

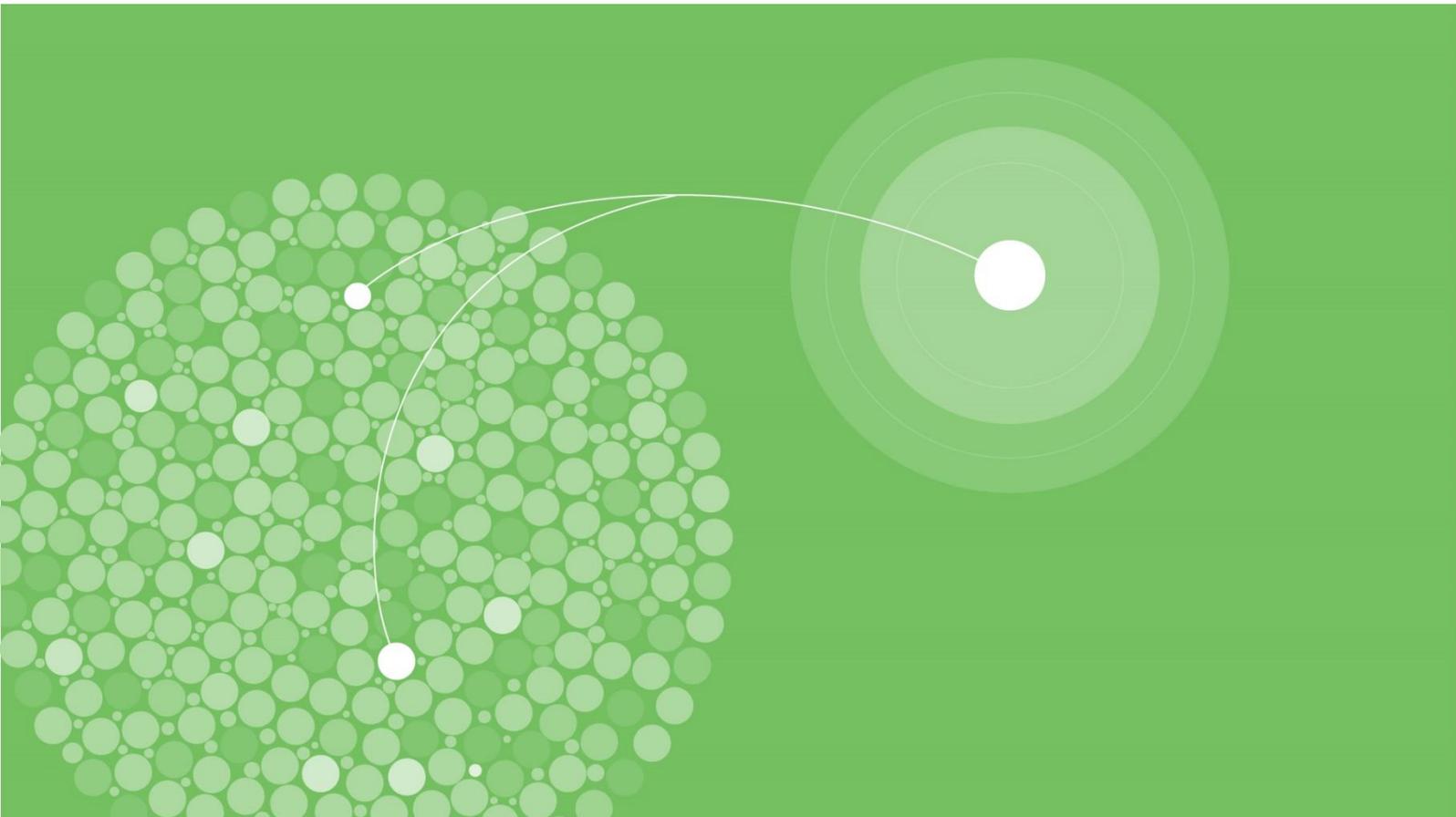
MILLIMAN REPORT

# How to equalise risk in healthcare systems

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## 1. Introduction

Health insurance, like most insurance, can be priced using risk ratings, where premiums are set based on the relative risk of insured lives and the propensity to claim. However this may result in health insurance being unaffordable for the most high-risk members of society. As a result, many governments restrict the use of risk ratings in health insurance markets, in favour of 'community rating'—where insured lives pay the same premium regardless of risk.

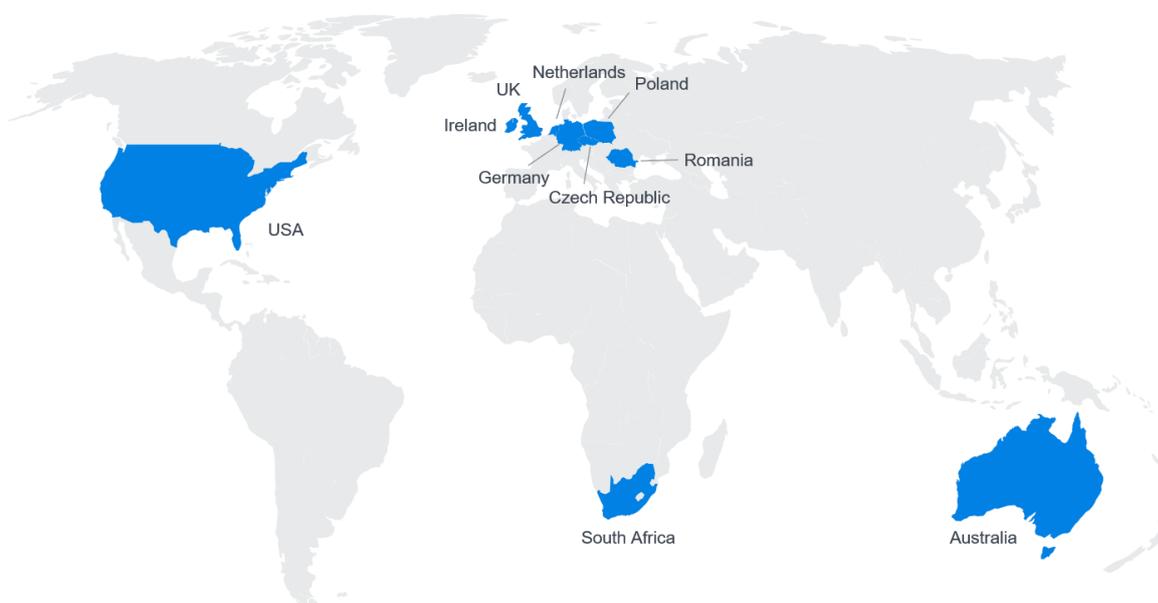
In a community-rated system where all consumers are charged the same premium, many high risk consumers are protected from paying unaffordable premiums. Others consumers, such as healthier or younger individuals, will generally pay a higher premium to subsidise sicker and often older individuals. Consequently, premium revenue collected by insurers or other risk-bearing entities may no longer truly reflect the underlying risk associated with their insured populations. Insurers and risk-bearing entities differ by geographic location, product design, provider networks, reputation, and management efficiency, amongst other things. Community rating removes much of the relationship between premiums and expected claims costs at the individual level, which is where most purchasing decisions are made, and this can lead to an uneven distribution of risk among insured populations. In the absence of a secondary "smoothing" mechanism, those that attract a healthier-than-average population may generate high underwriting surplus, and those that attract a sicker-than-average population may generate financial losses.

In many healthcare systems and health insurance markets around the world where risk rating is not allowed, risk equalisation is used to enhance consumer protection and market stability. Its aim is to compensate for the risk profiles of different groups of the population such that the additional medical expenses associated with high-risk members are shared amongst healthcare providers or insurance companies. This is generally achieved by the transfer of payments through a risk equalisation pool, or similar mechanism. The exact form of risk equalisation varies from country to country depending on the specific nature of each one's healthcare system and interaction with the private health insurance market.

In this paper we have set out a 'how-to' guide to risk equalisation, or risk adjustment. We have referenced illustrative examples from around the world to explain the challenges and practicalities that should be considered in the design and management of a risk equalisation system.

The countries considered in the illustrative examples outlined in this paper are highlighted in Figure 1. This includes a mix of countries that currently have functioning risk equalisation schemes as part of their healthcare systems as well as countries where healthcare reform or the implementation of risk equalisation was not successful. It is important to consider both successes and failures in understanding the challenges faced in implementing and managing a risk equalisation system.

FIGURE 1: COUNTRIES CONSIDERED IN THIS PAPER



This paper outlines how to implement a risk equalisation system and is structured as follows:

- **Section 2** sets out the rationale for developing a risk equalisation system
- **Section 3** describes the considerations for designing the system, including the following:
  - Choice of algorithm and parameters
  - Calculation approach—prospective or retrospective
  - Solutions for handling exceptionally high claims
  - Competition and efficiency
  - Ongoing management
- **Section 4** sets out some examples of external challenges, including legal, political and general external challenges.
- **Section 5** contains the author' concluding comments

## 2. Why develop a risk equalisation system?

Before discussing the key considerations for developing a risk equalisation system, we first address the purpose of risk equalisation, why this mechanism exists in various healthcare systems around the world and how it works.

Risk equalisation can exist in various forms and the way in which different healthcare funders share risk varies according to each system's structure, policies and objectives. For example, in some healthcare systems, risk equalisation involves redistributing funds among insurers, e.g., Ireland and the Netherlands, while in other healthcare systems it involves allocating total resources among funders in an equitable way, e.g., the National Health Service (NHS) in the United Kingdom.

Many health insurance markets have restrictions on the ability of insurers to charge premiums that reflect the true underlying risk of each insured life. In these markets, insurers charge a community-rated premium reflecting one or more broad risk characteristics in the market, rather than a risk-rated premium that reflects the risk profile of the individual taking out the policy. This is generally a policy decision aimed at promoting solidarity in the market and ensuring that higher-risk individuals have access to health insurance products.

One challenge that can arise in such a market is the incentive for insurers to target low-risk lives and avoid those who are more likely to make large health insurance claims. This can result in product design, pricing and marketing strategies that serve the needs of the healthy at the expense of those in poor health. These problems can be compounded where there are differences in the risk profiles of the insured population of different insurers. Where an insurer has a higher proportion of unhealthy customers, it would need to charge higher premiums on average to reflect this position. By contrast, an insurer with lower-risk customers can charge lower premiums. This results in the less healthy customers paying higher premiums on average, which is contrary to the one of the key aims of community rating.

