018). The OCM led to higher-value (more cost-conscious) use of supportive care drugs to prevent nausea, neutropenia, and cancer-related bone fractures, but did not spur driving value-oriented chemotherapy or radiation treatment. Health care service utilization remains largely unchanged. There was no significant impact of the programme on hospice use, but a decline in the proportion of patient with inpatient hospitalisations in the last 30 days of life, and ICU admissions in the last 30 days of life by 1.5% and 2.1 %, respectively (Brooks et al. 2019).

Evaluations of best practice tariffs are inconclusive. Evaluations of the BPT for hip fracture point towards a positive direction, and range from no significant decline in mortality (Oakley et al. 2017) to a significant decline (Metcalf et al. 2019; Whitaker et al. 2019; Zogg et al. 2021). Evaluations of the non-payment for hospital-acquired conditions in the United States has been mixed too. Evaluations range from no significant effect, to a positive effect on central line-associated bloodstream infections and catheter-associated urinary tract infections, but no improvements on hospital-acquired pressure ulcers and inpatient falls, to a positive effect on all conditions (Waters et al. 2015; Thirukumaran et al. 2021; Lee et al. 2012; Schuller et al. 2014).

The HVBP and the HACP generally failed to yield positive results (Sankaran et al. 2019; Ryan et al. 2017). Evaluations of the HRRP, on the other hand, indicated a positive impact of penalties on hospital

readmissions and might have a spill over effect on other conditions, that were not incentivized (Ibrahim et al. 2017; Zuckerman et al. 2016; Ramaswamy et al. 2019).

Evaluations on quality of care from population-based programmes in the United States range from mixed to positive results (Wilson et al. 2020; Epstein et al. 2014). For example, evaluations point at positive outcomes for diabetes (Zhang et al. 2019). The literature indicates that PACE was associated with reductions in the risk of hospitalization, but findings for other outcomes, such as nursing facility use and mortality, were mixed (Medicare Payment Advisory Commission 2019). Medicare's ACE Demonstration Program was not associated with a change in 30-day mortality for cardiac or orthopaedic surgery for participants (Chen et al. 2018).

### ***...and unintended consequences should be monitored***

In the United States, some concerns about the unintended consequences of bundled payment models on disparities and volumes of care remain (Liao et al. 2020). Early evaluations of ACOs indicated that patients participating in an ACO had higher income and were less likely to be black than non-ACO patients (Epstein et al. 2014). Hospitals participating in ACOs were found to be larger, more likely to be located in an urban area, and had a smaller share of Medicare patients (Colla et al. 2016). The CJR model was associated with modest worsening of racial/ethnic disparities in total knee replacement (Thirukumaran et al. 2021). Similar concerns hold true for pay-for-performance programmes (Yearby, Clark and Figueroa, 2022). Hospitals that treat a higher proportion of disadvantaged population groups could be discriminated under pay-for-performance schemes and contribute to raising health inequities (Gilman et al. 2015; Sankaran et al. 2019). Second, penalties for poor quality, such as sentinel events, might result in perverse incentives for coding practices, implying that such events would more likely go unreported (Kawai et al. 2015; McNutt et al. 2010). Third, episode-based and population-based programmes might incentivise providers to shift care to a less costly setting, or a setting outside of the bundle (Einav et al. 2020; Yee et al. 2020; Plate et al. 2019). It remains unclear whether this has a negative effect on quality of care, or not.

## **Recommendations for bundling care and payments**

Payment systems set incentives on how providers provide care, and serve as a policy instrument to incentivise the redesign of health care systems (Glied 2021; OECD 2016a). In particular, bundled payment models can improve value through economies of scope and vertical integration. However, bundled payments do not offer a one-size-fits-all solution, and their design and implementation process is complex (Steenhuis et al. 2020). It is difficult to assess whether bundled payments are successful or not because much depends on the context of the health system within which they are implemented as well as their various design features. By identifying which features of bundled payment work under which circumstances, policy makers can use the intervention points of bundled payments to tailor providers' payment models to their health system characteristics.

Fixing the care bundle and setting a single price requires clearly defined and homogenous patient groups. All constituent services and related providers need to be included within the bundle to ensure that all providers are aware of and make their contribution in a co-ordinated approach. This requires a very high degree of cooperation and information sharing. In order for bundled care to achieve clinical and financial objectives, it is necessary that physicians, who make the decisions about the care for patients, be included to align clinical with financial decision making. When multiple physicians across different specialties work together, there are opportunities for improved coordination and quality of patient care and in-house or within network referrals. Further, when physicians align with non-physician partners, such as hospitals, this may result in lowered transaction costs and improved efforts to monitor, manage and co-ordinate patient care. Finally, bundled payments provide incentives for closer collaboration and evidence-based decisions, and may include shared gains and shared risk among providers across the continuum of care.

The following recommendations for the design and implementation of bundled payment models could be made:

- Align bundled payments with health policy objectives. Payment systems impact how providers provide care. They allow policymakers to streamline the provision of care with overall policy objectives. To do so, policy makers are encouraged to identify the causal mechanisms which describe how the new payment model is expected to contribute to achieve stated policy objectives. There should also be a widespread recognition that care needs to be better organised.
- Choose conditions and duration carefully. The availability of specifications on best practice care and agreement of physicians and other care providers on these specifications is essential to engage physicians with a focus on improving patient care, enable risk-management, set the duration of care, determine and monitor quality indicators and set appropriate payment levels. Effective bundled care and payments have ranged from short-term procedural episodes to ongoing funding models (e.g., the PACE programme and ACOs). Short-term bundles related to specific procedures with an inpatient hospitalization as the index event tend to have more clearly defined care pathways, providers and timeframes, which implies more easily measurable outcomes and leads to a better ability to set appropriate prices and hold the appropriate practitioners accountable for care. Regardless of the length of the bundle, it is important that a bundle capture all necessary patient care related to the condition, procedure or population. The definition of episodes covered by payment should match the duration of treatment for a specific condition. Longer episode durations can put greater financial risk on providers since they will be more accountable for patient outcomes and the quality of care further into the future from the episode event.
- Choose bundles also on the basis of observed variation in spending and volume of cases. The most suitable opportunities to improve care by bundling services occurs when within-provider variation for similar patients is low, reflecting the capability of providers to ensure consistent care for patients with similar conditions, but between-provider variation for similar patients is high, suggesting opportunities for better alignment with best practice care and improved efficiencies across providers. Criteria to select conditions may relate to high volume of cases, to large fraction of spending those cases account for, and to large observed variation in spending per case.
- Include all providers in a bundled care price. Effective bundles are inclusive of all payments to all providers within the period (i.e., acute and post-acute, primary care, home care, drugs, etc.) which enables accountability. Physicians make most of the decisions about the care that is provided to patients, and including their payment within the bundle increases their partnership with other providers also paid through the bundle.
- Move towards as much bundling as possible. Comprehensive patient-centred care should be the goal for bundled care and payment. Bundled payments work best when there are not opportunities for shifting some (e.g. more complex) patients or services and costs outside given bundles to other parts of the health care system. If a bundled payment system operates alongside other payment to providers for the same patients and in the same time period, it can be difficult to ensure that gaming does not occur or that costs are not simply shifted outside of a bundle. In evaluating care bundles, it is important to track total system costs to determine whether costs are being shifted outside of a bundle. In the long run, a harmonisation of population-based and episode-based payment models should be envisaged.
- Engage physician from the very beginning. Physicians are integral in implementing changes to care delivery, so their involvement in defining care pathways is necessary. Physician engagement is an important component of bundling care. Ongoing physician engagement can be achieved through appropriate compensation which includes risk sharing and aligning the incentives of providers and payers with quality assurance stipulations. Compensation, however, is not the only factor in ensuring physician engagement. Clinical governance structures that include payer and

