



# A roadmap for comparing readmission policies with application to Denmark, England, Germany and the United States



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## ABSTRACT

Hospital readmissions receive increasing interest from policy makers because reducing unnecessary readmissions has the potential to simultaneously improve quality and save costs. This paper reviews readmission policies in Denmark, England, Germany and the United States (Medicare system). The suggested roadmap enables researchers and policy makers to systematically compare and analyse readmission policies. We find considerable differences across countries. In Germany, the readmission policy aims to avoid unintended consequences of the introduction of DRG-based payment; it focuses on readmissions of individual patients and hospitals receive only one DRG-based payment for both the initial and the re-admission. In Denmark, England and the US readmission policies aim at quality improvement and focus on readmission rates. In Denmark, readmission rates are publicly reported but payments are not adjusted in relation to readmissions. In England and the US, financial incentives penalise hospitals with readmission rates above a certain benchmark. In England, this benchmark is defined through local clinical review, while it is based on the risk-adjusted national average in the US. At present, not enough evidence exists to give recommendations on the optimal design of readmission policies. The roadmap can be a tool for systematically assessing how elements of other countries' readmission policies can potentially be adopted to improve national policies.

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## 1. Introduction

Health care systems around the world are under pressure to deliver value for money [1,2] with policymakers simultaneously aiming to control costs and improve the quality of care. Reducing unnecessary hospital readmissions seems to be an attractive means to that end, as fewer readmissions can potentially both reduce costs and improve the quality of care [3,4]. In England,

in 2011–2012 the 28 days emergency readmission rate was 11.5% – an increase from 9% in 2002–2003 [5]. In the United States (US), 16% of Medicare beneficiaries who were discharged from hospital had an unplanned readmission within 30 days in 2011 [6].

Hospital readmissions have been of interest to researchers and policy makers since the late 1970s [7]. However, it is only relatively recently that policies were developed in several countries with the specific aim of reducing readmissions. Interest in the link between financial incentives and readmissions increased considerably in the early 1980s, when DRG-based hospital payment was introduced in the United States [8]. Under DRG-based

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payment, hospitals are paid a fixed amount per admission, with the amount depending on certain patient and treatment characteristics [9]. Consequently, incentives were introduced for hospitals to increase their income by admitting more patients, and possibly to readmit patients as new admissions for financial reasons [10]. Therefore, at the time, it was speculated that some readmissions might be “avoidable” under a different set of incentives [11–13]. Following the introduction of DRG-based hospital payment systems in most European countries [14], similar concerns emerged (for example in Germany [15], England [16], and France [17]).

Recent policy attempts to reduce readmission rates in England and the United States (US) have in common a reliance on financial penalties. It is perhaps less well known that Germany introduced similar financial incentives for hospitals to avoid readmissions more than 10 years ago. In comparison, in Denmark, readmission rates are monitored but there is no national policy concerning the use of financial incentives.

The use of financial penalties to reduce readmission rates has been met with some resistance from the medical communities in England and the US [18,19]. In the US, the importance of risk adjustment, and which factors to include in such adjustment has attracted particular attention, and it has been highlighted that for example community characteristics are likely to be important factors influencing readmission rates [19–22].

The debate has also focused attention on the fact that the specific incentives of different policies are decisive in determining whether a policy is successful [3,23]. Recognising the importance of different policy designs, a review of current national policy approaches to dealing with readmissions has the potential to provide valuable learning and inspiration for future reform across countries currently struggling with similar problems.

Currently, a systematic comparison of readmission policies across different countries is unavailable. This paper aims to fill this gap by providing and applying a roadmap for systematically comparing readmission policies across four high-income countries with different institutional settings: Denmark, England, Germany and the United States (Medicare inpatient prospective payment system, IPPS). These countries represent illustrative differences in dealing with readmissions and are informative cases for demonstrating the use of our roadmap. We begin by developing a roadmap of policies distinguishing between policies for the measurement and management of hospital readmissions. Subsequently, we apply the roadmap to readmission policies in the selected countries, and lessons arising from the comparison are discussed.

## 2. Methods: a roadmap for analyzing readmission policies

We gathered information and reviewed official documents and policy statements for relevant country-specific laws and regulations for the countries included in the study. The laws and regulations could be either specific readmission policies or policies that indirectly influence hospitals' incentives to reduce readmissions. The policies

[24–27] were analysed in order to identify similarities and differences across countries, and to identify characteristic features of different policies.

