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Assessing the impact of DRGs on patient care and professional practice in Switzerland (IDoC) – a potential model for monitoring and evaluating healthcare reform

*The IDoC group**

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Summary

QUESTIONS UNDER STUDY: The starting point of the interdisciplinary project "Assessing the impact of diagnosis related groups (DRGs) on patient care and professional practice" (IDoC) was the lack of a systematic ethical assessment for the introduction of cost containment measures in healthcare. Our aim was to contribute to the methodological and empirical basis of such an assessment.

METHODS: Five sub-groups conducted separate but related research within the fields of biomedical ethics, law, nursing sciences and health services, applying a number of complementary methodological approaches. The individual research projects were framed within an overall ethical matrix. Workshops and bilateral meetings were held to identify and elaborate joint research themes.

RESULTS: Four common, ethically relevant themes emerged in the results of the studies across sub-groups: (1.) the quality and safety of patient care, (2.) the state of professional practice of physicians and nurses, (3.) changes in incentives structure, (4.) vulnerable groups and access to healthcare services. Furthermore, much-needed data for future comparative research has been collected and some early insights into the potential impact of DRGs are outlined.

CONCLUSIONS: Based on the joint results we developed preliminary recommendations related to conceptual analysis, methodological refinement, monitoring and implementation.

Key words: *diagnosis related groups (DRG), cost containment, ethics, interdisciplinary research, healthcare reform, Switzerland*

Introduction

Background to healthcare reforms, cost containment and DRGs

Cost containment is a major concern for contemporary healthcare systems that aim to sustain affordable healthcare of good quality. Many countries are therefore in the process of restructuring healthcare towards more efficient and economically viable systems. One of the mechanisms to incentivise the efficient delivery of healthcare is the introduction of a payment system based on diagnosis-related groups (DRGs). DRGs were first introduced as a payment system for Medicare in the USA in 1983, and are being increasingly implemented worldwide [1]. If the DRG system is used as the basis for reimbursement – and not only for classifying cases –, payment is effected according to a prospectively calculated standard amount per case, rather than, for example, fee-for-service or *per diem* payment [2–4]. Swiss acute-care hospitals were required to implement a DRG-based prospective reimbursement system for in-patient hospital care from 2012 on as part of a wider healthcare reform in Switzerland [5][1]. In the literature, the advantages of introducing DRGs are described as an increase in the transparency of hospital services, an incentive for the

efficient delivery of appropriate care, cost containment and the improvement of the quality of care [6–8].

However, from the outset of DRG implementation, concerns have been raised about how DRGs might influence aspects of healthcare delivery such as the quality of patient care, access to care and professional practice. For example, DRGs could encourage hospitals to admit more cost-effective patients on average, while hindering access for patients who are likely to cost more than is typical for their diagnosis [2, 9, 10]. The potential negative impact of DRGs on the working environment and professional standards of healthcare practitioners, such as nurses and physicians, has also been considered: the financial incentives implicit in DRGs could contradict the ethical standards and responsibilities of nurses and physicians [11–13]. Questions have also been raised about whether DRGs are achieving their often stated aims as some studies express doubts about whether DRG-based systems actually help to contain costs [6].

From our point of view, successful healthcare reforms should not only be judged according to whether or not they contain costs but also according to any additional impact they might make on healthcare, be it at the level of population health, at the level of hospital management or at the level of individual healthcare settings. However, in most cases there is no comprehensive assessment of the impact of healthcare reforms on cost, quality and access to care, nor on the professional standards of healthcare practitioners. This is particularly striking given that there are well-elaborated international standards to evaluate risks, benefits and cost-effectiveness of pharmaceuticals, and that healthcare reforms arguably have an even larger impact on public health than pharmaceuticals do [14–16]. In addition, the implementation of DRGs particularly has not been considered according to a systematic ethical framework, neither in Switzerland nor elsewhere [17].