provider representatives as well as information technology systems that deliver information to providers in a timely manner are also important ways to engage physicians.

- Set a sound prospective target price for the bundle. Setting prices require historical data but it is important to be mindful of the bundled payment level compared to previous levels. Benchmarks should be designed to fairly and accurately project future costs across an entire population or episode of care. The process of setting target prices should be clear and understandable to participants. If available data have a substantial amount of variability, it is more difficult to set an appropriate prospective price.
- Risk mitigation strategies. Strategies that lower the (perceived) financial risk for providers may help to stimulate the adoption of bundled payment models. Such risk mitigation strategies include stopping loss provisions (e.g., the exclusion of high-risk patients or high-cost services) and risk adjustments. Risk adjustment and the identification of outlier patients ensures that providers are not penalized for providing care to patients with higher medical need.
- Incorporate pay for performance into the payment. Collecting data on quality should be an integral part of the payment design. This allows to adjust prices based on appropriate quality metrics to improve value-based purchasing. The exact measures employed depend on the clinical conditions and the services bundled. Measures should assess important aspects of quality based on scientific evidence, such as medical guidelines, and should be available also for the comparison groups.
- Decide on the way pay-for-performance is integrated. Pay-for-performance can complement base payment methods as an add-on payment without changing their basic structures. This offers payers the most practical approach to improving value with providers who are unwilling or unable to accept new forms of base payment. Alternatively, pay-for-performance can be implemented with varying degrees of intensity, consistent with the context of application, the strength of the measures available for the clinical conditions to which it is being applied, or other relevant factors. To date, pay-performance elements have been very small in size and normally represent less than 1 % of a hospital's total income (Milstein and Schreyoegg 2016). Due to that, they are unlikely to unfold their effect. Programmes should consider a greater redistribution of financial volume to increase the effect of financial incentives on quality of care.
- Ensure transparency of cost and quality data. Transparency can help to support partnership between payers and providers. In particular, transparency and accuracy in cost estimates are central to setting an appropriate price for a service bundle that will help to ensure provider engagement. Transparency of quality data can facilitate discussions between physicians and administrators in the early stages of a bundled care programmes and physician report cards were cited as a possible mechanism to facilitate this. Less successful programmes cited a lack of transparency with respect to cost arrangements as a major challenge.
- Ensure timely and integrated data. The receipt of data from multiple sources in a timely manner is required to facilitate the construction, pricing, operation, and evaluation of bundled care programmes. At the same time, it is key that the payers share data with providers to provide opportunities for earlier, data-informed interventions.
- Invest in information technology. IT system capability and adaptability to record bundled payment information is necessary. Ideally, electronic health records can be easily shared across providers have been a component of all the successful bundled care and payment initiatives reviewed. The use of these systems has been integral in facilitating care coordination between stakeholders and the exchange of information, as well as enabling the automation of processes to minimise administrative burden.
- Pilot and evaluate bundled payment models. Pilot testing of the bundled payment model allows identifying flaws with a model that can subsequently be addressed to produce a more successful model. Sufficient time should be allowed for implementing complex bundled payment models as

innovative payment models may take time to unfold their effects (Health Policy Analysis, 2020). Assessment of the impact of bundled payments should be embedded into the process, with independent evaluation carried out on a systematic basis. Evaluations should take potential spillover effects into account, and extend their scope to unintended consequences of a switch to a new providers' bundled payment model.

## References

- Agarwal, Rajender; Liao, Joshua M.; Gupta, Ashutosh; Navathe, Amol S. (2020): The Impact Of Bundled Payment On Health Care Spending, Utilization, And Quality: A Systematic Review. *Health Affairs* 39 (1), S. 50–57. DOI: 10.1377/hlthaff.2019.00784.
- Australian Commission on Safety and Quality in Healthcare (2018): Australian sentinel events list version 2 - Development and specifications. Sydney. <https://www.safetyandquality.gov.au/ourwork/indicators/australian-sentinel-events-list>.
- Australian Government Department of Health (2020), *Health Care Homes, Handbook for General Practices and Aboriginal Community Controlled Health Services*, Canberra, [https://www1.health.gov.au/internet/main/publishing.nsf/Content/health-care-homesinformation/\\$File/Health%20Care%20Homes%20Handbook%20-%20October%202020.pdf](https://www1.health.gov.au/internet/main/publishing.nsf/Content/health-care-homesinformation/$File/Health%20Care%20Homes%20Handbook%20-%20October%202020.pdf).
- Bakker, Dinny H. de; Struijs, Jeroen N.; Baan, Caroline A.; Raams, Joop; Wildt, Jan-Erik de; Vrijhoef, Hubertus J.M.; Schut, Frederik T. (2012): Early Results From Adoption Of Bundled Payment For Diabetes Care In The Netherlands Show Improvement In Care Coordination. *Health Affairs* 31 (2), S. 426–433. DOI: 10.1377/hlthaff.2011.0912.
- Barnett, Michael L.; Wilcock, Andrew; McWilliams, J. Michael; Epstein, Arnold M.; Joynt Maddox, Karen E.; Orav, E. John et al. (2019): Two-Year Evaluation of Mandatory Bundled Payments for Joint Replacement. *New England Journal of Medicine* 380 (3), S. 252–262. DOI: 10.1056/NEJMsa1809010.
- Berlin NL, Peterson TA, Chopra Z, Gulseren B and Ryan AM (2021). Hospital Participation Decisions In Medicare Bundled Payment Program Were Influenced By Third-Party Conveners. *Health Affairs* 40 (8): 1286-1293.
- Brooks, Gabriel A.; Jhatakia, Shalini; Tripp, Amanda; Landrum, Mary Beth; Christian, Thomas J.; NewesAdeyi, Gabriella et al. (2019): Early Findings From the Oncology Care Model Evaluation. *Journal of oncology practice* 15 (10), e888-e896. DOI: 10.1200/JOP.19.00265.
- Centers for Medicare & Medicaid Services (2019): Quality Measures Fact Sheet. CMS Patient Safety Indicators PSI 90 (NQF #0531). Baltimore.
- Centers for Medicare & Medicaid Services (2021a): Bundled Payments for Care Improvement (BPCI) Initiative, Models 2-4. Baltimore: CMS.
- Centers for Medicare & Medicaid Services (2021b): Bundled Payments for Care Improvement (BPCI) Initiative: General Information. <https://innovation.cms.gov/innovation-models/bundled-payments>.
- Centers for Medicare & Medicaid Services (2021c): Home Health Value-Based Purchasing Model. <https://innovation.cms.gov/innovation-models/home-health-value-based-purchasing-model>.
- Centers for Medicare & Medicaid Services (2021d): Medicare Acute Care Episode (ACE) Demonstration. <https://innovation.cms.gov/innovation-models/ace>.
- Centers for Medicare & Medicaid Services (2021e): Oncology Care Model. <https://innovation.cms.gov/innovation-models/oncology-care>.
- Centers for Medicare & Medicaid Services (2021f), *Global and Professional Direct Contracting (GPDC) Model*, <https://innovation.cms.gov/innovation-models/gpdc-model>.