Analysis of the identified policies led to the identification of two main dimensions of readmission policies: (1) readmission measurement and (2) readmission management (see Fig. 1). Policies can focus either on readmission of individual patients or on readmission rates. The aim of the policy and the intended audience determine the specific characteristics of how readmissions are measured and how this information is used for readmission management.

### 2.1. Readmission measurement

#### 2.1.1. Focus of readmission policies: individual patients or readmission rates

Readmission policies can focus on measuring and managing readmissions of individual patients or they can focus on readmission rates. If the focus is on readmission rates, a denominator and numerator must be defined, and the level at which rates are calculated must be chosen [28]. Depending on the aim and audience, this level could be the nation, the region, the hospital or the hospital department.

A policy focussing on the readmission of individual patients has the advantage that it directs the attention to the question of how to avoid a specific readmission of an individual patient or a specific group of patients. A focus on readmission rates has the advantage that it enables benchmarking of readmission rates across the chosen aggregate units.

#### 2.1.2. Definition of relevant readmissions

Independent of whether the focus is on individual readmissions or aggregate readmission rates, readmission measurement always requires a clear definition of what a relevant readmission is: in generic terms, a readmission is a second admission to a hospital within a specified period of time after a primary or index admission. The readmission is defined by criteria for the initial admission, criteria for the subsequent second admission, and the relevant time period between the two admissions [29–31]. Both admissions can be specified in terms of inclusion or exclusion criteria.

A relevant index- and second admission can be defined in terms of the patients' clinical characteristics (e.g. the diagnosis), demographic characteristics (e.g. age and gender), the specialty where patients were treated, or the admission type (e.g. emergency or elective admission). These specifications can be the same or different for the index and the second admission. For example, the definition of relevant readmissions could specify that only emergency admissions following an initial elective admission are to be included. If readmission rates are calculated, the index admission defines the denominator population, while the number of second admissions within the relevant time period defines the numerator.

The time period has to be specified in order to determine whether a second admission is to be considered a relevant readmission and not just another primary admission. Time can be measured from discharge of the index admission, or from the first day of the initial admission. The choice of criteria for the index admission, the second admission, and

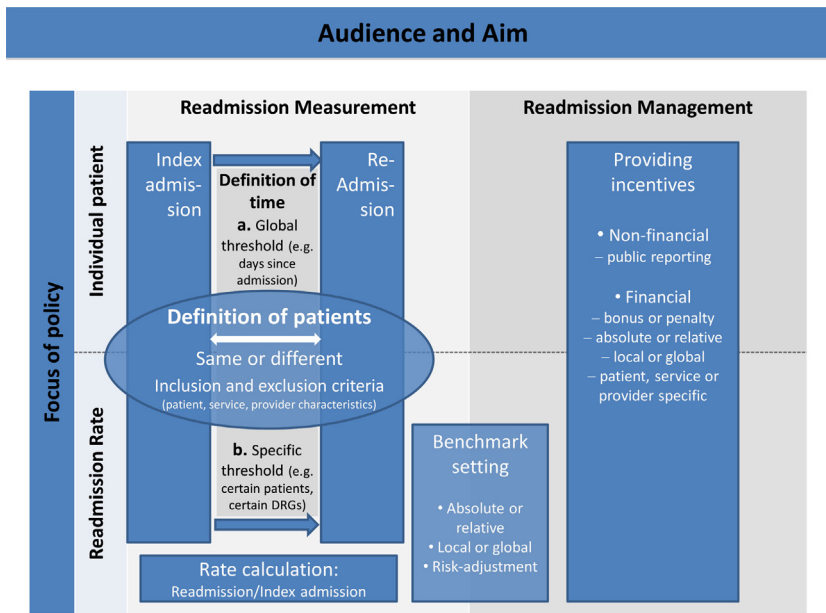


Fig. 1. A roadmap for health system policies for hospital readmissions.

the time frame depend on the audience of the indicator and the purpose of measuring readmissions.