In the wider context of changes in Swiss health policy, the DRG-based payment system and accompanying reforms have been implemented in a healthcare system with high patient satisfaction, which however, the OECD has described as having "a poor health information system", and which requires better monitoring and reporting of quality of care in hospitals [18]. Despite these problems and even though in 2011 the OECD called for an improvement in cost containment in Switzerland, its health care system has been ranked as one of the best worldwide [19]. Due to its superior performance, the Swiss healthcare system has been considered as a possible model for other countries [20, 21]. If Switzerland succeeds in systematically assessing the impact of the introduction of DRGs, this assessment could also provide a model for evaluating cost containment reforms in other countries.

The IDoC project

The starting point of our interdisciplinary IDoC project, "Assessing the impact of diagnosis related groups (DRGs) on patient care and professional practice"[2], was the lack of a systematic assessment of the introduction of cost containment measures in healthcare in general. Our aim was to provide a pioneering model for such an assessment, and we chose to study the example of DRGs, as they were about to be introduced in Switzerland. Our research consisted of (1.) providing a systematic ethical framework for our research, (2.) developing elements of tools for future use in monitoring the impact of DRGs, and (3.) performing empirical research on the impact of DRGs from various perspectives. Since significant ethical values underlie cost containment, quality of and access to care, and professional practice, the overall context for the project was set by the discipline of biomedical ethics. However, we explicitly aimed to benefit from the resulting synergies of the different disciplines involved (medical ethics, law, nursing science and health services research) [4, 22]. Such a far-reaching reform of the healthcare system, as it took place in Switzerland, is bound to have multiple effects. By adopting an interdisciplinary approach we aimed to avoid jumping to conclusions based on results in one area only. Instead, our project was developed in order to consider a wider array of parameters than standard approaches and to place these results within an ethical context.

To develop such a multidisciplinary project, and to perform empirical research on isolated elements of complex changes in healthcare – the introduction of DRGs was only one of several aspects of the healthcare reform in Switzerland – is challenging on many levels [4]. One of the principal challenges is to deal with the difficulty of causal attributions between changes in healthcare and the introduction of particular measures, such as DRGs, especially in such a short period of study – only three years[3]. Even though we provide some empirical data on the years 2011–2013 our primary aim for the IDoC study was therefore not to provide a comprehensive empirical assessment of the effects of DRGs, as this would have required a longitudinal study over a longer time span. However, these limits in terms of empirical results, and which are prevalent in much of the literature, are precisely part of the reason why we have developed a framework for understanding how specific and isolated results should be understood within a wider research, policy and ethical context.

While individual papers have been published by the subgroups during the course of the study, this paper intends to provide an overview of the results and recommendations of the IDoC project as a whole.

The five sub-projects included the disciplines of Biomedical Ethics (Project Leaders (PL): Nikola Biller-Andorno and Verina Wild, University of Zurich), Law (PL: Bernice Elger, University of Basel, and Thomas Gächter, University of Zurich), Nursing Sciences (PL: Rebecca Spirig, University Hospital Zurich), Health Services Research I (PL: Dragana Radovanovic, University of Zurich), and Health Services Research II (PL: Bernard Burnand and John-Paul Vader, University of Lausanne).

Methods

Framing the project systematically: an ethical matrix for identifying the ethical implications of DRG-based systems

Our literature reviews for the overall IDoC project indicated that no attempt had been made to systematically assess the major ethical issues associated with DRGs or other cost containment measures. In order to ultimately develop tools

to assess the potentially significant impact of cost containment measures in healthcare on a number of ethically relevant issues, one of our central joint results of the IDoC project was the development of an ethical matrix that frames the IDoC project [17]. As we have chosen the example of DRGs in Switzerland as our primary research focus, the matrix was generated by reviewing the literature on DRGs and collecting empirical data, and by analysing and assessing literature on ethical frameworks in public health and clinical ethics. The matrix helps us to situate our own research questions in a framework at various levels of the health care system in order to understand how our research can contribute to determining the impact that DRGs have on ethically relevant factors (table 1). The matrix has been explicitly formulated in such a way that it could be adapted for assessing other cost containment measures in other contexts.