Centers for Medicare & Medicaid Services (2021g), Overview of CJR Quality Measures, Composite Quality Score, And Pay-For-Performance Methodology, <https://innovation.cms.gov/files/x/cjr-qualsup.pdf>.

Chen, Lena M.; Ryan, Andrew M.; Shih, Terry; Thumma, Jyothi R.; Dimick, Justin B. (2018): Medicare's Acute Care Episode Demonstration: Effects of Bundled Payments on Costs and Quality of Surgical Care. *Health Serv Res* 53 (2), S. 632–648. DOI: 10.1111/1475-6773.12681.

Chernew ME, Carichner J, Impreso J, McWilliams JM, McGuire TG, Alam S, Landon BE, Landrum MB (2021). Coding-Driven Changes In Measured Risk In Accountable Care Organizations. *Health Affairs* 40 (12): 1909-1917.

Colla, Carrie H.; Lewis, Valerie A.; Tierney, Emily; Muhlestein, David B. (2016): Hospitals Participating In ACOs Tend To Be Large And Urban, Allowing Access To Capital And Data. *Health Affairs* 35 (3), S. 431–439. DOI: 10.1377/hlthaff.2015.0919.

Cutler D.M., Nickpay, S. and R.S. Huckman (2020), "The Business of Medicine in the Era of COVID-19", *JAMA*, 323/20, pp. 2003-2004, DOI: 10.1001/jama.2020.7242.

Department of Health (2016). England case example- maternity pathways. Unpublished. Submitted for the OECD project on payment systems.

Einav, Liran; Finkelstein, Amy; Ji, Yunan; Mahoney, Neale (2020): Randomized trial shows healthcare payment reform has equal-sized spillover effects on patients not targeted by reform. *Proceedings of the National Academy of Sciences* 117 (32), S. 18939–18947. DOI: 10.1073/pnas.2004759117.

Embuldeniya G, Gutberg J, Wodchis WP (2021). The reimagination of sustainable integrated care in Ontario, Canada, *Health Policy* 125 (1): 83-89,

Epstein, Arnold M.; Jha, Ashish K.; Orav, E. John; Liebman, Daniel L.; Audet, Anne-Marie J.; Zezza, Mark A.; Guterman, Stuart (2014): Analysis Of Early Accountable Care Organizations Defines Patient, Structural, Cost, And Quality-Of-Care Characteristics. *Health Affairs* 33 (1), S. 95–102. DOI: 10.1377/hlthaff.2013.1063.

Finkelstein, Amy; Ji, Yunan; Mahoney, Neale; Skinner, Jonathan (2018): Mandatory Medicare Bundled Payment Program for Lower Extremity Joint Replacement and Discharge to Institutional Postacute Care: Interim Analysis of the First Year of a 5-Year Randomized Trial. *JAMA* 320 (9), S. 892–900. DOI: 10.1001/jama.2018.12346.

Gilman, Matlin; Adams, E. Kathleen; Hockenberry, Jason M.; Milstein, Arnold S.; Wilson, Ira B.; Becker, Edmund R. (2015): Safety-Net Hospitals More Likely Than Other Hospitals To Fare Poorly Under Medicare's Value-Based Purchasing. *Health Affairs* 34 (3), S. 398–405. DOI: 10.1377/hlthaff.2014.1059.

Glied, Sherry (2021): Reinhardt lecture 2021: Health care prices as signals. *Health Serv Res* 56 (6), S. 1087–1092. DOI: 10.1111/1475-6773.13878.

Haas, Derek A.; Zhang, Xiaoran; Kaplan, Robert S.; Song, Zirui (2019): Evaluation of Economic and Clinical Outcomes Under Centers for Medicare & Medicaid Services Mandatory Bundled Payments for Joint Replacements. *JAMA Intern Med* 179 (7), S. 924–931. DOI: 10.1001/jamainternmed.2019.0480.

Health Policy Analysis (2020). Evaluation of the Health Care Homes program. Interim evaluation report 2020.

[https://www1.health.gov.au/internet/main/publishing.nsf/Content/AD51EBE397452EF5CA2580F700164BAD/\\$File/HCH%20Interim%20eval%20report%202020%20Vol%201%20Summary%20report%20\(Final.pdf](https://www1.health.gov.au/internet/main/publishing.nsf/Content/AD51EBE397452EF5CA2580F700164BAD/$File/HCH%20Interim%20eval%20report%202020%20Vol%201%20Summary%20report%20(Final.pdf)

Helse- og omsorgsdepartementet (2019): Nasjonal helse- og sykehusplan 2020-2023. Oslo: Regeringen.

Helsedirektoratet (2019): Innsatsstyrt finansiering 2020. Regelverk. Oslo: Helsedirektoratet.