## 2.2. System level readmission management

In general, the aim of measuring the number or the rate of readmissions is to generate the necessary background information for managing readmissions [29]. System level readmission management involves the provision of system level incentives to reduce readmissions. It is the intention of such policies that they will generate incentives for reducing readmissions at a local level. This can be in the form of changes to in-patient care such as introducing case managers and improving discharge information, or in the form of follow-up community care.

A non-financial incentive is the publication or public reporting of readmission rates, e.g. showing an individual hospital's performance relative to other hospitals. This can, in theory, reduce readmissions through two interconnected pathways, a selection pathway, where patients select hospitals with lower readmissions (demand reaction), and a change pathway, where hospitals reduce readmissions because they find themselves underperforming [32–34].

Financial incentives may include bonuses for “good” performance, i.e. for reducing the number or the rate of readmissions, or “penalties” for hospitals with higher numbers or rates of readmissions. Penalties can be in the form of non-reimbursement for an individual readmission, a reduction of reimbursement or even in the extreme case no reimbursement and a penalty for the hospital.

In the case where financial incentives are linked to readmission rates and not to individual readmissions, a performance benchmark has to be established against which the hospital specific rate can be compared.

The performance benchmark can be absolute or relative to the individual provider's performance in a previous period (a local benchmark) or other providers' performance (a global benchmark). For example, an absolute benchmark can be set on the basis of expert opinion. A relative benchmark might be defined as performance below a certain quantile of the distribution. In addition, readmission rates are usually risk-adjusted when they are compared with the benchmark because rates have been found to vary with a range of factors such as age, gender, comorbidities and treatment setting (inpatient or outpatient care) [29,35–37].

## 3. Results: readmission policies in Denmark, England, Germany, and the United States

### 3.1. Introduction, audience and aims of readmission policies

Table 1 shows that readmission policies were introduced relatively recently in all four countries. England was the first country to introduce measurement of readmission rates and to make this information publicly available in 2001. Denmark started measuring readmissions in 2002 but introduced public reporting (initially for 35 types of surgery) only in 2006. In the US, public reporting was introduced for hospitals paid under the IPPS in 2010. In Germany, the current readmission policy, which includes the provision of financial incentives, was introduced in 2004 together with the nationwide introduction of the DRG-based hospital payment system (Table 1).

In all countries, information on readmissions is collected to inform the payers and providers in the national hospital care system. In addition, all countries except for Germany make information on readmissions available to the public. The stated aim of measuring readmissions varies from

**Table 1**  
Introduction, audiences and aims of readmission policies in Denmark, England, Germany, and the United States.

| Country        | Introduction  | Audience  | Aim   |
|----------------|---|---|---|
| Denmark        | Administrative measurement: 2002<br>Public reporting: 2006              | Hospitals, regions, municipalities, the public  | To increase awareness of variation in readmission rates at all levels of the health care system, support patients' free choice of hospital and for public reporting   |
| England        | Public reporting: 2001<br>Financial incentives: Apr-2011                | The NHS and the public  | Public reporting: to monitor success in avoiding (or reducing to a minimum) readmission following discharge from hospital" [51]<br>Financial incentive: to reduce the actual level of emergency readmission into hospital by making hospitals responsible for patients for the 30 days after discharge  |
| Germany        | 2004 (with the country-wide introduction of DRG-based hospital payment) | The Institute for the Hospital Reimbursement System (InEK) acting on behalf of the Association of Sickness Funds (GKV), the Association of Private Health Insurers (PKV) and the German Hospital Federation (DKG) | Avoiding unintended consequences, i.e. increased readmissions, resulting from the introduction of the DRG-based hospital payment system [15]  |
| USA (Medicare) | Public reporting: 2010<br>Financial incentives: Oct-2012                | Hospitals, policymakers, and other stakeholders   | Public reporting: to improve health care quality, population health, to reduce the costs of health care, and to allow hospitals, policymakers, and other stakeholders to evaluate the quality of care and to seek improvements that will impact patient well-being<br>Financial incentives: to transform Medicare from a passive payer to one that pays not just for quantity of services but for quality as well |

aiming to increase the awareness of variation in readmission rates (Denmark), to an aim of using this awareness to reduce avoidable readmissions (England, Germany, US), which in the case of Germany is recognised as being a potential unintended consequence embedded in a DRG-based payment system, and in the case of the US explicitly seen as a way of reducing costs and increasing quality.