Individual study designs

The focus of this paper is to present the first joint results and the overall recommendations of the IDoC project. However, in order to understand the joint results better, the aims and methodologies associated with each sub-project can be briefly described as follows:

Sub-project A: DRGs and changes in healthcare: an analysis of the ethical issues and their perception by physicians (Area: Medical Ethics)

The aim of Sub-project A was to determine which ethical concerns physicians perceived or expected, and in which way they attributed these changes to DRGs. Examples of these concerns are conflicts of interest, perceived limitations to professional autonomy, observed discrepancies between physicians' ethical standards and real life practice, and expected implications for work motivation and job satisfaction. We conducted two quantitative studies among physicians working in Swiss hospitals for acute care [23]. The first consisted of an online questionnaire at the end of 2011 (n = 776); the second was a paper-and-pencil questionnaire in the summer of 2013 (n = 382). The benefit of the surveys was twofold: firstly, we wanted to generate empirical data on the status quo. As the second study was performed after the introduction of DRGs, an early pre-post comparison was possible, but was not our primary aim. Due to the short time span we did not expect major changes, but wanted to lay the basis for future follow-up studies. Secondly, and more importantly, the design of the questionnaires and the method of distribution were intended to help develop a survey tool for monitoring the impact

Table 1: Matrix for identifying the ethical implications of the implementation of DRGs. Reprinted from Fourie C, Biller-Andorno N, Wild V. Systematically evaluating the impact of diagnosis-related groups (DRGs) on health care delivery: a matrix of ethical implications. Health Policy. 2014;115(2-3):157-64, with permission from Elsevier.

1. Value/s	**2. DRG-specific factors**	**3. Examples**		
		Macro-level	Meso-level	Micro-level
	Effects of DRGs on primary ethically relevant parameters:			
i. Utility	Cost & efficiency	(D) Do DRGs help to contain costs for the healthcare system?	(D) Is efficiency under DRGs correlated with the kind of hospital providing the service?	(M) What, if anything, can we learn about the impact of DRGs from HCPs' perceptions of efficiency?
ii. Producing benefits	Quality of care	(N, M) How should we define and measure good quality of healthcare?	(D) How is patient safety affected by the implementation of DRGs at specific hospitals?	(D) How, if at all, do DRGs influence the quality of care for individual patients?
iii. Distributive justice	Access to healthcare	(N) Is sufficient access to health care a fundamental requirement of justice?	(D) Does the implementation of DRGs affect access to care at specific hospitals?	(D) What are HCPs' perceptions of how vulnerable groups are affected by DRGs?
iv. Transparency	Hospital transparency	(D) Do DRGs result in greater pricing transparency?	(D) Are the procedures in place at specific hospitals conducive to promoting transparency?	(M) How, if at all, can hospital transparency be judged at a micro-level?
v. Autonomy	Patient autonomy	(N, M) What is patient autonomy and how should it be measured?	(D) Do DRGs lead to greater competition between specific hospitals and does this impact on patient choice?	(D) How, if at all, does the implementation of DRGs affect the autonomy of individual patients, e.g. through an impact on informed consent?
	Effects of DRGs on secondary ethically relevant parameters:			
vi. Professionalism (and links to above values)	Adherence to ethical standards	(N) Which ethical obligations should be contained in HCPs' professional standards?	(D) Have hospitals adapted their policies on professionalism in response to the implementation of DRGs?	(D, N) Does cost containment cause conflict with the professional standards of HCPs?
vii. (Potential links to above values)	Work environment& job satisfaction	(N, M) What impact, if any, does HCPs' job satisfaction have on the primary parameters?	(D) Which procedures, if any, do hospitals have in place for counter-acting any effects that DRGs could have on workload?	(D) How do DRGs influence HCPs' perceptions of workload and job satisfaction?
	Ethics of DRG-related decision-making procedures:			
viii. Procedural justice	The fairness of the procedures of health care reform	(D, N) Did the processes leading to DRG-based health care reform comply with 'public accountability'?	[Not applicable at a meso-level]	[Not applicable at a micro-level]

D = descriptive; M = methodological; N = normative; HCP = healthcare practitioner
Note: The questions in the individual cells are of exemplary character, and do not represent the spectrum of questions that could be asked.

of DRGs (or other cost containment measures) on professional practice in the future.