Helsedirektoratet (2021): Foreløpig ISF regelverk med mer. 19. oktober 2021. Oslo.

Ibrahim, Andrew M.; Nathan, Hari; Thumma, Jyothi R.; Dimick, Justin B. (2017): Impact of the Hospital Readmission Reduction Program on Surgical Readmissions Among Medicare Beneficiaries. *Ann Surg* 266 (4), S. 617–624. DOI: 10.1097/SLA.0000000000002368.

Independent Hospital Pricing Authority (2021a): National Pricing Model 2021-22. Technical Specifications. Sydney.

Independent Hospital Pricing Authority (2021b): Pricing and funding for safety. Risk adjusted model for avoidable hospital readmissions. National Efficient Price Determination 2021-22. Sydney.

Integrated Care and Resource Center (2021): Program of All-Inclusive Care for the Elderly (PACE) Total Enrollment by State and by Organization.

Jacobs, John; Imtiaz, Daniel; G. Baker, Ross; Brown, Adalsteinn; Wodchis, Walter P. (2015): Bundling Care and Payment: Evidence From Early-Adopter.

Joynt Maddox KE, Orav EJ, Zheng J, Epstein AM (2018). Evaluation of Medicare's Bundled Payment Initiatives for Medical Conditions. *The New England Journal of Medicine* 379: 260-269.

Joynt Maddox KE, Orav EJ, Zheng J, Epstein AM (2021). Year 1 of the Bundled Payments for Care Improvement-Advanced Model. *The New England Journal of Medicine* 385: 618-627.

Jubelt, Lindsay E.; Goldfeld, Keith S.; Blecker, Saul B.; Chung, Wei-yi; Bendo, John A.; Bosco, Joseph A. et al. (2017): Early Lessons on Bundled Payment at an Academic Medical Center. In: *JAAOS - Journal of the American Academy of Orthopaedic Surgeons* 25 (9).

[https://journals.lww.com/jaaos/Fulltext/2017/09000/Early\\_Lessons\\_on\\_Bundled\\_Payment\\_at\\_an\\_Academic.7.aspx](https://journals.lww.com/jaaos/Fulltext/2017/09000/Early_Lessons_on_Bundled_Payment_at_an_Academic.7.aspx).

Jubelt, Lindsay E.; Goldfeld, Keith S.; Chung, Wei-yi; Blecker, Saul B.; Horwitz, Leora I. (2016): Changes in Discharge Location and Readmission Rates Under Medicare Bundled Payment. *JAMA Intern Med* 176 (1), S. 115–117. DOI: 10.1001/jamainternmed.2015.6265.

Karimi, Milad; Tsiachristas, Apostolos; Looman, Willemijn; Stokes, Jonathan; van Galen, Mirte; Ruttenvan Mólken, Maureen (2021): Bundled payments for chronic diseases increased health care expenditure in the Netherlands, especially for multimorbid patients. *Health Policy* 125 (6), S. 751–759. DOI:

10.1016/j.healthpol.2021.04.004.

Kaufman, Brystana G.; Spivack, B. Steven; Stearns, Sally C.; Song, Paula H.; O'Brien, Emily C. (2019): Impact of Accountable Care Organizations on Utilization, Care, and Outcomes: A Systematic Review. *Medical Care Research and Review* 76 (3), S. 255–290. DOI: 10.1177/1077558717745916.

Kawai, Alison Tse; Calderwood, Michael S.; Jin, Robert; Soumerai, Stephen B.; Vaz, Louise E.; Goldmann, Donald; Lee, Grace M. (2015): Impact of the Centers for Medicare and Medicaid Services Hospital-Acquired Conditions Policy on Billing Rates for 2 Targeted Healthcare-Associated Infections. *Infection control and hospital epidemiology* 36 (8), S. 871–877. DOI: 10.1017/ice.2015.86.

Khullar, D., Bond, A.M., and W.L. Schpero (2020), "COVID-19 and the Financial Health of US Hospitals", *JAMA*, Vol. 323/21, pp. 2127-2128. DOI: 10.1001/jama.2020.6269.

Lee, Grace M.; Kleinman, Ken; Soumerai, Stephen B.; Tse, Alison; Cole, David; Fridkin, Scott K. et al. (2012): Effect of Nonpayment for Preventable Infections in U.S. Hospitals. *New England Journal of Medicine* 367 (15), S. 1428–1437. DOI: 10.1056/NEJMsa1202419.

Lewin Group (2020): CMS Comprehensive Care for Joint Replacement Model: Performance Year 3 Evaluation Report. Third Annual Report. Falls Church, VA.



Lewin Group (2021): CMS Bundled Payments for Care Improvement Advanced Model: Year 2 Evaluation Report. Falls Church, VA.

Liao JM, Navathe AS, Werner RM (2020). The Impact of Medicare's Alternative Payment Models on the Value of Care. *Annual Review of Public Health* 41: 551-565.

Li, Yue; Ying, Meiling; Cai, Xueya; Thirukumaran, Caroline P. (2021): Association of Mandatory Bundled Payments for Joint Replacement With Postacute Care Outcomes Among Medicare and Medicaid Dual Eligible Patients. *Medical Care* 59 (2), S. 101–110. DOI: 10.1097/MLR.0000000000001473.

Malik, Azeem Tariq; Phillips, Frank M.; Retchin, Sheldon; Xu, Wendy; Yu, Elizabeth; Kim, Jeffery; Khan, Safdar N. (2019): Refining risk adjustment for bundled payment models in cervical fusions—an analysis of Medicare beneficiaries. *The Spine Journal* 19 (10), S. 1706–1713. DOI: 10.1016/j.spinee.2019.06.009.

Martin, Brook I.; Lurie, Jon D.; Farrokhi, Farrokh R.; McGuire, Kevin J.; Mirza, Sohail K. (2018): Early Effects of Medicare's Bundled Payment for Care Improvement Program for Lumbar Fusion. *Spine* 43 (10).  
[https://journals.lww.com/spinejournal/Fulltext/2018/05150/Early\\_Effects\\_of\\_Medicare\\_s\\_Bundled\\_Payment\\_for.16.aspx](https://journals.lww.com/spinejournal/Fulltext/2018/05150/Early_Effects_of_Medicare_s_Bundled_Payment_for.16.aspx).

McNutt, Robert; Johnson, Tricia J.; Odwazny, Richard; Remmich, Zachary; Skarupski, Kimberly; Meurer, Steven et al. (2010): Change in MS-DRG assignment and hospital reimbursement as a result of Centers for Medicare & Medicaid changes in payment for hospital-acquired conditions: is it coding or quality? *Quality management in health care* 19 (1), S. 17–24. DOI: 10.1097/QMH.0b013e3181ccb07.