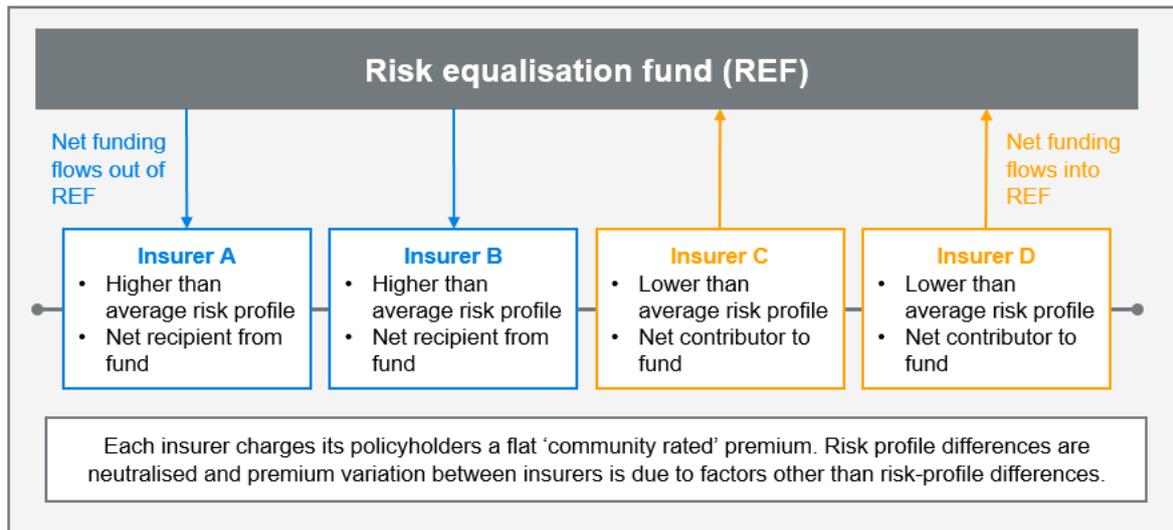
In addition, in a community-rated market, the insurer with low-risk customers can gain a competitive advantage on the other insurers by charging premiums that are marginally lower, but perhaps not as low as the premiums that could be justified based on the risk profile. This could allow an insurer with a low risk membership to generate higher than average underwriting surplus, offer richer benefits to customers, or pay healthcare providers more, while an insurer with a high risk membership could struggle to maintain profit levels, offer robust benefits to customers, or fairly compensate healthcare providers. Without some mechanism to equalise the risk profiles of the two insurers, this approach leads to significant challenges, not just for the high risk insurer, but also for the stability of the market as a whole.

Similarly, hospitals and other healthcare providers may be paid based on the activities they carry out or based on the number of patients treated. If one hospital tends to treat higher-risk patients or those more likely to experience complications, relative to another hospital, then the remuneration received may not adequately reflect the complexity of the activity carried out. A risk equalisation system can help ensure the allocation of resources among healthcare providers more fairly reflects the complexity of the populations covered.

Risk equalisation can also incentivise efficiency. As insurers are less likely to compete on risk selection, they should be encouraged to ensure that delivery of healthcare occurs as efficiently as possible. This could result in lower care costs and lower premiums or better patient outcomes. If the risk equalisation system is effective, and insurers are competing on efficiency rather than risk selection, lives with higher than average healthcare costs should in theory be more appealing to insurers, as there is greater capacity to improve efficiency for lives with higher claims than lives with little or no claims. Moreover, insurers or healthcare providers with an aptitude for serving specific populations or medical needs can focus on what they are good at even if their target population is higher risk. In this type of environment, efficient health insurers or healthcare providers are more likely to hold a better market position than their inefficient counterparts, irrespective of the make-up of their insured population.

Figure 2 illustrates how a risk equalisation system for a health insurance market could work in practice where insurers with higher than average risk profiles are compensated through net transfers from insurers with lower than average risk profiles. Ultimately, risk profile differences among insurers should be neutralised and premium variation among insurers should arise from factors other than differences in risk profile. In practice, it may not be possible to neutralise all risk-profile differences and there will be many practical and political challenges to overcome. These challenges and considerations are discussed in the sections that follow.

FIGURE 2: RISK EQUALISATION FUND TRANSFERS FOR PRIVATE HEALTH INSURERS



In Figure 3, we introduce the risk equalisation systems that will be discussed in this paper and provide some context around why risk equalisation exists in these markets and how it operates.

FIGURE 3: RISK EQUALISATION AROUND THE GLOBE

<b>Irish private health insurance market</b>	In Ireland risk equalisation is used to support a community-rated, voluntary private health insurance market. Each insurer is charged a stamp duty in respect of each insured life. The stamp duties are paid into a central fund. Risk equalisation transfers are made from the fund, via the tax system, in respect of insured lives based on age, gender, product type and utilisation of some healthcare services.
<b>The Netherlands</b>	In the Netherlands, citizens are obliged to purchase basic health insurance. Insurers are not allowed to risk rate premiums and there is an obligation to accept everyone. Prospective morbidity-based risk equalisation is used to support this community-rated, compulsory health insurance market for basic healthcare. Health insurers are compensated based on age, gender and the prevalence of chronic diseases, based on a broad set of morbidity criteria ranging from diagnosis and pharmaceutical claims up to physiotherapy and usage of medical diagnostic devices. The system also allows for other characteristics that have a correlation with health, such as socioeconomic status and source of income.
<b>English NHS</b>	In the English NHS, risk equalisation is used to share out the total available funding between local purchasing bodies—Clinical Commissioning Groups (CCGs)—rather than having a transfer of funds between CCGs. Resources are allocated according to a funding allocation formula that accounts for expected differences in healthcare resource utilisation among CCGs, based on parameters such as population size, age/sex mix, supply-side variables, unmet need/health inequalities and market forces (adjustments for how the cost of providing services differs by area, e.g., land and staff costs).

<p><b>The United States of America</b></p>	<p>In the US, risk equalisation is more commonly referred to as risk adjustment and is used in the commercial individual and small employer group markets to transfer funds between insurers based on the riskiness of their members. The transfer formula accounts for health status risk (as measured by pharmacy and diagnosis-based risk scores), geographic variations in cost, and cost and utilisation variations associated with different benefit designs. Risk equalisation between healthcare providers is used in direct government payments under Medicare and Veterans Healthcare Administration. Risk equalisation is also used in government-funded programs with insurance company intermediaries like Medicare Advantage and Medicaid managed care to pay private insurers on a risk-adjusted basis.</p>
<p><b>Australia</b></p>	<p>The Australian risk equalisation scheme was introduced in 2007 and has been administered by the Australian Prudential Regulation Authority since 2015. It includes an Age-Based Pool that shares higher than average claims costs of older individuals and a High Cost Claimants Pool (HCCP) for the most expensive claimants. The Age Based Pool is the main component of the risk equalisation scheme while the HCCP is a secondary component, accounting for a much lower percentage of claims.</p>
<p><b>Czech Republic</b></p>	<p>In the Czech Republic, the risk equalisation scheme redistributes premiums between sickness funds based on age, gender and pharmaceutical groupings (PCG). In addition, ex post partial compensation is allowed for the most expensive lives. The redistribution is centralised by the General Health Insurance Fund—<i>Všeobecná Zdravotní Pojišťovna (VZP)</i>—through a special account.</p>
<p><b>Germany</b></p>	<p>The German health insurance system includes both statutory health insurance and private health insurance. In January 2009, a prospective morbidity-based risk equalisation system was implemented for budget allocation across all statutory sickness funds. The model is regression-based, and uses age, gender and 106 hierarchical morbidity conditions (called ‘hierarchical condition categories,’ or HCCs) derived from all sites of healthcare service. Pharmacy claims are used to validate certain medical diagnoses. In many aspects, the model is similar to what is being used in the US in commercial markets (such as the Department of Health and Human Services Hierarchical Condition Categories, or HHS-HCC) and in Medicare.</p>

### 3. Designing the system

A key aim of risk equalisation is to spread risk across all insurers or healthcare providers, such that higher-risk customers continue to have access to affordable healthcare. However, it may not be possible or straightforward to define or put a value on 'risk.' Therefore different healthcare systems use different proxies or parameters to estimate the 'riskiness' of insured lives. Riskiness depends on the health status of the insured lives, with healthy individuals being classified as low-risk and individuals in poor health being classified as high-risk, but again this is not something that is necessarily easy to quantify or predict. In reality risk level is not a binary choice between low and high. A person's risk level generally relates to factors that affect the likelihood of future claims or healthcare resource use. Risk equalisation systems can try to quantify this by using past medical history including diagnostic reports, hospital utilisation or pharmaceutical records, but this information may not be freely available or recorded in a consistent manner, and may not be fully predictive of future risk.

In designing a risk equalisation system, there are a number of considerations, including:

- The choice of algorithm or model
- The choice of parameters
- The calculation approach—prospective or retrospective
- The impact on market competition, stability and efficiency
- Special considerations for exceptionally high claims
- The impact on competition and efficiency

Many of the considerations above will be influenced by the availability of accurate and relevant data. In this section of the report we look at each of these considerations in more detail.

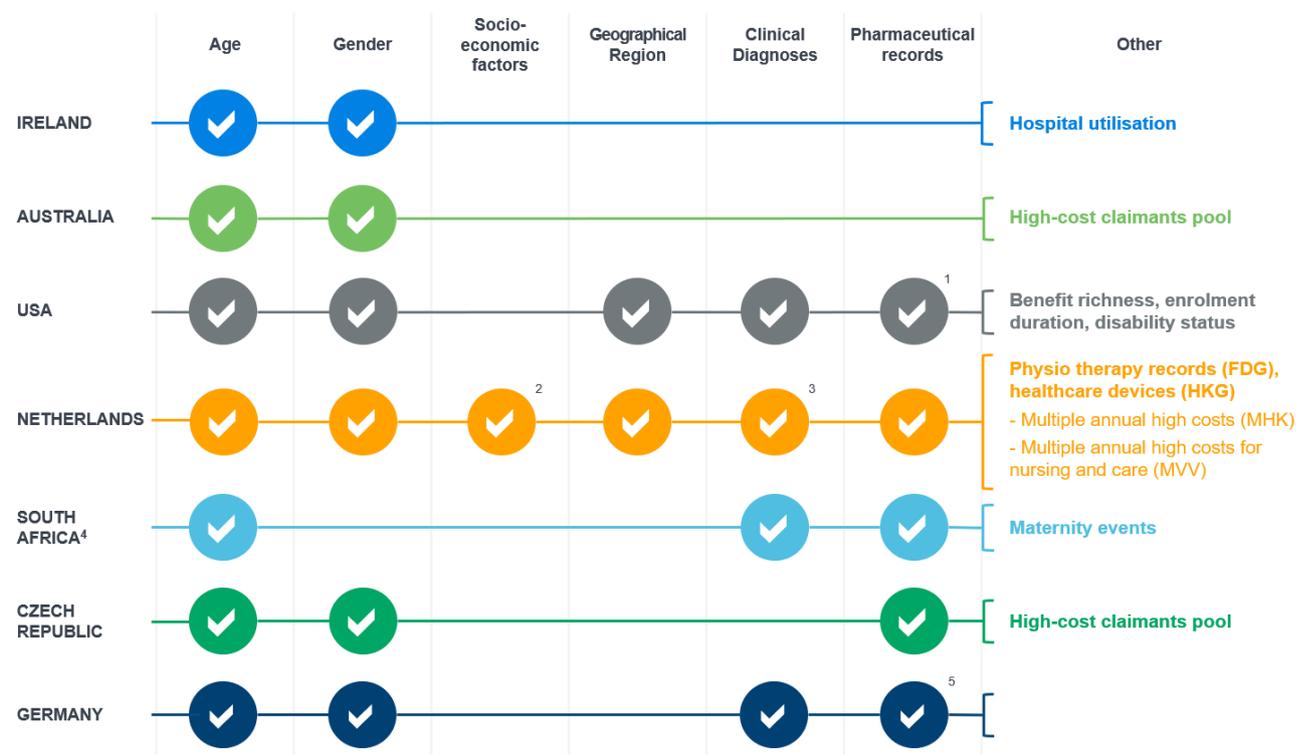
#### **CHOICE OF ALGORITHM AND PARAMETERS**