### 3.2. Readmission measurement

#### 3.2.1. Focus of readmission policies: the level at which readmissions are measured

Table 2 shows that readmission policies focus on measurement of readmissions at different levels. Denmark, England, and the US measure readmissions rates at the hospital level. Denmark and England also calculate readmission rates at various regional levels. In addition, all three countries calculate condition-specific readmission rates for a limited number of conditions, as well as all-cause readmission rates.

In Germany, by contrast, the readmission policy focuses on the individual patient. A relevant readmission is

identified by the hospital (or the payer), when an individual patient is readmitted to the hospital. Subsequently, the hospital has to merge the patient's records from the two admissions into a single file, and this becomes relevant for reimbursement (see Section 3.3.1).

#### 3.2.2. Definition of relevant readmissions

Table 2 also shows that Denmark, England, and Germany consider readmissions for almost all conditions to be relevant. In Germany, certain restrictions apply in so far as only readmissions for the same reasons or for complications of treatment are considered to be relevant. By contrast, in the US, only readmissions for acute myocardial infarction (AMI), heart failure (HF) and pneumonia (PN) are covered under the current readmission policy, although inclusion of three more conditions (chronic obstructive pulmonary disease, total hip arthroplasty and total knee arthroplasty) is planned for 2015.

In Denmark, England and the US, the definition of relevant readmissions excludes planned readmissions. In England, only emergency readmissions are considered to be relevant readmissions. The rationale for excluding

**Table 2**  
Readmission measurement in Denmark, England, Germany, and the United States.

| Country        | Level at which readmissions are measured   | Definition of relevant readmissions   |   |   |
|----------------|--|---|---|---|
|                |  | Defining criteria   | Exceptions  | Time frame of measurement   |
| Denmark        | Hospital, municipality, disease  | All second acute admissions in public and private hospitals   | The general indicators have no exemptions, but exemptions apply to within disease specific indicators   | 30 days from discharge  |
| England        | For publication purposes: Strategic Health Authorities, NHS Trusts, Mental Health Trusts, Government Office Regions, Primary Care Organisations, Local Authorities, Hospital Trusts, Country, County, Independent Sector Health Care Providers, Primary Care Trusts, Regions, Gender and condition<br>For reimbursement purposes: Hospital Trust level | For publication purposes: All cause readmission rate and specific rates for: fractured proximal femur, hip replacement, hysterectomy, stroke<br>For reimbursement purposes: Emergency admissions after an emergency or elective index admission.  | For publication purposes:<br>– patients <16 years of age<br>For reimbursement purposes:<br>– HRGs that do not have a national tariff<br>– Maternity and child birth<br>– Cancer, chemotherapy and radiotherapy patients<br>– Children under age 4<br>– Patients who discharged themselves against clinical advice<br>– Emergency transfers from another provider<br>– Cross-border activity<br>– Patients receiving renal dialysis<br>– Transplant patients | For publication purposes: 28 days from discharge<br>For reimbursement purposes: 30 days from discharge  |
| Germany        | Individual patient   | (1) A second admissions for the same reason (within the same base-DRG)<br>(2) A second admission for the same reason (within same MDC) if the patient was first a medical case and is now treated with significant procedures (e.g. surgery)<br>(3) A second admission for complications of treatment | Exceptions are defined at the DRG level. Exempted DRGs are indicated in the DRG catalogue:<br>– maternal and newborn care<br>– DRGs with ICU treatment<br>– certain cancer cases (haematological cancer, radiotherapy)<br>– pain therapy<br>– renal dialysis<br>– all pre-MDC DRGs (including transplants)<br>– error DRGs (surgery unrelated to the main diagnosis)<br>→ about 23% of all DRGs are exempted from the policy                                | For (1) and (3) the relevant time period is the upper length of stay threshold of the relevant DRG (counted from the day of initial admission). The threshold depends on the specific DRG. E.g. it is 4 days for the DRG for certain ophthalmological surgeries and 70 days for the DRG for craniotomy with radiotherapy. For (2) within 30 days from initial admission |
| USA (Medicare) | For public reporting: Hospital-Wide All-cause and separately for AMI, COPD, Hip/knee, HF, PN, Stroke<br>For financial incentives: Hospital by condition (AMI, HF, PN), From FY 2015 also COPD; elective total hip arthroplasty (THA) and total knee arthroplasty (TKA)   | A second admission after discharge from admission for Acute Myocardial Infarction (AMI) Heart Failure (HF) or Pneumonia (PN)  | Planned readmissions (obstetrical delivery, transplant surgery, maintenance chemotherapy, rehabilitation and non-acute readmission for a scheduled procedure)   | 30 days from discharge  |