McWilliams JM, Hatfield LA, Landon BE, Hamed P, Chernew ME (2018). Medicare Spending after 3 Years of the Medicare Shared Savings Program. *New England Journal of Medicine* 379 (12): 1139-1149.

Medicaid and CHIP Payment and Access Commission (2021). Value-Based Payment for Maternity Care in Medicaid: Findings from Five States. <https://www.macpac.gov/publication/value-based-payment-formaternity-care-in-medicaid-findings-from-five-states/>.

Medicare Payment Advisory Commission (2019): Report to the Congress: Medicare and the Health Care Delivery System. [http://www.medpac.gov/docs/defaultsource/reports/jun19\\_ch6\\_medpac\\_reporttocongress\\_sec.pdf?sfvrsn=0](http://www.medpac.gov/docs/defaultsource/reports/jun19_ch6_medpac_reporttocongress_sec.pdf?sfvrsn=0).

Medicare Payment Advisory Commission (2020): Accountable care organisation payment system. [http://www.medpac.gov/docs/default-source/paymentbasics/medpac\\_payment\\_basics\\_20\\_aco\\_final\\_sec.pdf?sfvrsn=0](http://www.medpac.gov/docs/default-source/paymentbasics/medpac_payment_basics_20_aco_final_sec.pdf?sfvrsn=0).

Medicare Payment Advisory Commission (2021a): Report to the Congress: Medicare and the Health Care Delivery System. [http://medpac.gov/docs/default-source/default-documentlibrary/jun21\\_ch2\\_medpac\\_report\\_to\\_congress\\_sec.pdf?sfvrsn=0](http://medpac.gov/docs/default-source/default-documentlibrary/jun21_ch2_medpac_report_to_congress_sec.pdf?sfvrsn=0).

Medicare Payment Advisory Commission (2021b): Report to the Congress: Streamlining CMS's portfolio of alternative payment models. [http://www.medpac.gov/docs/default-source/default-documentlibrary/jun21\\_ch2\\_medpac\\_report\\_to\\_congress\\_sec.pdf?sfvrsn=0](http://www.medpac.gov/docs/default-source/default-documentlibrary/jun21_ch2_medpac_report_to_congress_sec.pdf?sfvrsn=0).

Metcalfe, D.; Zogg, C. K.; Judge, A.; Perry, D. C.; Gabbe, B.; Willett, K.; Costa, M. L. (2019): Pay for performance and hip fracture outcomes. *The Bone & Joint Journal* 101-B (8), S. 1015–1023. DOI: 10.1302/0301-620X.101B8.BJJ-2019-0173.R1.

Milstein, Ricarda; Schreyoegg, Jonas (2016): Pay for performance in the inpatient sector: A review of 34 P4P programs in 14 OECD countries. *Health Policy* 120 (10), S. 1125–1140. DOI: 10.1016/j.healthpol.2016.08.009.

Ministère des affaires sociales et de la santé; Assurance Maladie (2019a): Cahier des charges. Expérimentation d'un paiement à l'épisode de soins pour des prises en charge chirurgicales (EDS). Orthopédie - Prothèse Totale de Genou. Paris.

Ministère des affaires sociales et de la santé; Assurance Maladie (2019b): Cahier des charges. Expérimentation d'un paiement à l'épisode de soins pour des prises en charge chirurgicales (EDS). Orthopédie - Prothèse Totale de Hanche programmée. Paris.

Ministère des affaires sociales et de la santé; Assurance Maladie (2019c): Cahier des charges. Expérimentation d'un paiement à l'épisode de soins pour des prises en charge chirurgicales (EDS). Chirurgie viscérale et digestive: Colectomie pour cancer.

Ministère des solidarités et de la santé (2018): Rapport Task Force "Réforme du Financement du système de santé". Réformes des modes de financement et de régulation. Vers un modèle de paiement combiné. Paris.

Ministère des solidarités et de la santé (2021): Cahier des charges. Expérimentation d'un paiement en équipe de professionnels de santé en ville - PEPS. Paris.

Ministère des solidarités et de la santé; Assurance Maladie (2019): Cahier des charges. Expérimentation d'une incitation à une prise en charge partagée (Ipep). Paris.

Mjåset, Christer; Byrkjeflot, Haldor; Hanssen, Frederik A.S.R.; Wynn-Jones, William (2020): An introduction to bundled payments. *Tidsskr Nor Legeforen*.

Navathe AS, Liao JM, Wang E et al (2021). Association of Patient Outcomes with Bundled Payments Among Hospitalized Patients Attributed to Accountable Care Organizations. *JAMA Health Forum* 2 (8): e212131. doi:10.1001/jamahealthforum.2021.2131.

Nederlandse Zorgautoriteit (2020): Beleidsregel huisartsenzorg en multidisciplinaire zorg 2020 - BR/REG-20133.

Nederlandse Zorgautoriteit (2021): Prestatie- en tariefbeschikking huisartsenzorg en multidisciplinaire zorg 2021 - TB/REG-21627-02.

NHS England and NHS Improvement (2020), *Important and Urgent - Next steps on NHS response to COVID-19*, London.

NHS England and NHS Improvement (2021): Consultations on 2021/22 National Tariff Payment System. Annex DtC: Guidance on best practice tariffs. London.

Oakley, B.; Nightingale, J.; Moran, C. G.; Moppett, I. K. (2017): Does achieving the best practice tariff improve outcomes in hip fracture patients? An observational cohort study. *BMJ Open* 7 (2), e014190. DOI: 10.1136/bmjopen-2016-014190.

OECD (2016a): Better Ways to Pay for Health Care. <https://www.oecdilibrary.org/content/publication/9789264258211-en>.

OECD (2016b): Health Systems Characteristics Survey. <https://qdd.oecd.org/subject.aspx?Subject=hsc>.

OECD (2022), "Adaptive Health Financing: Budgetary and Health System Responses to Combat COVID19", *OECD Journal on Budgeting*, Vol. 2021/1. DOI: 10.1787/16812336.

OECD; World Health Organization (2014): Paying for Performance in Health Care. <https://www.oecdilibrary.org/content/publication/9789264224568-en>.

Osnes-Ringen, Hanne; Hanssen, Frederik A.S.R. (2019): ISF-ordningen 2020. DRG-forum 25.11.2019. Helsedirektoratet.