The choice of parameters, or risk adjustors, is a key consideration for a risk equalisation system. Simple risk equalisation systems may use demographic parameters such as age and/or gender as a proxy for health status, perhaps with an additional payment for hospital utilisation, such as the risk equalisation scheme in Ireland, or a High Cost Claimants Pool (HCCP), such as the system in Australia). However, claims costs for two 50-year-old males may vary significantly and therefore other parameters should also be considered. More complex systems use parameters that can more accurately predict claims costs, such as medical or pharmaceutical history, and may even include geographical and socioeconomic parameters to estimate the riskiness of the insured lives.

The number of parameters will affect the complexity of the system. With potentially large amounts of money exchanging hands, it is generally preferable to have a relatively transparent system, which may limit the choice of parameters. Although simplicity is important from a transparency point of view, there is also a balance to be struck between having an overly simplistic system and an accurate one. If the system is not accurate it may not be effective in preventing risk selection and fairly compensating differences in risk. Precision at an individual customer level is not as important as precision at the expected population level when balancing the cost of increased complexity.

The infographic in Figure 4 outlines some of the parameters used in risk equalisation systems around the world.

FIGURE 4: PARAMETERS USED IN RISK EQUALISATION SCHEMES AROUND THE WORLD



1 This is used to a limited extent in commercial (IND/SG), in some Medicaid states, and in managed Medicare.

2 Socioeconomic status x age (SES), source of income x age (AVI) and household composition x age (numbers of persons per address, or PPA).

3 Primary and secondary diagnostic groups (DKGs).

4 Proposed factors of shadow scheme.

5 For validating certain medical diagnoses.

The key challenge in design is identifying the extent to which differences in claims costs are actually caused by differences in risk profile. For example, insurers may have different claims payment approaches or different levels of healthcare management, which may result in higher or lower claims on average for the same risk profile. The richness of benefits can also impact claims costs for individuals with the same risk profile. The risk equalisation system should aim to only equalise differences in claims costs due to differences in risk profile.

The system should isolate differences relating to risk profile from other factors by identifying parameters that can influence risk profile and then equalising claims costs based on those parameters. This can include age, sex or measures of health (e.g., diagnosis with certain medical conditions, pharmaceutical data). Other factors can also be included like geographic location or income level in addition to socioeconomic parameters.

In terms of predictive accuracy, diagnosis-based risk models generally have slightly higher predictive accuracy than pharmacy-based models, as pharmacy-based models can be sensitive to treatment and prescription patterns, where diagnosis-based data is not.<sup>1</sup> The impact of comorbidities may also be considered although it will increase the complexity of the calculation. Despite the increased predictive accuracy, treatment bias may be an issue with diagnosis-based data such as is the hospital diagnostic-related groups (DRGs). For example, DRGs will only pick up patients who have been treated in a hospital setting, so chronic patients who are treated in hospital will be classified with a certain diagnosis but similar patients being treated by a general practitioner or in a primary care facility may not. Therefore diagnosis-based risk factors, and pharmaceutical-based factors, are sensitive to treatment and prescription patterns.

1 Society of Actuaries (October 2016). Accuracy of Claims-Based Risk Scoring Models, Tables 4.2.1 and 4.2.2. Retrieved 5 December 2019 from <https://www.soa.org/globalassets/assets/Files/Research/research-2016-accuracy-claims-based-risk-scoring-models.pdf>.

Different algorithms can be used such as a simple algorithm to linear regression models like ordinary least squares (OLS) or more advanced generalised linear models (GLMs). Machine learning techniques can also be used to predict the value of healthcare costs based on a series of parameters, but lack of transparency may be an issue with a model that is based solely on machine learning techniques. All other things being equal, the algorithm underlying the risk equalisation system should in effect estimate the premium that would have been used if insurers were able to risk-rate (and had access to all the relevant data), and to recognise the difference between that and the actual premium charged. However, insurers all operate differently, and as a result differences in efficiency, claims payment procedures and benefit richness should also be allowed for where possible. The more parameters that are taken into account in the algorithm, the higher the potential for a sophisticated and effective system, but with a corresponding increase in complexity at the expense of transparency and ease of understanding of the system.

In the US in particular, some issues arose when the Patient Protection and Affordable Care Act (ACA) was introduced that were due to the lack of predictability in terms of the transfer payments. This is partially because of the use of a concurrent rather than retrospective calculation approach (which is discussed later in this paper). The impact of the lack of predictability is outlined in Illustrative Example 1.

#### ILLUSTRATIVE EXAMPLE 1: LACK OF PREDICTABILITY

In the US, under the ACA's individual and small employer group risk adjustment program, payments are made according to a formula that depends on a number of different parameters. This includes average risk scores, premiums, benefit richness, area and other demographic characteristics of each insurer relative to other insurers in the same market. The ACA uses a modified community rating, where premiums are allowed to vary based on a member's age, geographic area and tobacco usage, in addition to plan design, but are not allowed to vary by gender, health status or other factors. The formula underlying the risk transfers must factor in that some characteristics are already accounted for through premiums, and therefore exclude their impact from the transfer payments. Due to the formula's reliance on the demographic characteristics of other insurers and the complexity of the formula in general, transfers can be difficult to understand, let alone estimate or predict. This is primarily due to the concurrent way in which the transfers are calculated, which is discussed further below.

Transfer payments often account for a material portion of an insurer's premium, either increasing or decreasing revenue significantly, relative to target profit margins. For example, in the 2018 benefit year, the absolute value of transfers was an average of 9% of premium in the individual market and 4% of premium in the small employer market,<sup>2</sup> with many issuers receiving or paying significantly higher transfer amounts. While large transfer payments are a sign that risk equalisation is necessary, the calculation and eventual settlement of transfer payments does not occur until at least six months after the end of each benefit year, thereby complicating premium setting and financial reporting. Furthermore, ACA risk equalisation remains a controversial program in the US, which has resulted in frequent policy changes and seen a number of lawsuits that challenge the implementation and fairness of the program, with mixed outcomes, all of which contributes to the uncertainty of future transfer payments.

The choice of parameters and algorithm will also depend on the level of data available. Data availability may be limited for a number of reasons, for example the specific data required may not be collected, it may not be collected in a consistent or transparent manner or there may be legal restrictions on using it e.g., privacy of medical records. The complexity of national healthcare systems means that it can take a long time to improve the level and quality of data recorded, and in some cases legislative changes are required to allow or compel stakeholders to record data in the required format.

<sup>2</sup> Richard C Van Kleef, René CJA Van Vliet and Wynand PMM Van de Ven. Risk equalisation in the Netherlands: An empirical evaluation.

Data gaps can significantly impair the ability to create good risk equalisation systems, compromising the capacity of the system to facilitate competition and efficiency and prevent risk selection. However, it is possible to create risk equalisation systems when data is limited. Illustrative Example 2 considers the risk equalisation system in Ireland, where lack of data is a challenge.

#### ILLUSTRATIVE EXAMPLE 2: LACK OF DATA

In Ireland, the risk equalisation scheme was originally developed using age and gender as a proxy for health. A risk equalisation payment was made to insurers based on age and gender, the 'age related credit' (ARC), for older insured lives. One disadvantage of this approach is that the ARC overcompensates for older healthier lives and undercompensates for older sicker lives. In addition, no risk equalisation payments were made in respect of high-risk younger lives.

Lack of data is an issue in Ireland in respect of claims recording. While public hospitals in Ireland record DRGs claims data that allows for consistent analysis of inpatient and day-case claims arising in a public hospital setting, similar data is not recorded on a consistent basis across all private hospitals (nor is it currently recorded in public hospitals in respect of outpatient treatment). It is estimated that there is a significant cost involved for private hospitals to provide relevant and consistent DRG data that is reliable enough to use within the risk equalisation system, and even if the Irish government introduced legislative changes requiring private hospitals to record this data it may take some time to introduce fully.

In order to improve the 'health status' element of the Irish risk equalisation scheme without specific claims data, a Hospital Utilisation Credit (HUC) was introduced in 2013. The HUC is a payment made to insurers based on hospital utilisation of insured lives. The only data required to implement this change to the risk equalisation scheme was the number of inpatient nights spent in hospital and the number of day-case procedures in a hospital setting split by age and gender. This information was readily available in the claims data provided to insurers.

The HUC has the benefit of redistributing some of the risk equalisation credits from older healthier lives to younger less healthy lives, where healthiness is determined based on hospital utilisation. It has achieved its aim of improving the health status element of the risk equalisation scheme to some extent, but there are limitations to its use. Firstly, the utilisation credit is a flat payment based on whether the patient is seen in an inpatient or day-case setting and therefore does not reflect the varying costs of treatments. Secondly, the possibility of perverse incentives mean that the HUC is kept low to avoid encouraging overutilisation and as a result the scheme does not fully compensate for differences in health status. However, based on estimated figures for 2018, the HUC had redistributed about 30% of the total risk equalisation fund to lives with instances of hospital utilisation, instead of making payments purely based on age and gender.

Where lack of data is not an issue, it is possible to see large improvements in the predictive accuracy of risk equalisation systems through the introduction of additional parameters. The Dutch risk equalisation system is a prime example of how the inclusion of new parameters has improved the accuracy and effectiveness of the system over time. We have looked at this in more detail in Illustrative Example 3.

### ILLUSTRATIVE EXAMPLE 3: REDUCING RISK SELECTION THROUGH CONTINUOUS IMPROVEMENTS TO THE MODEL

In the Netherlands, risk equalisation was initially introduced through a simple system using demographic factors (age and gender) in 1993. The introduction of the Health Insurance Act (Zvw) in 2006 was a turning point for risk equalisation in the Netherlands. The Zvw further implemented government policy to compensate health insurers for insuring high-risk individuals but it also focused on preventing risk selection of unhealthy lives and stimulating efficiency in the health insurance market. Health insurers were instructed to specifically limit costs and improve the quality of care. The role of the health insurance company changed substantially, with the focus shifting from selecting and pricing the risks of insured lives to selecting and pricing healthcare providers, with insurers implementing targeted control of healthcare costs.