planned readmissions is that these do not constitute poor quality of care. In Germany, planned readmissions are also covered by the policy. The objective is to avoid that hospitals can artificially increase their revenue by splitting one hospital stay into two admissions. For example, in the absence of the readmission policy, it would be possible for

hospitals to bill two DRGs if they discharge a patient after a diagnostic procedure and subsequently readmit the patient a few days later for surgery.

England, Germany, and the US exempt certain conditions from the readmission policy. The exemptions always include transplants, maternal and newborn care, cancers

and chemotherapy as well as certain other cases that vary depending on the country. For publication purposes, England explicitly focuses on patients aged 16+, while for reimbursement purposes, the focus is on patients aged 4+. The US policy focuses on all Medicare patients, which implicitly means all patients aged 65+. In Denmark, most indicators do not exempt specific patient groups e.g. defined by age, but some indicators are presented for aged 65+ separately.

The time period during which a second admission is considered to be a readmission is relatively similar in Denmark, England and the US. In England, it is 28 days for public reporting and 30 days for reimbursement purposes, in both cases calculated from discharge. In Denmark and the US it is 30 days from discharge. Germany is the only country, where the time period is measured from initial admission, and where condition specific time periods are used to identify a second admission as a readmission. If a patient is readmitted for the same reason, i.e. in the same base-DRG, or for complications of treatment, the time period that determines whether a second admission is a readmission is delimited by the DRG specific upper length of stay (LOS) threshold. This threshold specifies the number of days for which hospitals receive the normal DRG tariff, and it lies between 4 and 70 days depending on the DRG (if patients stay longer, DRG specific per diem surcharges apply). A second admission-taking place before the upper LOS threshold is considered a readmission. An unspecified 30 day threshold applies only if a patient was initially treated medically and is subsequently readmitted for the same reason for surgery.

### 3.3. Readmission management

#### 3.3.1. Incentive provision

Table 3 summarises information on incentives aiming at reducing readmissions in the four countries included in our study. Denmark, England and the US have implemented public reporting of readmission rates with the aim of motivating hospitals to reduce readmissions. In England raw and risk adjusted readmission rates are published for all causes aggregated, and individually for four conditions. In Denmark, raw readmission rates are reported online for an increasing number of surgical conditions. In the US, an increasing number of condition specific readmission rates have been published as part of the Hospital Inpatient Quality Reporting (HIQR) Programme since 2010, and the all-cause unplanned readmission rate was added to the programme in 2013. Participating in the HIQR programme is financially encouraged (see Table 3).

Financial incentives to reduce readmissions exist in all four countries but the specificities of these policies differ greatly across countries. In Germany, the patient records of the first admission and the relevant readmission are merged into a single case, and the hospital is paid as if there had been only one admission. Consequently, the hospital receives payment for only one DRG. However, this DRG is determined on the basis of the merged data, i.e. all secondary diagnoses found or surgical procedures performed during the second stay can lead to the reclassification of the patient into a DRG with an associated payment that might

be higher than what the hospital would have been paid for the first admission only. In addition, if the combined length of stay of the first admission and the readmission exceed the DRG specific LOS threshold the hospital receives the applicable per diem surcharges.

In England, the original policy introduced in 2011 was similar to the German policy in that the NHS no longer reimbursed any readmission occurring within 30 days from discharge from an elective admission, although reclassification of patients on the basis of the readmission was not allowed. However, since April 2012, the non-payment policy is based on the hospital specific readmission rate, and only applies to readmissions above a locally set benchmark (see Section 3.3.2). In addition, as part of the English policy to reduce the number of readmissions, the savings generated from withholding payment for readmissions, must be reinvested by payers into post discharge rehabilitation services to prevent future readmissions.