Plate, Johannes F.; Ryan, Sean P.; Black, Collin S.; Howell, Claire B.; Jiranek, William A.; Bolognesi,

Michael P.; Seyler, Thorsten M. (2019): No Changes in Patient Selection and Value-Based Metrics for Total Hip Arthroplasty After Comprehensive Care for Joint Replacement Bundle Implementation at a Single Center. *The Journal of arthroplasty* 34 (8), S. 1581–1584. DOI: 10.1016/j.arth.2019.05.016.

Ramaswamy, Ashwin; Marchese, Maya; Cole, Alexander P.; Harmouch, Sabrina; Friedlander, David; Weissman, Joel S. et al. (2019): Comparison of Hospital Readmission After Total Hip and Total Knee Arthroplasty vs Spinal Surgery After Implementation of the Hospital Readmissions Reduction Program. *Jamanetworkopen* 2 (5), e194634. DOI: 10.1001/jamanetworkopen.2019.4634.

Ringel, J.S., Predmore, Z. and C.L. Damberg (2021), *Value-Based Payment and Health Care System Preparedness and Resilience. Prepared for the Office of the Assistant Secretary for Planning and Evaluation (ASPE) at the U.S. Department of Health & Human Services, RAND Health Care.*

Rolnick, Joshua A.; Liao, Joshua M.; Emanuel, Ezekiel J.; Huang, Qian; Ma, Xinshuo; Shan, Eric Z. et al. (2020): Spending and quality after three years of Medicare's bundled payments for medical conditions: quasi-experimental difference-in-differences study. *BMJ* 369, m1780. DOI: 10.1136/bmj.m1780.

Rutledge RI, Romaine MA, Hersey CL, Parish WJ, Kissam SM, Lloyd JT (2019): Medicaid Accountable Care Organizations in Four States: Implementation and Early Impacts. *Milbank Q* 97 (2), S. 583–619. DOI: 10.1111/1468-0009.12386.

RTI International (2021a). Global and Professional Direct Contracting Model PY2022 Financial Operating Policies: Capitation and Advanced Payment Mechanisms. <https://innovation.cms.gov/media/document/gpdc-py2022-cap-adv-pay-mech>.

RTI International (2021b). Global and Professional Direct Contracting Model: Quality Measurement Methodology (for PY 2022 only). <https://innovation.cms.gov/media/document/gpdc-py2022-qual-measmeth>.

RTI International (2021c). Global and Professional Direct Contracting and Kidney Care Choices Models: PY 2022 Risk Adjustment. <https://innovation.cms.gov/media/document/gpdc-py2022-risk-adj>.

Ryan, Andrew M.; Krinsky, Sam; Maurer, Kristin A.; Dimick, Justin B. (2017): Changes in Hospital Quality Associated with Hospital Value-Based Purchasing. *New England Journal of Medicine* 376 (24), S. 2358–2366. DOI: 10.1056/NEJMsa1613412.

Sankaran, Roshun; Sukul, Devraj; Nuliyalu, Ushapoorna; Gulseren, Baris; Engler, Tedi A.; Arntson, Emily et al. (2019): Changes in hospital safety following penalties in the US Hospital Acquired Condition Reduction Program: retrospective cohort study. *BMJ* 366, l4109. DOI: 10.1136/bmj.l4109.

Schuller, Kristin; Probst, Janice; Hardin, James; Bennett, Kevin; Martin, Amy (2014): Initial impact of Medicare's nonpayment policy on catheter-associated urinary tract infections by hospital characteristics. *Health Policy* 115 (2-3), S. 165–171. DOI: 10.1016/j.healthpol.2013.11.013.

Schwartz AL, Chernew ME, Landon BE, McWilliams JM (2015). Changes in Low-Value Services in Year 1 of the Medicare Pioneer Accountable Care Organization Program. *JAMA Intern Med* 175(11):1815–1825.

Steenhuis S et al. (2020). Unraveling the complexity in the design and implementation of bundled payments: a scoping review of key elements from the payer's perspective. *The Milbank Quarterly* 98 (1): 197-222.

Struijs, Jeroen N.; Jong-van Til, J. T. de; Lemmens, L. C.; Drewes, H. W.; de Bruin SR; Baan CA (2012): Drie jaar integrale bekostiging van diabeteszorg. Effecten op zorgproces en kwaliteit van zorg. Bilthoven.

Thirukumaran, Caroline P.; Kim, Yeunkyung; Cai, Xueya; Ricciardi, Benjamin F.; Li, Yue; Fiscella, Kevin A. et al. (2021): Association of the Comprehensive Care for Joint Replacement Model With Disparities in the Use of Total Hip and Total Knee Replacement. *Jamanetworkopen* 4 (5), e2111858-e2111858. DOI: 10.1001/jamanetworkopen.2021.11858.

United States Government Accountability Office (2018): Medicare Advantage. Benefits and Challenges of Payment Adjustments Based on Beneficiaries' Ability to Perform Daily Tasks. <https://www.gao.gov/assets/700/694425.pdf>.

Waitzberg, R. et al. (2021). The Structure and Financing of Health Care Systems Affected How Providers Coped With COVID-19, *The Milbank Quarterly*, Vol. 99/2, pp. 542-564.

Walker K, Hall R, Wodchis W (2019b). Evaluation of six integrated funding model pilot projects—a difference-in-differences analysis. Toronto: Health System Performance Research Network.

Walker K, Hall R, Embuldeniya G, Kirst M, Wodchis W (2019a). Integrated funding models central evaluation. Toronto: Health System Performance Research Network.

Waters, Teresa M.; Daniels, Michael J.; Bazzoli, Gloria J.; Perencevich, Eli; Dunton, Nancy; Staggs, Vincent S. et al. (2015): Effect of Medicare's Nonpayment for Hospital-Acquired Conditions: Lessons for Future Policy. *JAMA Intern Med* 175 (3), S. 347–354. DOI: 10.1001/jamainternmed.2014.5486.

Whaley CM, Dankert C, Richards M, and Bravata D (2021). An Employer-Provider Direct Payment Program Is Associated With Lower Episode Costs. *Health Affairs* 40 (3): 445-452.

Whitaker, Samuel R.; Nisar, Sohail; Scally, Andrew J.; Radcliffe, Graham S. (2019): Does achieving the 'Best Practice Tariff' criteria for fractured neck of femur patients improve one year outcomes? *Injury* 50 (7), S. 1358–1363. DOI: 10.1016/j.injury.2019.06.007.

Wilcock A.D. et al. (2019). Association between Medicare's Mandatory Joint Replacement Bundled Payment Program and Post-Acute Care Use in Medicare Advantage, *JAMA Surgery*, Vol. 155/1, pp. 884.