Since the introduction of the Zvw, the risk equalisation system has been developed to become the sophisticated model that is in place today, which allows for health status through DRGs and Pharmaceutical-based Cost Groups (PCGs) and other parameters such as geographical region and socioeconomic status. The most recent update to the parameters was in 2018 when the risk equalisation system was developed further to allow for multiple prior years' low costs (MLC). The current system consists of three different models, one for somatic care (e.g., primary care, hospital care and pharmaceuticals), one for mental health care and one for out-of-pocket payments due to mandatory deductibles. The different models and large number of parameters result in a high number of categories of insured lives, which leads to a complex risk equalisation system. However, there is empirical evidence that developing the system to include the additional parameters has increased the predictive accuracy of the system.<sup>3</sup>

Since 2018, the focus has shifted from improving the accuracy of the model to maintaining the model. However, there is current debate regarding whether continuous improvement is required to minimise the predictability of profits and losses for specific subgroups of the insured population to avoid insurers risk-selecting. While the predictive accuracy of the system has been improved through developing the scheme to include additional parameters, not all the parameters are based on information that is available to the insurers (e.g., some of the socioeconomic parameters). This means that insurers are not able to predict the risk equalisation transfers associated with each specific subgroup.

However, over time, if the system is not continuously developed, insurers may be able to predict the profit and losses for specific subgroups based on past information. This could result in increased risk selection, which is against the ethos of the risk equalisation system in the Netherlands. Recent debate in the Dutch market has pointed to machine learning as a possible mechanism for improving the current model to reduce the predictability of profit making or loss making subgroups by insurers. Up until recently machine learning would not have been considered as a realistic solution for the risk equalisation system in the Netherlands due to a lack of transparency.

To limit the risk of negative risk selection, the Dutch Healthcare Authority, the Nederlandse Zorgautoriteit, recently made a strong call to continue to improve the risk equalisation system and to search for new methods—such as machine learning techniques—in order to minimise predictable profits and losses for specific subgroups and limit risk selection<sup>4</sup>. In this context continuous improvements to the model (by adding more and more parameters and using more advanced, less transparent modelling techniques) seem to be favoured despite the complexity and lack of transparency. In terms of the trade-off between unpredictability and transparency in the Dutch health insurance market at least, transparency seems to be becoming less and less important.

<sup>3</sup> Ibid.

<sup>4</sup> Monitor Zorgverzekeringen 2019, published by the Nederlandse Zorgautoriteit in September 2019.

When choosing the parameters to include in a risk equalisation system, it is also worth considering what to exclude. For example, claims costs may vary for supply-side reasons unrelated to health status, such as access and capacity, supplier-induced demand or practice pattern variation. Many different factors influence healthcare consumption and, therefore, it can be difficult to isolate instances of supplier-induced demand to exclude it from a risk equalisation system. As the main aim of risk equalisation is to equalise differences in claims costs due to health status, therefore differences due to other factors need to be considered, where possible, when defining the data, parameters or algorithm underlying the risk equalisation system.

Benefit richness can also result in higher claims costs. In some health insurance markets, particularly mandatory insurance markets, there is a standardised benefit package and the risk equalisation system reflects the standard basket of benefits. However, in many private health insurance markets, the level of benefit is variable. Individuals have an opportunity to choose richer or poorer benefit packages with differences in the types of services covered, the hospitals or providers covered, the level of accommodation, the level of copayment required etc. For a risk equalisation system this can raise challenges. The system may aim to equalise differences in risk due to the health status of the insured lives, but would typically not wish to equalise differences caused by richness of benefits. It may be unfair to a low-risk person to cross-subsidise the extra claims costs of a higher-risk person if the higher-risk person has a much richer benefit package driving part of the claims cost differences. Many systems use past claims information to calibrate the payment levels and separating the components of past payments can be a challenge.

As well as the level of benefit that insured lives choose, the insurers may also have differences in claims payment procedures or even simply efficiency, which can affect payment levels. It would be counterproductive to have an insurer that operates efficiently, minimising claims payments, for example, if the benefit of this efficiency was effectively shared with other insurers through a risk equalisation payment.

In the Netherlands, for example, the risk equalisation system is based on a standard basket of benefits that underpin the Dutch universal health insurance system. In this way it is easy to ensure that there are no cross-subsidies for benefit richness. In Ireland, the level of benefit varies across a broad range of health insurance products, making it more challenging to ensure that differences in claims amounts due to benefit richness are excluded from the risk equalisation scheme. This is considered further in Illustrative Example 4.

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#### ILLUSTRATIVE EXAMPLE 4: BENEFIT RICHNESS

In Ireland, consumers can choose between a broad range of health insurance products with varying levels of services covered, hospitals or providers covered, accommodation and copayment required. When setting the risk equalisation credits, health insurance products are categorised based on their levels of cover. The products are categorised as 'advanced' and 'non-advanced' products by the health insurance regulator (the Health Insurance Authority). The 'advanced' products represent about 90% of the market, however these plans include a wide range of benefits. Plans are categorised based on characteristics set out in legislation, with non-advanced plans providing limited payments where inpatient care is provided in a private hospital.

For a number of reasons, the non-advanced population tends to be younger on average than the advanced plan population and they are also generally less risky on average. The parameters for the scheme vary between advanced and non-advanced plans. In setting the non-advanced parameters, the whole population (advanced and non-advanced) is considered, but only non-advanced benefit levels are considered. In this way, the lower-risk (on average) non-advanced lives cross-subsidise the higher-risk advanced plan lives, but only up to a non-advanced benefit level.

When setting the parameters for advanced plans under the scheme, benefits in excess of a standard level are excluded. The standard benefit level broadly reflects the most common inpatient benefit package held by insured lives with advanced plans. In this way the scheme allows for equalisation of risk across the entire population of advanced plan holders but eliminates cross-subsidy of benefits in excess of those most widely held across the population.

## CALCULATION APPROACH: PROSPECTIVE OR RETROSPECTIVE

The calculation approach is also an important consideration. Risk equalisation systems can operate on a prospective or retrospective basis.

In a retrospective system, sometimes called a concurrent system, payment transfers occur at the end of a defined period and are calculated according to *actual* risk exposure over the relevant period. In a prospective system, payments are calculated according to *predicted* risk exposure over the period and are generally paid at the beginning of the defined period. Blended or 'hybrid' systems can also exist, which may result in more accurate reflections of the exposure years' experience, and hence more accurate cost predictions. For example, in the Irish risk equalisation scheme, the parameters are set prospectively based on predicted risks, but the payments are made retrospectively, at the end of the period, based on insurers' actual insured populations. In the US Medicare Advantage market, initial payments are made based on the previous years' experience, followed by an interim calculation to reflect the membership mix at the time, and a final settlement to account for the full-year membership exposure.

Figure 5 compares the key advantages and disadvantages of the two methods, ignoring any hybrid solutions.

**FIGURE 5: COMPARISON OF PROSPECTIVE AND RETROSPECTIVE RISK EQUALISATION SYSTEMS**

CONSIDERATION	PROSPECTIVE RISK EQUALISATION (NO REBALANCING)	RETROSPECTIVE RISK EQUALISATION
Certainty of payments	Funders have more predictability in terms of payment amounts at the beginning of the term and are able to plan accordingly.	Less predictability of payments because risk equalisation only occurs at the end of the term. For shorter time periods, this is less of a concern (e.g., monthly vs. annual payments).
Accuracy	The accuracy of the risk reflected in the transfer payments depends on the accuracy of the risk predictors used to calculate the payments. In a prospective system with no rebalancing, there is an opportunity for funders to 'win' or 'lose' based on the formula used to calculate the payments. For example, if an insurer's actual risk is lower than expected, it will transfer less into the fund or receive more from the fund than it should according to the actual level of risk.	Transfer payments are based on the actual insured lives each funder was exposed to over the relevant period.
Complexity and administration burden	Less complex and lower administration burden because no retrospective reconciliation is required. However, setting the parameters of the system may be more complex than the retrospective approach. Obtaining data from a prior period may be difficult if participants were in a different insurance program.	Both systems will have some level of complexity associated with the calculation and administration of the payment transfers but a retrospective system has the added requirement to reconcile and adjust payments at the end of the period.

In the UK a prospective approach is used to fund the English NHS. This is discussed further in Illustrative Example 5.

### ILLUSTRATIVE EXAMPLE 5: USE OF PROSPECTIVE APPROACH IN THE ENGLISH NHS

CCGs receive an annual funding allocation from NHS England (NHSE) to commission services for their registered populations. The level of funding is known two to three years in advance and target funding amounts are calculated as a weighted (risk-adjusted) capitation amount based on the following parameters: population size, age/sex mix, supply-side variables, unmet need/health inequalities and market forces (adjustments for how the cost of providing services differs by area, e.g., land and staff costs).

The actual allocation that a CCG receives may be lower than its target allocation because the total level of funding available is fixed. Once the target allocations have been calculated, this is adjusted for the 'Pace of Change Policy',<sup>5</sup> which aims to move CCG areas closer to their target allocations over time.

The population size of each CCG is estimated according to general practitioner (GP) registration levels and projected using estimates from the Office for National Statistics (ONS). There is no retrospective adjustment to account for differences in predicted and actual experience. Consequently, if a CCG has changes to its population size or risk profile that are different from expected, it could end up receiving a funding allocation different from its actual level of risk. For example, if a CCG has an unexpected decrease in its population size, it would be receiving a funding allocation for more people than it is technically responsible for commissioning services for. This is a disadvantage of the prospective approach without rebalancing.

5 <https://www.england.nhs.uk/wp-content/uploads/2016/04/1-alltins-16-17-tech-guid-formulae-v1.pdf>

In the Netherlands, a purely prospective (or ex ante) approach is also used. This means that the contributions received by health insurers from the risk equalisation fund are determined prior to the calendar year to which the contributions relate. This exposes the health insurers to financial risk as the risk equalisation contribution and premium income is independent of the actual claims costs incurred in the relevant calendar year. The prospective approach stimulates the health insurers to manage resources as effectively as possible to limit the financial impact of unexpected variance in income (premiums and risk equalisation contributions) and outgo (claims costs).

In contrast, the retrospective approach is used in the US commercial individual and small employer group markets. Illustrative Example 6 provides more detail on this.

#### ILLUSTRATIVE EXAMPLE 6: USE OF RETROSPECTIVE APPROACH

In the commercial individual and small employer group markets in the US, funds are transferred among plans on a retrospective basis using a concurrent risk adjustment model. Risk scores are calculated for the benefit year using claims data through to April of the year following the benefit year, and transfers are announced in June and paid in September. Premiums are typically set six to nine months in advance of the benefit year, and issuers are required to include the expected risk adjustment receivable or payable in the premiums. So there is at least a twenty-four month lag between when premiums are set and transfer payments are known.