In the US, hospitals paid under the Medicare IPPS with higher than expected readmission rates for AMI, HF, and PN are penalised by a percentage reduction of the hospital's DRG base rate of up to 2% (depending on the readmission performance of the hospital) in 2014. This reduction has increased from 1% in 2013 and will increase to 3% in 2015. The reduction refers to the hospital's DRG base operating payment, meaning that payments are reduced for all patients admitted to the hospital for any reason and not just for readmissions or the covered conditions.

In Denmark, there is no national policy to provide explicit financial incentives for reducing the number of readmissions. However there are regional rules that do so implicitly. Some regions reduce hospitals' reimbursement if a hospital's intensity of treatment – measured as the sum of the DRG value of the production divided by the total number of patients treated at this hospital within a given year – has increased by more than 1.5%. This indirectly incentivises hospitals to avoid readmissions.

The feasibility of using financial incentives for reducing the number of readmissions may differ depending on the specific organisational structure and financing of the health care system.

#### 3.3.2. Benchmark setting and risk-adjustment

In the US and England, where financial incentives are targeted at reducing 'avoidable' readmissions, a benchmark is used to determine which proportion of all admissions should be considered avoidable. In the US, readmission rates of hospitals paid under the IPPS are compared to a benchmark, which is the expected risk adjusted readmission rate for that hospital. The expected risk adjusted readmission rate is calculated by taking into account the hospital specific distribution of patients' age, gender and 30–40 (depending on the indicator) clinical risk factors, using data from the previous 3 financial years.

In England, for the reimbursement policy, the benchmark is set during the first three months of the year on the basis of a detailed local clinical review of all readmissions to each hospital occurring within a fixed time period of at least 1 week. The aim of the review is to determine the avoidability of each readmission. The rate of unavoidable readmissions determined during this review period is then

**Table 3**  
Readmission management in Denmark, England, Germany, and the United States.

| Incentives     |   |  | Performance benchmark  |  |   |
|----------------|---|--|--|--|---|
| Country        | Financial   | Non-financial  | Definition   | Source of information  | Risk adjustment   |
| Denmark        | Some types of admissions are reimbursed by block grants, which indirectly create an incentive to decrease no. of readmissions   | Reporting in publicly available quality monitoring reports, and public reporting | Hospital-specific risk adjusted total and disease-specific readmission rates | National patient register including all hospitals admissions   | Yes (age and gender)  |
| England        | No reimbursement for the proportion of readmissions considered to be avoidable during clinical review. (Savings have to be invested into post discharge enablement services and the prevention of readmission -particularly in the areas identified in the clinical reviews.)   | Public reporting of hospital readmission rates                                   | Locally agreed level of 'avoidable' readmissions                             | Clinical review of readmissions at each hospital during a period of at least 1 week (and up to 3 months) determines the local level of avoidable admissions. | For reimbursement not applicable<br>For public reporting: adjusted for age, method of admission of discharge spell, diagnosis (ICD 10 chapter/selected sub-chapters within medical specialties) and procedure (OPCS 4 chapter/selected sub-chapters within surgical specialties). |
| Germany        | Hospitals receive only one DRG-based payment (readmitted cases are merged with the first admission for reimbursement purposes)  | No public reporting  | Not applicable   | Not applicable   | Not applicable  |
| USA (Medicare) | For hospitals not participating in public reporting: reduction in the market basket update (an annual inflation adjustment to Medicare payments) of initially 0.4% (from 2005) and from 2007 2%<br>For hospitals with risk-adjusted readmissions above national average: reduction of base operating DRG payments by up to 2% (will increase to 3% in 2015) | Public reporting of hospital readmission rates                                   | National average condition-specific readmission rate                         | National data for the previous 3 years   | Yes (patient demographic characteristics, comorbidities, and patient frailty)   |

used as a threshold readmission rate of acceptable readmissions, beyond which the hospital will not be reimbursed for its readmissions [26].

Contrary to the readmission rate used for reimbursement purposes, the readmission indicator used for public reporting in England is subject to risk adjustment.

In Denmark risk adjusted readmission rates are reported publicly in websites, search engines and reports on hospital performance.

#### 4. Discussion

This is the first study to systematically assess hospital readmission policies across four countries. The results

show that policies differ considerably: in Germany, the readmission policy was primarily introduced with the aim of avoiding unintended consequences of the introduction of DRG-based payment. It focuses on readmissions of individual patients within a certain time period that (often) depends on the clinical condition of patients; and hospitals receive only one DRG-based payment for both the initial and the re-admission. By contrast, the introduction of readmission policies in Denmark, England and the US was more related to aims of quality improvement.