Sub-project B: DRGs in Switzerland: critical analysis of the legal aspects and their perception by experts and hospital managers (Area: Law & Ethics)

Sub-project B aimed to (1.) analyse the legal changes associated with DRGs and (2.) to evaluate whether and how the changes associated with the Swiss-wide implementation of DRGs affected the attitude of hospital managers and experts in hospitals. In the first part, the following legal questions relevant to the introduction of DRGs were examined according to the themes of rationing and discrimination. Do DRGs create a form of more or less visible rationing? How much control do experts have for ensuring just and equal access to healthcare? The second, empirical part aimed at studying the impact of the new legal instruments (duty to admit all patients, acute and transitional care) on hospital decision making, especially with respect to the risk of discrimination and rationing, and at describing and analysing expectations and fears. The sample consisted of hospital directors and persons responsible for quality, coding, finance, and medicine controlling (n = 43). The qualitative interviews were conducted in 2012 in 24 cantons of Switzerland, resulting in 11 interviews in French- and Italian-speaking Switzerland and 32 interviews in German-speaking Switzerland [24–27]. Qualitative content analysis was used for the interpretation of the text material (1,708 quotations, 531 pages, 215,547 words) and was carried out according to Mayring [28, 29].

Sub-project C: Monitoring the impact of the DRG payment system on the nursing service context factors in Swiss hospitals (Area: Nursing Sciences)

Sub-project C examined nursing service context factors, such as the complexity of nursing care or leadership, which influence nursing-sensitive patient outcomes. First, empirical data on the status quo was gathered and second a conceptual model and tool for the future monitoring of DRGs was further developed. The study was a cross-sectional survey and not designed as a pre-post comparison; we are aiming for a longitudinal analysis through future comparative studies.

The study – a mixed methods design in the form of a sequential explanatory strategy – was conducted at three University Hospitals and two Cantonal Hospitals prior to DRG-introduction [44]. With a set of questionnaires we evaluated the quality of the work environment, leadership, moral distress, job satisfaction, and nursing performance [30–35, 45]. Our sample consisted of 5156 Registered Nurses (RNs) and clinical nurse specialists, as well as the unit managers from 204 inpatient units. Additional personnel and patient-related data such as grade mix, nurse turnover, workload, complexity of nursing care, average length of stay and nursing-sensitive patient outcomes were obtained from other electronic sources of information. The results were analysed by means of descriptive and inferential statistics.

Additionally, we conducted 32 focus group interviews in 2012. The sample consisted of 224 RNs, clinical nurse practitioners involved in direct patient care and unit managers of the five hospitals. The data of the focus group interviews was analysed through knowledge maps and content analysis according to Mayring [28].

The outcome of our study is an improved monitoring model based on the results of this first cross-sectional survey as well as the further development of a set of instruments and performance metrics. Nurse leaders and professional development initiatives will benefit from the data generated, providing a basis for discussions and for measures taken to ensure quality of care and to support practice development.

Sub-project D: The impact of the implementation of the DRG system in Switzerland on evidence-based treatment of patients with acute myocardial infarction (Area: Health Services Research I)

The aim of the sub-project was to assess the quality of evidence-based treatment for acute myocardial infarction (AMI) patients one year before and one year after the introduction of the Swiss DRG system. For this purpose we designed a measurement set using clinical data independent from administrative coded data that are linked to the coding guidelines and regulations of the DRGs themselves [36]. All hospitals participating in the AMIS Plus[4] registry in both years 2011 and 2012 were selected, and patients presenting with an AMI diagnosis within the first 24 hours of symptoms onset were included.