The advantages of this method are that premiums and plan revenue tend to align more closely with the average health status and expenditures of the insured population within a market. Indeed, insurers will likely get credit for high cost individuals through the diagnoses concurrently coded with those claims. This can be particularly important in markets that experience significant turnover of the insured population, such as the individual market. Concurrent risk adjustment models are generally more accurate than prospective,<sup>6</sup> and the risk scores used to calculate the transfer values will reflect the actual population and diagnoses for the benefit year.

However, retrospective risk adjustment methods also present many challenges for insurers, in particular as community-rated premiums must be set, allowing for estimated risk adjustment transfers, prior to open enrolment, i.e., before insurers know the risk profile of their insured lives for a given benefit year.

The retrospective timing of payments may cause liquidity issues for some insurers. If plans are expecting a large risk adjustment receivable, premiums will typically not be sufficient to cover expected claims costs, and these costs will need to be funded by insurers in advance of receiving risk adjustment payments in September of the year following the benefit year. Furthermore, if premiums are priced in anticipation of a large risk adjustment receivable, but ultimately must pay into the risk equalisation pool (for example, due to differences in the risk profiles of members that enroll in the plan compared to assumptions made during pricing), then there is a risk that they will not have sufficient funds to make the required payment.

Conversely, if premiums are priced high in anticipation of making a large payment into the pool, but ultimately see more favourable experience and do not need to make such a payment, the unexpectedly high profit margin may need to be rebated back to customers, causing extra administration and potentially negative publicity toward the insurer.

#### SOLUTIONS FOR EXCEPTIONALLY HIGH CLAIMS

Another important consideration for a risk equalisation system is whether there needs to be some specific solutions for high-cost claims, as healthcare costs have the potential to be very skewed for very high-risk individuals. While the risk equalisation transfers will be higher for high-risk lives, there still may be a very large gap between actual risk equalisation transfers and claims costs, particularly in the case of catastrophic claims. In some risk equalisation systems a solution in respect of high-cost claims may be an important part of the system as a whole.

The concept of a high-risk pool, or a High Cost Claimants Pool (HCCP), exists in a number of risk equalisation systems around the world. This is typically designed as a risk-sharing pool for low incidence, very expensive claims that sits alongside a 'traditional' risk equalisation fund. This is the case in the Australian risk equalisation system, which is considered further in Illustrative Example 8 below.

<sup>6</sup> Society of Actuaries, Accuracy of Claims-Based Risk Scoring Models, op cit.

The benefit of a HCCP is that it can target risk equalisation credits towards the most high-risk individuals or catastrophic claimants and can reduce insurer's incentives to avoid insuring these individuals through segregated products. However, a HCCP may dis-incentivise claims cost efficiency, as insurers may be less likely to challenge high claims costs if they are being reimbursed through the risk equalisation system. This means that a HCCP could have limited benefits in the long term.

#### ILLUSTRATIVE EXAMPLE 7: HIGH-COST COMPENSATION IN THE NETHERLANDS

In the Netherlands, a High-Cost Compensation (HKC) settlement was included in the risk equalisation system for a number of years following the introduction of the Zvw but has since been removed. In 2012 the HKC was removed from the somatic care model and in 2015 it was removed from the mental healthcare model. The HKC was removed as there was a fear that it reduced the incentive for efficiency. With the abolition of the HKC, the Dutch government aimed to incentivise efficient procurement and volume control. The HKC was replaced by the prospective, or ex ante, Long-Term High Costs (MHK) groups parameter.

However, due to the skewedness of mental healthcare costs, the removal of the HKC resulted in some insurers facing large mental healthcare claims that were not covered by the risk equalisation system, which resulted in incentives for negative risk selection. Prospective payments cannot accurately predict the costs associated with these patients in the short term, due to a lack of data amongst other things. As a result, it was decided to reintroduce the HKC ex post compensation solution for a small group of insured lives with the highest mental healthcare claims. For insured lives with the 0.5% highest mental healthcare costs, 75% of the costs are pooled above the 0.5% percentile value.

In reintroducing the retrospective ex post payment, the competing aims of reducing incentives for risk selection and increasing efficiency were balanced against one another. With a high-cost claims pool, the efficiency incentives are reduced by lower thresholds and higher reimbursement. In the Dutch system, the incentive inefficiency is limited by the very high threshold and the fact that only 75% of claims costs are covered. In addition the retrospective payment is used to redistribute funds within the risk equalisation system, rather than resulting in an increase in the total level of risk equalisation payments.

The reintroduction of the retrospective payment for mental healthcare costs does not mean that this type of payment will be reintroduced elsewhere in the risk equalisation system. Prospective payments are still preferred within the Dutch risk equalisation systems and research is being carried out on the possibility of using a prospective payment in respect of these costs. The results of these investigations will need to be tested against the assessment framework (covered in Illustrative Example 11 below) and the various objectives of the risk equalisation (e.g., equalising effect, efficiency, risk selection and practicability) before any changes are introduced.

It is also difficult to estimate the impact that a HCCP will have on the effectiveness of a risk equalisation system, as this will depend on where the parameters of the HCCP are set. If the claims threshold is set at a very high level, then the HCCP will equalise risk for only the sickest individuals, and it may not be significant enough to improve the effectiveness of the system as a whole. Conversely, if the threshold is set at a lower level, then this HCCP will equalise risk for more individuals but it may result in a significant increase in the cost of risk equalisation, which may affect the sustainability of the market.

However, evidence suggests that a HCCP can increase the overall 'goodness of fit' of a risk equalisation scheme with limited negative impact on an insurer's incentives.<sup>7</sup>

#### ILLUSTRATIVE EXAMPLE 8: HIGH-COST CLAIMS POOL IN AUSTRALIA

In Australia, the current risk equalisation system was implemented in 2007 to support the community rating principle. It differentiates two distinct pools: the Age Based Pool (ABP) and the High Cost Claimants Pool (HCCP). The amount of claims costs to be allocated to the ABP depends on specific percentages defined for each of the age cohorts for people aged 55 and over. The percentage varies from 15% of average claims for people aged 55 to 59 to 82% for those aged 85 and over. Insured lives aged 54 and younger are not eligible for the ABP pool.

Claims allocated to the HCCP pool are defined as 82% of the excess of claims over \$50,000 after any recoveries from the ABP pool. The concept of the HCCP pool was introduced in 2007. The main aim of the HCCP pool is to cover catastrophic risk. Relative to the system as a whole, the HCCP might be considered immaterial (accounting for about 3% of claims equalised in Australia<sup>8</sup>) but it is a key to the system as a whole. It particularly benefits smaller insurers where the pool of members is not sufficient enough to spread high-cost claims. It is also the only form of risk equalisation for high-risk insured lives aged 54 and younger—without the HCCP there would be no compensation under the risk equalisation scheme for these lives.

High claims costs resulting from low incidence events are particularly a problem for smaller insurers. In the absence of a separate equalisation pool for expensive claims smaller insurance companies may indemnify such risks with private reinsurance arrangements. It is common for insurers or other risk-bearing entities (such as self-funded employers or risk-bearing provider organisations in the US) to purchase reinsurance from private reinsurers. Typical private reinsurance arrangements cover specific (individual-level) or aggregate (risk-pool-level) stop-loss amounts. These policies protect insurers from catastrophic claims and exist outside of the risk equalisation system as supplementary risk mitigation.

#### ILLUSTRATIVE EXAMPLE 9: FEDERAL AND STATE REINSURANCE

In the US there are reinsurance programs operating at federal and state levels, as well as private reinsurance arrangements purchased from private reinsurers. In this example we consider the federal and state reinsurance programs.

##### Federal reinsurance programs

The ACA's transitional reinsurance program was a temporary risk equalisation program in effect from 2014 to 2016. It was intended to help stabilise premiums in the individual market for the first three years after the ACA's market rules were fully implemented. The program pooled contributions from all commercial insurers (including individual, small employer group, large employer group fully insured and large employer group self-funded plans), and used those contributions to fund reinsurance payments to the individual market.

Beginning in 2018, the Centres for Medicare and Medicaid Services (CMS) introduced a new national high cost risk pool to complement the ACA's individual and small group market risk equalisation transfer payments. Premium assessments are used to fund reinsurance in those markets, covering 60% of an individual members annual claims exceeding \$1,000,000 (as of 2018). Since the program handles claims above \$1,000,000, the risk equalisation can be modelled using truncated claims amounts, which increases the predictive power and stability of the transfer payment formula.

There is also a federal reinsurance program to cover catastrophic claims for insurers offering prescription drug coverage to Medicare beneficiaries.

<sup>7</sup> Society of Actuaries in Ireland (26 September 2018). Healthcare Seminar on Risk Equalisation & Regulation in Private Health Insurance. Retrieved 5 December 2019 from <https://web.actuaries.ie/sites/default/files/2018-09/180926%20Healthcare%20Seminar%20-%20Full%20Presentation.pdf>.

<sup>8</sup> Institute of Actuaries of Australia (2011). Risk Equalisation 2020: Is the Current System Sustainable? Retrieved 5 December 2019 from [https://www.actuaries.asn.au/library/events/Conventions/2011/Con2011\\_Paper\\_Reid.pdf](https://www.actuaries.asn.au/library/events/Conventions/2011/Con2011_Paper_Reid.pdf).

### State reinsurance programs

The ACA allows states to apply for “state innovation waivers” enabling the use of federal funding to implement innovative stabilisation programs in the individual and small employer group markets. Several states have used this waiver to establish reinsurance programs, mainly as a substitute for the federal reinsurance program that ended after 2016. Since the state-based reinsurance program reduces costs for some members who are supported by federal premium subsidies, the federal government’s savings are then reinvested into the program, thereby extending the funds available for reinsurance.

### COMPETITION AND EFFICIENCY

Competition among insurers is important in terms of increasing efficiency in healthcare delivery. In order to attract and maintain customers in a competitive market, insurers will need to utilise their resources carefully, ensure that administrative costs are managed efficiently, provide quality customer services and pass available cost savings to insured lives by charging lower premiums. Inefficient insurers will have to charge higher premiums than their competitors and may subsequently risk losing customers. In a competitive market, insurers may be encouraged to be more responsive to customer preferences and more innovative in their product offerings and delivery of services. If consumers are sensitive to price and quality, insurers will need to keep improving quality and minimising costs to maintain or grow their customer bases.