It is a limitation of this study that we are not able to provide specific recommendations to policymakers wishing to reduce the number of unplanned readmissions. This is due to the fact that no evaluations of the effects of

national readmission policies on reducing readmissions are currently available. The application part of the paper is limited by the fact that we consider the readmission policies of four countries only. While other countries might have policies that can serve as further inspiration, a survey of all countries' readmission policies is beyond the scope of this paper.

Our findings have important implications for policy makers as they allow the identification of advantages and disadvantages of alternative approaches. In particular, advantages and disadvantages are evident in relation to three dimensions of our roadmap: [1] the focus of the policy on individual patients vs. readmission rates [2], the time period used for defining readmissions [3], the definition of the benchmark for determining avoidable readmissions, and [4] the use of financial or non-financial incentives as for managing readmissions.

#### 4.1. *The focus of the policy*

A policy focussing on individual patients – as is the case in Germany – has the advantage that it directs attention of hospitals to each individual patient. When combined with financial incentives, such a policy basically introduces a “warranty” of hospitals for treated patients [3]. Consequently, all hospitals have interest in reducing readmissions – not only those with readmission rates above a certain threshold. However, this approach can unintentionally penalise hospitals serving local communities where factors out of the hospitals control lead to above average readmission rates. To avoid such penalties, payment rates should ideally be determined based on historical local cost data and include an adjustment for the average cost of and probability of readmissions net a monetary reduction to provide incentives for reducing readmissions [3].

In Germany, DRG-based payment rates are calculated based on average costs of patients in a sample of German hospitals [38]. During payment rate calculation, the readmission rule of merging readmissions with initial admissions is applied; and calculated rates, therefore, include costs of the average proportion of readmitted patients in these hospitals. As such, this approach may penalise hospitals in communities at high risk of readmission. In countries, such as England and the US, where cost data is available from all hospitals, payment rates could be adjusted to reflect the local proportion of readmissions to avoid penalising hospitals in communities at high risk of unavoidable readmissions. In addition, as in England, withheld payments from readmissions may be invested in post-discharge initiatives to avoid future readmissions.

Countries focusing on readmission rates have the possibility to explicitly adjust for risk factors that they consider to cause higher rates of unavoidable readmissions. However, as will be discussed below (see Section 4.3), it is difficult to exactly determine which factors should be controlled for and which not.

#### 4.2. *The time period defining readmissions*

In Denmark, England and the US, readmission policies focus on readmissions occurring within 28–30 days of

discharge. However, the rationale for focusing on readmissions within this period relies on little empirical evidence [39]. On the one hand, if the aim of monitoring readmissions is to support clinical quality development, longer follow-ups may be appropriate. On the other hand, if the aim is to hold hospitals accountable for readmissions that would be avoidable by a change in hospital behaviour a shorter time frame may be desirable.

Chambers and Clarke [40] analysed unplanned readmissions occurring between 1 and 104 days after discharge in acute hospitals in three districts in a region of England in general medicine, general surgery, gynaecology, trauma and orthopaedics, and geriatrics. Across all specialities they found a peak in readmissions at 0–6 days after discharge, which levelled off after 28 days. In addition, Clarke [41] found that readmissions occurring within 0–6 days from discharge were statistically significantly more likely to be avoidable than readmissions occurring within 21–27 days.

More recently, Walraven et al. assessed the avoidability of readmissions of unplanned readmissions from 11 hospitals in Ontario [42]. They confirmed the findings of Chambers and Clarke, estimating that the odds of a readmission being classified avoidable decreased by 32% per month after discharge. Of the readmissions occurring within 4 days of discharge, 22% were classified as avoidable, compared to 6% of readmissions occurring more than 135 days after discharge. Results are confirmed in reviews [43,44].

In view of these findings, a policy that uses a condition specific time threshold for identifying readmissions might be preferable. Germany is the only country, where the DRG specific upper length of stay threshold is used to identify readmissions. DRGs for highly complex cases usually have a long upper length of stay threshold whereas DRGs for less complex cases have a short length of stay threshold.