Wilson, Michael; Guta, Adrian; Waddell, Kerry; Lavis, John; Reid, Robert; Evans, Cara (2020): The impacts of accountable care organizations on patient experience, health outcomes and costs: a rapid review. *Journal of Health Services Research & Policy* 25 (2), S. 130–138. DOI: 10.1177/1355819620913141.

Yee, Christine A.; Pizer, Steven D.; Frakt, A (2020): Medicare's Bundled Payment Initiatives for Hospital-Initiated Episodes: Evidence and Evolution. *Milbank Q* 98 (3), S. 908–974. DOI: 10.1111/14680009.12465.

Zhang, Hui; Cowling, David W.; Graham, Joanne M.; Taylor, Erik (2019): Five-year Impact of a Commercial Accountable Care Organization on Health Care Spending, Utilization, and Quality of Care. In: *Medical Care* 57 (11). [https://journals.lww.com/lwwmedicalcare/Fulltext/2019/11000/Five\\_year\\_Impact\\_of\\_a\\_Commercial\\_Accountable\\_Care.2.aspx](https://journals.lww.com/lwwmedicalcare/Fulltext/2019/11000/Five_year_Impact_of_a_Commercial_Accountable_Care.2.aspx).

Zogg, Cheryl K.; Metcalfe, David; Judge, Andrew; Perry, Daniel C.; Costa, Matthew L.; Gabbe, Belinda J. et al. (2021): Learning from England's Best Practice Tariff: Process Measure Pay-for-Performance Can Improve Hip Fracture Outcomes. *Annals of Surgery*. [https://journals.lww.com/annalsofsurgery/Fulltext/9000/Learning\\_from\\_England\\_s\\_Best\\_Practice\\_Tariff\\_93747.aspx](https://journals.lww.com/annalsofsurgery/Fulltext/9000/Learning_from_England_s_Best_Practice_Tariff_93747.aspx).

Zorginstituut Nederland (2021): Factsheet multidisciplinaire zorg en zorgvernieuwing bij de huisarts. Diemen.

Zuckerman, Rachael B.; Sheingold, Steven H.; Orav, E. John; Ruhter, Joel; Epstein, Arnold M. (2016): Readmissions, Observation, and the Hospital Readmissions Reduction Program. *New England Journal of Medicine* 374 (16), S. 1543–1551. DOI: 10.1056/NEJMsa1513024.

## Annex A. Comprehensive Care for Joint Replacement model regional target prices (in US\$), 2021-22

Region	MS-DRG 469/no fracture	MS-DRG 521/with fracture	MS-DRG 470/no fracture	MS-DRG 522/with fracture
New England	37 700	52 813	20 379	38 784
Middle Atlantic	36 481	55 684	20 384	41 577
East North Central	35 022	51 990	19 477	40 057
West North Central	33 279	50 465	18 956	39 396
South Atlantic	35 189	53 392	19 950	40 216
East South Central	34 904	53 190	19 691	40 511
West South Central	37 453	57 434	21 128	44 602
Mountain	31 459	50 796	18 682	38 728
Pacific	34 147	51 873	18 858	38 139

Note: MS-DRG 469: Major hip and knee joint replacement or reattachment of lower extremities with major complications or comorbidities or total ankle replacement; MS-DRG 470: Major hip and knee joint replacement or reattachment of lower extremities without major complications or comorbidities; MS-DRG 521: Hip replacement with principal diagnosis of hip fracture with major complications or comorbidities; MS-DRG 522:

Hip replacement with principal diagnosis of hip fracture without major complications or comorbidities

Source: Centers for Medicare and Medicaid Services (<https://innovation.cms.gov/innovation-models/cjr>)

## Annex B. Oncology Care Model quality measures

OCM measure number	Measure name	Measure source
OCM-2	Risk-adjusted proportion of patients with all-cause emergency department visits or observation stays that did not result in a hospital admission within the 6-month episode	Claims
OCM-3	Proportion of patients that died who were admitted to hospice for 3 days or more	Claims
OCM-4a	Oncology: medical and radiation. Pain intensity quantified	Practice reported
OCM-4b	Oncology: medical and radiation. Plan of care for pain	Practice reported
OCM-5	Preventive care and screening: screening for depression and follow-up plan	Practice reported
OCM-6	Patient-reported experience of care	CMS acquired data

Source: Centers for Medicare and Medicaid Services (<https://innovation.cms.gov/innovation-models/oncology-care>).

## Annex C. Medicare Shared Savings Program. Accountable Care Organisations quality measures benchmarks for performance year 2020-21

Domain	Measure	Description	Pay-for-performance phase in			30 <sup>th</sup> perc.	40 <sup>th</sup> perc.	50 <sup>th</sup> perc.	60 <sup>th</sup> perc.	70 <sup>th</sup> perc.	80 <sup>th</sup> perc.	90 <sup>th</sup> perc.
			PY1	PY2	PY3							
Patient/caregiver experience	ACO-1	Getting timely care, appointment and information	R	P	P	30	40	50	60	70	80	90
Patient/caregiver experience	ACO-2	How well your provider communicates	R	P	P	30	40	50	60	70	80	90
Patient/caregiver experience	ACO-3	Patients' rating of provider	R	P	P	30	40	50	60	70	80	90
Patient/caregiver experience	ACO-4	Access to specialists	R	P	P	30	40	50	60	70	80	90
Patient/caregiver experience	ACO-5	Health promotion and education	R	P	P	56.26	57.57	58.86	60.08	61.39	62.83	64.90
Patient/caregiver experience	ACO-6	Shared decision making	R	P	P	56.82	57.98	59.17	60.20	61.46	62.77	64.90
Patient/caregiver experience	ACO-7	Health status/functional status	R	R	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Patient/caregiver experience	ACO-34	Stewardship of patient resources	R	P	P	24.23	25.47	26.68	27.90	29.19	30.88	32.90
Patient/caregiver experience	ACO-45	Courteous and helpful office staff	R	R	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Patient/caregiver experience	ACO-46	Care coordination	R	R	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Care coordination/patient safety	ACO-8	Risk standardised, all condition readmissions	R	R	P	15.75	15.62	15.50	15.38	15.23	14.97	14.56
Care coordination/patient safety	ACO-38	Risk standardised acute admission rates for patients with multiple chronic conditions	R	R	P	66.46	62.37	58.85	55.49	52.15	48.57	43.74
Care coordination/patient safety	ACO-43	Ambulatory sensitive condition acute composite (AHRQ prevention quality indicator 91)	R	R	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Care coordination/	ACO-13	Falls: screening for future fall risk	R	P	P	30	40	50	60	70	80	90