Competition should be based on insurers’ freedom to design, price and market health insurance products, while avoiding moral hazard and promoting efficiency. However, where premium restrictions exist in health insurance markets, e.g., due to community rating, risk selection may occur. This is where insurers try to compete on the basis of only insuring ‘good’ risks or healthy lives through designing products to attract low-risk individuals or excluding certain coverage. If insurers can generate profits through risk selection, they may not be sufficiently financially motivated to focus on increasing their efficiency or otherwise innovating in terms of product design or service delivery.

However there are always trade-offs in designing a program intended to remove the impact of risk selection. A fundamental issue relates to defining and placing a value on health risk, which can be difficult to separate from other aspects that might influence health insurance premiums, such as the breadth of healthcare provider networks, the level of compensation to healthcare providers, the level of customer service, or other aspects of cost. Even the concept of inefficiency can have varying interpretations. For example, an insurer that increases its customer service and care coordination staff and pays healthcare providers a higher rate may find a niche in an open marketplace with customers willing to pay a higher premium (e.g. for perceived better value or access to more providers). An effective risk equalisation system should not discriminate against this insurer relative to other more “efficient” insurers, however in practice it might be difficult to allow for all the different factors influencing efficiency without an overly complex system.

An effective and robust risk equalisation system should discourage risk selection and allow insurers to compete in other ways. In theory, if high-risk patients are properly catered for within the risk equalisation system then they may become the preferred customer base of an efficient insurer because the potential efficiency gains per person may be higher for the chronically ill, for example, than for healthy lives. This could have the added benefit of reducing risk equalisation payments to inefficient insurers.

However, if the risk equalisation system does not fully compensate for the riskiness of some insured lives, or if the system is designed in such a way that efficiency benefits are shared with other members of the risk equalisation pool, then incentives to innovate and become more efficient are discouraged. This is counter-productive to the ethos underpinning risk equalisation, which is intended to highlight and reward efficiency.

Outside of the risk equalisation system, in the wider healthcare system, insurers also need to have access to tools that allow them to influence healthcare quality and costs and use them to engage in strategic purchasing. To promote efficiency, insurers need to be able to have strong purchasing power to negotiate with healthcare providers.

There is a balance to be struck also to ensure that the risk equalisation system does not encourage inefficient behaviour. This can be difficult to measure and control. It can sometimes be difficult to understand what is driving higher claims costs for a particular insurer; is it simply riskier insured lives or are the higher claims costs due to inefficiencies relative to other insurers in the market? The risk equalisation system needs to be parameterised in such a way to ensure that it is only neutralising risk and not incentivising inefficient behaviour for either insurers or providers.

A recent report by the South African Competition Commission on the Health Market Inquiry noted a number of issues with competition in the South African market that are prevalent in other markets also. We have considered this further in Illustrative Example 10.

#### ILLUSTRATIVE EXAMPLE 10: CONSIDERATIONS FOR COMPETITION: SOUTH AFRICA

The current health insurance market in South Africa operates in an environment of open enrolment, community rating and the provision of a package of prescribed minimum benefits. A risk equalisation scheme was proposed as part of the move towards social solidarity, but was never introduced—we have commented on this further in Illustrative Example 15 below.

A recent report published by the Competition Commission's Health Market Inquiry found that the private healthcare market was 'characterised by high and rising costs of healthcare and medical scheme cover, and significant overutilisation without stakeholders having been able to demonstrate associated improvements in health outcomes.' This is partly due to current practices of segmentation and risk selection within the market, due to the lack of an effective risk equalisation system.

The incomplete regulatory framework has meant that 'medical schemes' (the term used to describe health insurers in South Africa) are competing on the risk profile of lives under cover by designing products and benefit options to attract younger and healthier members. The social solidarity principles underlying the health insurance market do not allow the schemes to risk-rate, and therefore risk selection has become the preferred form of competition in the absence of risk equalisation.

The report notes that a consequence of this is increased market segmentation with a proliferation of products on sale in the medical schemes market with generally incomparable benefit options. This has resulted in an inability to easily compare options across schemes, making it more difficult for customers to switch providers. This means that schemes have no incentive to compete on pro-consumer metrics and to offer better products.

The Competition Commission states that these factors 'clearly do not foster an environment conducive to competition on metrics which would result in positive consumer welfare outcomes.' The paper notes that competition should occur on price, cost and quality of services and not risk selection. The introduction of the risk adjustment mechanism is welcomed by the report as an 'essential market mechanism to ensure that purchasing in the market becomes more effective, by forcing funders to compete on value and, therefore, stimulate competition between and the efficiency of providers.'

Similar issues relating to competition and inefficiency can occur in healthcare systems with risk equalisation systems that are not fully effective. For example, the Irish risk equalisation scheme lacks an appropriate parameter for health status and this has resulted in issues similar to those seen in South Africa. Insurers in Ireland continue to compete on the risk profile of insured lives and a significant level of segmentation exists in the market, with approximately 300 health insurance plans on offer from just three insurers.<sup>9</sup>

#### ONGOING MANAGEMENT

It is equally import to monitor the impact of a system on competition and efficiency on an ongoing basis post-introduction. The impact on competition may be assessed in a number of ways, such as monitoring insurers' cost ratios or profit levels. Other signs of healthy competition include new entrants to the market or new innovative product features, particularly if they are targeted at less healthy lives.

Risk selection may continue to be an issue if the risk equalisation system is not fully effective. Insurers may continue to compete on risk profile to increase profits if they are not being fully reimbursed for high-risk lives. Depending on the parameters and algorithm underpinning the risk equalisation system, segmentation may occur in the insurance market that results in older, sicker lives continuing to pay higher premiums, even if risk equalisation is in place. This is the case in Ireland, where plans with limited orthopaedic benefits are common in the market, while plans with full orthopaedic coverage (which are more likely to appeal to older lives) come at materially higher costs. In effect the higher cost of full orthopaedic cover reflects the risk level of the insured lives taking out the product, rather than the higher benefit coverage. Similarly, low-cost products with high deductibles are also used to segment the market, as they are generally preferred by younger, healthier lives.

<sup>9</sup> Based on the Health Insurance Authority's Comparison Tool as at 23 October 2019.

The risk equalisation system can include features to reduce the risk of segmentation. For example, the Irish risk equalisation scheme uses the concept of an 'overcompensation' test to reduce the capacity for insurers to receive risk equalisation transfers for older, sicker insured lives and also charge them a higher health insurance premium due to segmentation. This test is a statutory retrospective assessment to check the return on earnings (ROE), calculated as a three-year rolling average, of any health insurers in the Irish market that received net transfers under the scheme, against a benchmark. If the ROE is higher than the benchmark, overcompensation is deemed to have occurred and the insurer in question is required to refund the overcompensation identified to the risk equalisation scheme. There are of course some issues with the use of this type of test, specifically around the determination of the benchmark, but it plays an important role in limiting segmentation in the Irish health insurance market.

In order to monitor the system on an ongoing basis, it is important to have a measure to evaluate the effectiveness of the system. However, there may not be one single absolute measure for effectiveness, as the effectiveness of the system may depend on a number of different factors.

Firstly, in order to determine the measure of effectiveness, it will be important to determine exactly what the risk equalisation system is compensating and how this should be measured. For example, if the system compensates based on differences in average claims costs, there may be a number of factors underlying these differences, such as claims management policies and benefit richness in addition to health status. In practice there will be a trade-off between efficiency and effectiveness as a system that equalises 100% of differences in claims costs among insurers may incentivise inefficient behaviour. The assessment and measurement of the effectiveness of the system will need to allow for this trade-off.

Depending on the parameters and algorithm underlying the system, an ordinary least squares model could be used to measure R-squared or goodness of fit, based on the relevant factors. Such a model has the benefit of capturing the impact of factors other than health status, such as region or socioeconomic factors, based on the average for the population as a whole. This approach, however, moves from a closed form solution to a structural form, which may be of limited use in practice due to complexity. In addition the use of such techniques will depend on the level of data available to run the model.

The predictive accuracy of the system may also be used to measure effectiveness. The predictive ratio is a comparison of the predicted risk equalisation transfers with the actual transfers at a cohort level. It can be used to understand whether the risk transfers have been effective for a particular subgroup or cohort. However, depending on the variables used, it may be difficult to justify and may be challenging to ensure that it does not allow for differences in claims management, supply-side issues or benefit richness, in addition to health status. This ratio only measures the predicted transfers versus the actual transfers and does not measure the appropriateness of the predicted transfers relative to the riskiness of the insured population.

Another solution would be to add ex post risk equalisation, where deviations in predicted and actual transfers are shared retrospectively between insurers or payers and the risk equalisation fund system to some extent. The concept of a HCCP mentioned above is an example of an ex post risk equalisation for very high-cost claims. These measures, however, also have a downside as they can limit insurers' incentives for efficiency and contribute to the trade-off between efficiency and effectiveness.

In practice, it is difficult to implement a fully effective system and several challenges need to be considered and overcome in order to maintain a balance between the trade-off of efficiency and effectiveness. It is nevertheless important to do so because the more effective the risk equalisation system is, the more likely it is that it will achieve its aims.

Many of the risk equalisation systems in place today are subject to frequent updates, most notably to improve effectiveness. The Dutch scheme, for example, has gone through a significant number of developments and updates since it was introduced in 1993 and especially since the introduction of the healthcare insurance act in 2006. This is considered further in Illustrative Example 11. The Irish risk equalisation scheme is subject to approval by the European Commission (currently every five years) and is regularly updated and developed to increase the effectiveness of the scheme as part of this approval process.

**ILLUSTRATIVE EXAMPLE 11: MEASURING THE IMPACT OF CHANGES TO THE DUTCH RISK EQUALISATION SCHEME**

In the Netherlands, the impact of changes to the risk equalisation model is evaluated based on a specific assessment framework to measure the impact in terms of the objectives of the risk equalisation scheme. The framework serves as a guideline for the assessment of new parameters, assessing changes to existing parameters, including significant changes and testing variations of the model. The assessment is carried out at various levels, including the impact on the total insured population, the impact on subgroups of the population and the impact on insurers, and is both qualitative and quantitative in nature.

The weighted average absolute standard deviation is measured at all levels. R-squared is the standard measure both at the total population level and at the insurers' level. Although the R-squared can indicate a high predictive power at a population level, there can be significant differences between the actual and predicted healthcare costs at a subgroup level. The R-squared cannot tell whether the risk equalisation model sufficiently compensates for predictable variation in medical expenses across specific subgroups. On this basis, a further assessment is carried out to analyse the under-compensation or overcompensation at a subgroup level, including specific subgroups that are not explicitly included in the risk equalisation model. The following assessments are carried out:

**Equalising effect:** Before introducing a new parameter to the scheme, a significance test is performed to assess whether a parameter adds value to the risk equalisation model. The new parameter must improve predictability within a certain threshold. In addition the total additional healthcare costs must be presented at a macro level. This provides insight into the expected effects of the proposed parameter and can support the trade-off between combating risk selection and managing complexity. This is tested through various measures at different levels. The standard measures for both the somatic care and mental healthcare models are the R-squared and Cummings Prediction Measure (CPM) at the total population level and the weighted average absolute deviation at subgroup and insurer levels.