#### 4.3. *The benchmark determining avoidability*

In England and the US, where financial incentives target avoidable readmissions, national approaches differ greatly in how they translate the concept of avoidability into an administrative rule. The problem is that hospitals should – in theory – be held responsible only for those readmissions that can be affected by changes in hospital behaviour [31,43].

The US policy of calculating an expected risk-adjusted readmission rate as the benchmark for hospitals beyond which readmissions are considered as avoidable has the advantage of being highly transparent and standardised across all hospitals in the country. The risk-adjustment formula is published by the CMS implying that researchers and stakeholders can challenge the existing methodology. The methodology has been subject of considerable debate, and has been criticised amongst others for not taking patients' socioeconomic status into account [45].

In fact, this debate points to a general problem of risk adjustment, which is that it can be difficult to select appropriate factors to be included in a risk-adjustment formula

because these factors depend on the aim of the policy [46]. If the aim of a readmission policy is to hold hospitals accountable for readmissions and it is believed that for example age influences readmission rates in a way hospitals cannot affect, age should be included in the risk-adjustment formula. On the other hand, if it is thought that hospitals can influence elderly patients' readmission rates for example by special discharge programmes for the elderly, age may not be considered a "risk" but rather an indicator for the hospitals to use for identifying patients with special needs. The same arguments apply also for socioeconomic status. On the one hand, there are good reasons to adjust for socioeconomic variables because patients living in poorer neighbourhoods have been found to have higher readmission rates since the population in these areas may be sicker or have more severe conditions [47,48]. However, including socioeconomic variables in a risk-adjustment formula would implicitly mean that it was acceptable for hospitals located in poorer areas to have more readmission.

The English payment policy has the advantage that it avoids having to define a statistical risk-adjustment methodology because it relies on local clinical reviews of readmissions in a specified time period. Given the difficulty of selecting appropriate variables for risk-adjustment, a clinical approach to identifying 'avoidable' readmissions has some advantages. In addition, a local review of individual cases who were readmitted can be very useful also for the identification of context specific factors that led to the readmission of these patients. However, an important problem of the individual case approach is that it is very intransparent. The criteria determining whether a readmission is deemed avoidable may be open for interpretation, and this can create variations due to local differences in bargaining power between payers and providers. Furthermore, seasonal patterns in readmissions are not accounted for in England because the clinical review must be held during the first 3 months of the year. An alternative would be to base the review on a sample of readmissions drawn from across the full previous year when the threshold is set.

#### 4.4. Financial versus non-financial incentives for performance

In theory, the public reporting of readmission rates reduces asymmetry of information and enables consumer choice and competition between providers. Systematic reviews [32,34] have found little evidence that patients or purchasers pay much attention to publicly reported quality metrics in general, but found some evidence that hospitals do react to the publication of quality indicators, possibly because due to an expectation about a quality elastic demand curve.

The evidence for the effectiveness of financial incentives in the form of pay for performance programmes is equally scant [49]. More research has been called for into whether using penalties rather than bonuses for incentivizing hospitals is more effective [50].

There is thus no strong evidence base for recommending financial incentives over non-financial incentives for reducing readmissions.

## 5. Conclusion

In this paper we have suggested a roadmap for systematically comparing readmission policies across countries. An application of the roadmap to readmission policies in Denmark, England, Germany, and the US (Medicare IPPS) has highlighted advantages and disadvantages of alternative approaches.

Policy makers might want to consider whether particular elements of readmission policies in other countries could be adjusted to their national context in order to improve their own national readmission policy. For example, it might be attractive for England and the US to explore the possibility of introducing a "warranty" – similar as in Germany – and to hold hospitals accountable for individual patients, all while avoiding the problems of the German policy, where the unavailability of cost data from all hospitals means that payment rates are not adjusted to reflect local factors that may justifiably influence readmission rates. Also the German approach of defining DRG specific time thresholds for readmissions provides an interesting example of how readmission policies can move beyond a random 28 or 30 day readmission threshold. On the other hand, transparency could be considerably improved in Germany by following the examples of other countries and making information on risk-adjusted readmission rates publicly available – possibly combined with information on unavoidable readmissions based on a local clinical review.

Future studies could draw on our roadmap to identify how parameters of different national policies vary across other countries and how these variations may be associated with better results in terms of reducing hospital readmissions.

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