patient safety												
Preventive care	ACO-14	Preventive care and screening: influenza immunisation	R	P	P	30	40	50	60	70	80	90
Preventive care	ACO-17	Preventive care and screening: tobacco use, screening and cessation intervention	R	P	P	30	40	50	60	70	80	90
Preventive care	ACO-18	Preventive care and screening: screening for depression and follow up plan	R	R	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Preventive care	ACO-19	Colorectal cancer screening	R	R	P	30	40	50	60	70	80	90
Preventive care	ACO-20	Breast cancer screening	R	R	P	30	40	50	60	70	80	90
Preventive care	ACO-42	Statin therapy for the prevention and treatment of cardiovascular disease	R	R	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A
At risk population depression	ACO-40	Depression remission at twelve months	R	R	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A
At risk population diabetes	ACO-27	Haemoglobin A1C poor control	R	P	P	70	60	50	40	30	20	10
At risk population hypertension	ACO-28	Controlling high blood pressure	R	P	P	30	40	50	60	70	80	90

Note: P: pay-for-performance; R: pay-for-reporting; N/A: not available

Source: Centers for Medicare and Medicaid Services (<https://www.cms.gov/files/document/20202021-quality-benchmarks.pdf>).

## Annex D. End-Stage Renal Disease Quality Initiative Program quality measures, Payment Year 2022 and 2023

### *Clinical Care Measure Domain*

Kt/V Dialysis Adequacy

Standardized Transfusion Ratio Vascular

Access Type:

- Fistula
- Catheter

Hypercalcemia

Ultrafiltration Rate

### *Care Coordination Measure Domain*

Standardized Readmission Ratio

Standardized Hospitalization Ratio

Percentage of Prevalent Patients Waitlisted

Clinical Depression Screening and Follow-Up

### *Safety Measure Domain*

National Healthcare Safety Network Bloodstream Infection

National Healthcare Safety Network Dialysis Event Reporting

Medication Reconciliation for Patients Receiving Care at Dialysis Facilities

### *Patient and Family Engagement Domain*

In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems (ICH CAHPS) Survey

## Annex E. Sentinel Events and Hospital Acquired Complications List by the Australian Independent Hospital Pricing Authority

Sentinel Event		Hospital Acquired Complication		
No.	Event	No.	Condition	Diagnosis
1	Surgery or other invasive procedure performed on the wrong site resulting in serious harm or death	1	Pressure injury	<ul style="list-style-type: none"> <li>• Stage III ulcer</li> <li>• Stage IV ulcer</li> <li>• Unspecified decubitus ulcer and pressure area</li> <li>• Unstageable pressure injury</li> <li>• Suspected deep tissue injury</li> </ul>
2	Surgery or other invasive procedure performed on the wrong patient resulting in serious harm or death	2	Falls resulting in fracture or intracranial injury	<ul style="list-style-type: none"> <li>• Intracranial injury</li> <li>• Fractured neck of femur</li> <li>• Other fractures</li> </ul>
3	Wrong surgical or other invasive procedure performed on a patient resulting in serious harm or death	3	Healthcare associated infection	<ul style="list-style-type: none"> <li>• Urinary tract infection</li> <li>• Surgical site infection</li> <li>• Pneumonia</li> <li>• Blood stream infection</li> <li>• Infections or inflammatory complications associated with peripheral/central venous catheters</li> <li>• Multi-resistant organism</li> <li>• Infection associated with prosthetics/implantable devices</li> <li>• Gastrointestinal infections</li> <li>• Other high impact infections</li> </ul>
4	Unintended retention of a foreign object in a patient after surgery or other invasive procedure resulting in serious harm or death	4	Surgical complications requiring unplanned return to theatre	<ul style="list-style-type: none"> <li>• Post-operative haemorrhage/haematoma requiring transfusion and/or return to theatre</li> <li>• Surgical wound dehiscence</li> <li>• Anastomotic leak</li> <li>• Vascular graft failure</li> <li>• Other surgical complications requiring unplanned return to theatre</li> </ul>
5	Haemolytic blood transfusion reaction resulting from ABO incompatibility resulting in serious harm or death	5	Unplanned intensive care unit admission	□ Unplanned admission to intensive care unit
6	Suspected suicide of a patient in an acute psychiatric unit or acute psychiatric ward	6	Respiratory complications	<ul style="list-style-type: none"> <li>• Respiratory failure including acute respiratory distress syndrome requiring ventilation</li> <li>• Aspiration pneumonia</li> <li>• Pulmonary oedema</li> </ul>
7	Medication error resulting in serious harm or death	7	Venous thromboembolism	<ul style="list-style-type: none"> <li>• Pulmonary embolism</li> <li>• Deep vein thrombosis</li> </ul>
8	Use of physical or mechanical restraint resulting in serious harm or death	8	Renal failure	□ Renal failure requiring haemodialysis or continuous veno-venous haemodialysis
9	Discharge or release of an infant or child to an unauthorised person	9	Gastrointestinal bleeding	□ Gastrointestinal bleeding
10	Use of an incorrectly positioned oro- or nasogastric tube resulting in serious harm or death	10	Medication complications	<ul style="list-style-type: none"> <li>□ Drug related respiratory complications/depression</li> <li>□ Haemorrhagic disorder due to circulating anticoagulants</li> <li>□ Movement disorders due to psychotropic medication</li> </ul>

				<input type="checkbox"/> Serious alteration to conscious state due to psychotropic medication
		11	Delirium	<input type="checkbox"/> Delirium
		12	Incontinence	<input type="checkbox"/> • Urinary incontinence <input type="checkbox"/> • Faecal incontinence
		13	Endocrine complications	<input type="checkbox"/> • Malnutrition • <input type="checkbox"/> Hypoglycaemia
		14	Cardiac complications	<input type="checkbox"/> Heart failure and pulmonary oedema <input type="checkbox"/> Arrhythmias <input type="checkbox"/> Cardiac arrest  <input type="checkbox"/> Acute coronary syndrome including unstable angina, STEMI and NSTEMI <input type="checkbox"/> Infective endocarditis
		15	Third and fourth degree perineal laceration during delivery	<input type="checkbox"/> Third and fourth degree perineal laceration during delivery
		16	Neonatal birth trauma	<input type="checkbox"/> • Neonatal birth trauma <input type="checkbox"/> • Hypoxic ischaemic encephalopathy

Source: Independent Hospital Pricing Authority (<https://www.ihpa.gov.au/what-we-do/safety-and-quality>).