**Efficiency:** The addition of a new parameter to the risk equalisation scheme should not incentivise perverse behaviour by health insurers or care providers in terms of efficiency. Inefficiency incentives are distinguished between the features of the risk equalisation scheme that result in financial incentives for insurers to declare more healthcare costs and features that deter efficient behaviour (among insurers, healthcare providers and insured lives). Although efficiency can be tested by the earnings ratio, this assessment is generally qualitative in nature.

**Managing complexity:** Additional parameters and other estimation methods can make the model complex and non-transparent, in addition to leading to instability of the model and the risk equalisation transfers. It is important that the models generate results that can be clearly explained and result in stable and logical risk equalisation transfers, where possible. The complexity of the model is assessed in terms of the number of parameters used, the quality of data and the transparency of the underlying calculations. Significance tests and sensitivity analysis can be used to understand the stability of changes to the model over time.

**Validity and measurability:** Any changes to the model must be valid and measurable. The addition of a new parameter to the scheme will be deemed valid and measurable if it systematically relates to the healthcare costs for insurers and if it categorises insured lives in an objective and reliable way, without the need for arbitrary decisions. In addition, the data used must be accurate, reliable and available.

## 4. External challenges

Even if a risk equalisation system is designed to be as effective as possible, there may be some external challenges to overcome before the system can be implemented, or on an ongoing basis once the system is up and running. In this section of the report we have tried to highlight some additional key areas for consideration, including illustrative examples of where challenges have arisen in risk equalisation systems around the world. This includes legal challenges and political uncertainty as well as general implementation challenges.

### LEGAL CHALLENGE

Due to the large amounts of money that are transferred between individual insurers or healthcare providers within risk equalisation systems, they are regularly subject to legal challenge. In this section we consider specific legal challenges faced in the implementation of the Irish risk equalisation scheme and ongoing legal challenges faced in the US.

The introduction of the risk equalisation scheme in Ireland is a good example of how legal challenge can disrupt the implementation of a system and how creative solutions can be utilised to enable implementation. We have considered this further in Illustrative Example 12.

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#### ILLUSTRATIVE EXAMPLE 12: LEGAL CHALLENGE IN THE IRISH SYSTEM

When the Irish risk equalisation scheme was introduced in 2003 there was a large state-owned insurer that had been in operation for many years, and a small number of private insurers which were new entrants to the market. The government-owned insurer had a significantly older population than the private insurers. By implementing the risk equalisation scheme, the government was effectively introducing a scheme that would result in large payments from private insurers to the government-owned insurer. This resulted in a considerable amount of legal challenge, particularly from new entrants to the health insurance market that claimed the scheme was anticompetitive. Following a lengthy legal process through the Irish court system, the regulations that were introduced to implement the original risk equalisation scheme were eventually deemed to be ultra vires by the Irish Supreme Court in 2008 and no payments were ever made under the original scheme. The Supreme Court decision found that risk equalisation was introduced on the wrong legal basis, based on the definition of community rating in Irish legislation; it did not rule that the principles of risk equalisation or community rating were illegal.

The revised scheme utilised the tax system to achieve similar results in a more legally robust approach as changes to the tax system are generally more difficult to challenge. The government charged each insurer a flat stamp duty in respect of each life insured. This was used to raise funds for the risk equalisation scheme. The government then paid a tax credit to less healthy individuals, based on a number of risk factors. The tax credits were effectively passed through to the insurers. The premiums net of tax credits were community-rated but insurers received the premium plus the tax credit for riskier lives. Insurers could therefore reflect the combined impact of the stamp duty and tax credits in their pricing. The scheme overall resulted in a transfer from insurers with healthier populations to insurers with less healthy populations, albeit in a more legally robust way than the original scheme.

In the US, there have been a number of legal challenges to the introduction of risk equalisation, both in respect of the algorithm used to calculate the risk transfers and in changes made to state regulations. They are discussed further in Illustrative Example 13.

#### ILLUSTRATIVE EXAMPLE 13: LEGAL CHALLENGE IN THE US SYSTEM

There have been a number of legal challenges to the ACA in the U.S. since it was introduced. For example, various lawsuits have been filed challenging the risk adjustment program and in particular the decision to base risk adjustment transfers on state-wide average premiums. Some smaller insurers believe that this approach disadvantages them in favour of larger, well-established insurers. Larger insurers will have a larger impact on the state-wide average premium and therefore are less likely to deviate from the average, while smaller insurers with lower enrolment and higher volatility may be more likely to deviate materially from the state-wide average risk level, resulting in large transfers (whether favourable or unfavourable). The legal challenge was resolved without a change in methodology.

Changes to state regulations can also be prone to litigation. In some states, regulators worried that the risk transfer payments were too large and disruptive, so they took emergency action to reduce their financial impact. Some of the emergency regulations introduced were subject to legal challenge, such as the emergency regulation introduced in New York in 2016. In this example, the regulations were ultimately upheld by the New York district court. However in response to the emergency actions, the federal government reached a political compromise, and now all states have the flexibility to reduce the magnitude of transfer payments by up to 50%.

#### POLITICAL CHALLENGE

In addition to legal challenges from private companies, changes to a country's healthcare system can be politically charged and may not always be welcomed by the public. There are many examples of this but we have included two specific illustrative examples in this section where proposed changes to healthcare systems were revoked for political reasons. The first relates to the proposed introduction of a new healthcare bill in Romania at the end of 2011, which resulted in mass protests and was eventually overturned. This is discussed further in Illustrative Example 14.

#### ILLUSTRATIVE EXAMPLE 14: PROTESTS IN ROMANIA

In late 2011, Romanian politicians introduced a new healthcare bill to reduce state funding, deregulate the health insurance market and privatise hospitals. The change would replace the original system of controlled resource allocation with regulated competition at both the health insurer and service provider levels. The proposal included compulsory insurance, with citizens having the right to choose and change insurers on an annual basis. Insurers were obliged to accept individuals and could not terminate contracts, but could still charge risk-rated premiums.

This was criticized by the International Monetary Fund (IMF), which noted that, among other things, private health insurers could refuse high-risk patients with chronic conditions by imposing very high premiums on them to avoid this risk, Romania needed to redistribute the funds between private insurers based on patient profiles. However, the citizens of Romania were not happy with the proposal to introduce private funds to the Romanian healthcare system. The most vocal opponent of the reform was the Deputy Minister of Health who had founded the emergency services. He stated that privatising the emergency services would destabilise the system and that people who could not afford to pay for an emergency service may be condemned to death.

Romanian citizens took to the street to protest against the reform, resulting in the government resigning and significant changes being introduced to the planned reform, most notably in the area of emergency healthcare.

The second political challenge related to a shadow risk equalisation fund which operated in South Africa for a number of years. For political reasons, no transfers were ever made. This is discussed further in Illustrative Example 15.

#### ILLUSTRATIVE EXAMPLE 15: UNSUCCESSFUL IMPLEMENTATION IN SOUTH AFRICA

In South Africa, medical insurance is predominantly provided through 'medical schemes' that provide risk pooling for healthcare in the private system. The medical schemes are owned by their members and are nonprofit entities. They are regulated on the basis of social solidarity principles and they operate in an environment of open enrolment, community rating and the provision of a package of prescribed minimum benefits. Since January 2010, medical schemes are not allowed to underwrite or risk-rate their premiums. A risk equalisation 'shadow period' commenced in 2005 and operated for a number of years. During the shadow period, data was collected and a risk adjustment structure developed. However, no transfers ever occurred between medical schemes and a risk adjustment system was never put in place. In 2012, the South African Council for Medical Schemes, the regulatory body overseeing medical schemes in the country, said that it was 'highly unlikely that a risk equalisation system will be implemented in the near future.'<sup>12</sup>

One of the main reasons that the system was never implemented was due to a change in government policy towards the introduction of universal health insurance, through National Health Insurance (NHI). Under NHI, the future of medical schemes as they currently exist is uncertain, resulting in a move away from the social motivations for risk equalisation. In addition, some sources have noted that the demographic composition of some of the medical schemes may have made the introduction of the risk equalisation mechanism challenging from a political perspective. The absence of a risk equalisation mechanism in South Africa, in addition to the voluntary nature of the health insurance market, resulted in an incomplete regulatory environment for the introduction of social solidarity and has been identified as one of the key drivers of lack of innovation and escalating costs in the private healthcare market.<sup>13</sup>

The most recent developments on risk equalisation in South Africa come from the Competition Commission's Health Market Inquiry report, which was published in September 2019.<sup>14</sup> The report recommends the introduction of a risk adjustment mechanism to complement and benefit the NHI. Even if a risk equalisation system is implemented successfully, the political tensions surrounding healthcare may mean that the system is constantly under scrutiny and subject to ongoing changes and proposals for reform. This is certainly the case in the US since the introduction of the ACA in 2010. This situation in the US is considered further in Illustrative Example 16.

<sup>12</sup> Buthelezi, L. (17 January 2012). Medical risk fund on back burner. BHF. Retrieved 6 December 2019 from <http://ftp.bhfglobal.com/medical-risk-fund-back-burner-17012012>.

<sup>13</sup> Ramjee, S. & Veyra, T. (October 2014). Neither Here nor There: The South African Medical Scheme Industry in Limbo. Retrieved 6 December 2019 from <https://actuarialsociety.org.za/convention/convention2014/assets/pdf/papers/2014%20ASSA%20Ramjee%20Veyra.pdf>.

<sup>14</sup> Competition Commission (September 2019). Health Market Inquiry. Retrieved 6 December 2019 from <http://www.compcom.co.za/wp-content/uploads/2014/09/HMI-Executive-Summary.pdf>.

**ILLUSTRATIVE EXAMPLE 16: US POLITICAL REFORM**

In the US, healthcare reform is consistently on the political agenda. The ACA, signed into law on March 10, 2010, was perhaps the most significant regulatory overhaul of healthcare since the introduction of Medicare and Medicaid in 1965. Since the ACA was passed, there have been attempts to expand, repeal, partially repeal, or otherwise disable various provisions of the law. In addition, ongoing litigation over aspects of the ACA, including the funding of its risk mitigation programs, continues to present challenges.

One example of this relates to the risk corridor program, which was designed to complement risk equalisation by protecting insurers from the risk of mispricing. During each of the first three years following full implementation of community rating and other major reforms, the program created a corridor around which gains and losses would be shared between insurers and the government. The federal government did not set aside funds for the possibility that the overall corridor payments for the program would be a net cost to the government rather than a net gain. Moreover, there was conflicting guidance to insurers about the collectability of risk adjustment receipts prior to insurers setting their initial premium rates. When experience emerged in the first year, the amount of risk corridor payments owed by the government to insurers greatly exceeded the payments owed by other insurers to the government. Insurers who owed the government were required to pay 100% of the calculated risk corridor amount, while insurers who were owed funds from the government received only 12% of the calculated amount<sup>15</sup>.

As a result, many insurers, especially smaller insurers with less capital, went out of business, and many others decided it was in their best interest to discontinue offering coverage in the individual and/or small group markets entirely. These decisions left individuals in certain regions with limited options, hindering one of the ACA's key goals of increased access. Despite the temporary nature of the risk corridor program, its early failure created significant market disruption and political conflict concerning the long-term viability of the core reform of implementing community rating supported by risk equalisation.

Another key provision of the ACA was an 'individual mandate', a requirement for citizens to obtain health insurance from at least one source, which was intended to promote a stable mix of healthy and sick participants in health insurance markets under community rating. The individual mandate was repealed in 2019, while the community rating remains. This development will put upward pressure on premium rates because the anticipated exit of many healthy individuals from the market is a trend for which the risk equalisation program cannot provide relief.

In addition, the government has expanded alternative health insurance options that are outside the scope of the risk equalisation program: short-term limited duration policies and association health plans<sup>16</sup>. These plans are not required to provide comprehensive coverage or follow many of the ACA's other market rules and could lead to further divisions in the individual market; in particular, these products could attract healthy individuals out of the risk equalisation program, weakening its foundation.

These and other alterations to ACA have made it difficult for insurers to set rates, manage reserves, and report financials, and for regulators to sustain stable markets.

There are several new healthcare reform proposals being debated at the time of writing this report, in conjunction with the run up to the 2020 US Presidential Election, some of which aim to introduce public options or increase eligibility for public programs like Medicare and Medicaid (commonly referred to as "Medicare for All"). Some politicians support a single payer system funded fully by the federal government. If public programs are expanded alongside the private insurance markets, the use of risk equalisation will remain an important factor in stabilising the US healthcare system. Even if more significant reform, such as single payer system, is implemented, risk equalisation may be used to neutralise risk across healthcare providers. Therefore risk equalisation may continue to be an integral part of the U.S. healthcare system under many different paths that political reform may bring.

15 Katterman, S. (5 October 2015). Headwinds Cause 2014 Risk Corridor Funding Shortfall. Milliman Healthcare Reform Briefing Paper. Retrieved 6 December 2019 from <http://us.milliman.com/insight/2015/Headwinds-cause-2014-risk-corridor-funding-shortfall>.

16 Busch, F. & Karcher, J. (22 August 2018). Association Health Plans After the Final Rule. Milliman White Paper. Retrieved 6 December 2019 from <http://www.milliman.com/insight/2018/Association-health-plans-after-the-final-rule/>.

## GENERAL IMPLEMENTATION CHALLENGES

In addition to legal and political challenges, there may be general implementation issues that arise, particularly where healthcare reform or the introduction of risk equalisation systems is based on models in operation in different countries or territories. Such issues arose in Poland when the German healthcare system was used as the basis for reform of the Polish healthcare system in the late '90s, with little success. However, a similar system was introduced in the Czech Republic in the early '90s, with a combination of private health insurance and subsequently risk equalisation, and it is still in operation today. Illustrative Example 17 looks at these countries in further detail.

### ILLUSTRATIVE EXAMPLE 17: HEALTHCARE REFORM IN POLAND AND THE CZECH REPUBLIC

Successful reform of a healthcare system depends on a country's specific socioeconomic and political background and as a result it can be difficult to simply duplicate another healthcare system without allowing for country-specific factors. In the 1990s both Poland and the Czech Republic introduced healthcare reform that was based on the Bismarck model, which had operated successfully in Germany for many years.

Fundamental healthcare reform was introduced in Poland in 1999 with the introduction of a government-run insurance model, based on the Bismarck model operating in Germany. The public insurers were called 'sickness funds' and healthcare premiums were financed by employees through payroll tax deductions. In total 17 public sickness funds were established. No private sector insurance was allowed. Each sickness fund was to manage financial resources coming from insurance premiums and ensure provision of medical services for its members by contracting with providers.

However the healthcare reform faced significant political challenge. Even before the sickness funds started operating the legislation was amended over 25 times,<sup>21</sup> with the initial insurance premium being reduced from 12% of salary to 7.5% of salary. Significant assumptions underlying the self-financing concept of the healthcare system were compromised from the beginning (including the number of sickness funds established—too high to ensure a minimum of 4 million to 5 million members, which was considered to be required for a fund to be self-financing). Not surprisingly, shortly after their introduction, significant differences in access to and quality of services were identified between the sickness funds. Members' dissatisfaction and financial problems led to further deterioration of the system. The main issue seemed to be around transparency of funding—tracking premiums for insured lives, transferring to sickness funds and financial settlements. However, no improvements were possible at that time due to the collapse of the government coalition. Ultimately, sickness funds were replaced by a central insurance public institution, the National Health Fund (Narodowy Fundusz Zdrowia, or NFZ) in 2003, with the aim of providing equal access to medical services for all citizens.

In contrast, in the Czech Republic, healthcare reform based on the Bismarck system was successfully implemented in 1992 and still functions today, with some modifications. There are seven sickness funds currently in operation<sup>22</sup> (from the 27 sickness funds initially established)—one public fund, the General Health Insurance Fund (Všeobecná Zdravotní Pojišťovna, or VZP) covering 57% of the market, and six private insurance companies. The insurance premium is 13.5% of salary with two-thirds covered by an employer.<sup>23</sup>

A key difference of the system in the Czech Republic was the introduction of private insurers. This was also considered as part of the reform in Poland, but it would have required an appropriate system to track insurance premiums and ensure transparency, which was not in place at the time. In the Czech Republic, private health insurance funds (with a legal status as independent public entities or 'not-for-profit' insurers) were introduced in 1993, a year after the health reform was implemented and the VZP started its operations. The insurance funds were allowed to offer additional benefits on top of the standard benefit package (e.g., free travel health insurance, subsidies for wellness activities) and these were used to segment the market and attract younger, healthier lives. This resulted in the public VZP retaining the older, higher-risk lives. In 1994 a very simple risk equalisation scheme was used to redistribute about 60% of collected premiums between insurers based on the age of insured lives.

21 Medexpress.pl (18 March 2019). 43 amendments in total, XX-lecie Powszechnych Ubezpieczeń Zdrowotnych w Polsce. Retrieved 6 December 2019 from <http://www.medexpress.pl/xx-lecie-powszechnych-ubezpiezen-zdrowotnych-4/73234>.

22 OECD (7 December 2018). Improving the Czech Health Care System. Economics Department Working Papers No. 1522. Retrieved 6 December 2019 from [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ECO/WKP\(2018\)70&docLanguage=En](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ECO/WKP(2018)70&docLanguage=En).

23 Bankier.pl (11 August 2007). In the Czech Republic, since 1993, 18 health insurance funds have gone bankrupt, only 9 more are left. Retrieved 6 December 2019 from <https://www.bankier.pl/wiadomosc/W-Czechach-od-1993-r-zbankrutowalo-18-kas-chorych-zostalo-tylko-lub-az-9-1623783.html>.

The current risk equalisation system in the Czech Republic redistributed funds according to a risk-adjustment scheme based on age, gender and pharmaceutical cost group (PCG). In addition, a HCCP results in ex post compensation payments of 80% of claims above a specific threshold<sup>24</sup> and makes up about 10% of total transfers. The redistribution is managed through a central account that is supervised by a board of directors comprising representatives from each of the sickness funds and various government ministers. The last risk adjustment factor, PCGs, was added in January 2018 as a way to improve the health-status element of the risk-adjustment scheme. This change took over seven years to implement, from the initial proposal, partly because it transpired that chronic patients were evenly distributed among health funds, resulting in only a marginal increase in the allocation of funds to the public VZP.

While the healthcare reform in both countries was based on the same underlying model, the Bismarck system in Germany, these examples show that successful implementation of health reform depends on the specific socioeconomic and political background in the country in which the reform is taking place. The Czech Republic was able to implement a dynamic healthcare system that could respond to changes such as the introduction of private insurance funds and risk equalisation and the system was allowed to adjust to its optimal self-financing level (due to sickness funds' defaults and mergers and increases in insurance premium). In Poland the introduction of Bismarck-based system was less successful in part due to inadequate transparency in relation to fund transfers and the level of political compromise to the initial structure of the system (especially related to the level of insurance premium and number of sickness funds). Lack of political support led to the deconstruction of the public healthcare system, which today still does not allow private insurance companies to operate within the public sector.

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<sup>24</sup> The threshold is equal to 15 times the average annual costs per member in the entire healthcare system

## 5. Summary

While the concept of risk equalisation is relatively easy to understand, designing and implementing a risk equalisation system to fit into an existing healthcare system can be a complex and time-consuming process. This paper sets out some of the key considerations in designing and implementing a risk equalisation system. When choosing risk adjusters, predictive accuracy and transparency are key factors to consider. Consideration also needs to be given to the benefits to include, the calculation approach taken (prospective or retrospective), the impact on competition and efficiency and how to deal with exceptionally high claims. The technical and legal aspects of the system need to be carefully constructed in order to protect the scheme from legal challenge in the implementation phase and, where possible, from the risk of ongoing political and legal challenge.

Risk equalisation has many advantages for a healthcare system, but its primary role is to facilitate affordable access to healthcare to high risk individuals. An efficient risk equalisation system can reduce insurers' incentives to risk-select, resulting in greater competition in terms of efficiency, quality of service and consumer needs. This can increase innovation in the market and ultimately result in improved patient outcomes. However, risk equalisation can face significant challenges in its implementation, including legal and political challenges, particularly due to the large transfers of funds between insurers or healthcare providers.

The effectiveness of a risk equalisation scheme needs to be monitored on an ongoing basis once it is introduced, to ensure it has created the right incentives for insurers and healthcare providers. In addition, schemes are subject to regular updates to ensure they remain efficient for the current market.

### How Milliman can help

Milliman is one of the leading experts in healthcare financing and delivery. We advise clients on a wide range of issues—from assessing the impact of healthcare reform on organisations or populations to streamlining operations while advancing the quality of patient care. Our consulting work is supported by a powerful tool kit of data analytics solutions and informed by the most trusted, comprehensive set of cost guidelines in the industry.

Risk equalisation is not a pure actuarial and/or data science. It involves many stakeholders, requires a multitude of expertise and requires continuous monitoring and improvement. We combine technical and analytical excellence with policy expertise, business acumen and country-specific knowledge, and work with our clients closely to develop accurate, robust and practical risk equalisation programs. Our consultants have designed and implemented risk equalisation programs, advised governments, insurers, healthcare providers and other healthcare professionals on risk equalisation systems around the world.

If you have any questions or comments on this paper, or on any other issues affecting risk equalisation, please contact any of the consultants below or your usual Milliman consultant.

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