We measured ten items from the patient's symptom onset until hospital discharge as indicators for adherence to treatment guidelines. Secondary endpoints were the in-hospital outcomes (mortality, complications, length of hospital stay) and access to healthcare for clinically vulnerable populations defined before the start of the study. Vulnerable patient groups were defined based on literature and available records in the AMIS Plus registry, and included patients with advanced age, female gender, co-morbidities, or AMI related cardiac insufficiency at admission defined with Killip classes 3 or 4 [37–40].

"SAMI-Q" (Swiss Acute Myocardial Infarction and Quality), the resulting tool from our subproject combines three types of measurements: the quality of the delivered treatment; the quality in terms of in-hospital outcomes with the measurement of the mortality rate, the percentage of major adverse cardiac and cardiovascular events, and the length of hospital stay in days; access to care and in-hospital outcomes of clinically vulnerable patients.

Sub-project E: Developing and refining indicators to measure the impact on patient safety of generalised use of DRGs for hospital reimbursement in Switzerland (Area: Health Services Research II)

The aim of sub-project E was to evaluate potential changes in patient safety related to the introduction of DRGs by means of patient safety indicators (PSI) based on routinely collected data. Intermediate objectives were to: (1.) assess the accuracy of a subset of PSI algorithms in one university hospital, using the information collected in medical charts; (2.) assess the accuracy of some PSIs against other reference standards (e.g. existing indicators); (3.) document and investigate the frequency, variations and potential biases of PSI, using hospital discharge data collected by the Swiss Federal Statistical Office (Hospitals Medical Statist-

ics); (4.) evaluate trends in PSI for Swiss hospitals for the years 2008–2014.

The seven PSI selected for this study were: decubitus ulcer, bloodstream infection related to vascular catheter, post-operative physiological and metabolic disorders, post-operative deep vein thrombosis and pulmonary embolism (VTE – venous thrombo-embolism), post-operative sepsis, and obstetric trauma during vaginal delivery with/without instrument.

The seven ICD-10 PSI were based on a framework algorithm (table 2).

These individual algorithms for the different PSIs can be used to follow the evolution of the impact of the use of DRGs, but also any system-wide changes with the potential to affect patient safety.

In summary, the IDoC project examined the perspective of healthcare professionals (Sub-projects A and C), the perspective of hospital managers and administrative personnel (Sub-project B), the impact on the adherence to clinical guidelines (Sub-project D), and the impact on Patient Safety Indicators (Sub-project E).

Joint results

The IDoC project intended to reach an advanced level of data interpretation that would go beyond what each group was capable of individually. As stated above, an explicit aim was to benefit from the resulting synergies of different disciplines. A continuous exchange between the groups was therefore necessary. The joint results and recommendations were developed during six workshops [41], various telephone conferences, and bilateral meetings held by the IDoC group.

First, we can claim our systematic matrix (see table 1) as one of our major joint results. We started developing this matrix from the beginning of the project as a methodological and ethical frame for our research. However, it is also a joint result in the sense that is has evolved over the course of the project, profiting from the group discussions.

Secondly, we are in the process of developing a more comprehensive "package" of tools for future use in the quality management of hospitals. The quantitative and qualitative studies developed by each group in fact represent elements of these tools. More collaborative work is, however, necessary to bring these methods together and to provide valid and effective tools that can be used outside the research context.

Third, central themes have emerged, which affected every discipline involved to different degrees and which were discussed by the IDoC group. These areas include (I) the quality and safety of patient care, (II) the state of professional practice for nurses and physicians, (III) changes in incentives structure, (IV) vulnerable groups and access to healthcare services. This list is not meant to present a structured or comprehensive list; instead, it indicates the recurring and ethically significant topics which were not confined to one or two disciplines. We discuss these topics in greater detail below.

Table 2: Framework algorithm as base for the seven ICD-10 PSIs.

PSI = (secondary diagnosis codes corresponding to the clinical definition of the selected PSI) / (population at risk defined by DRG codes, principal diagnosis codes, secondary diagnosis codes, procedure codes)

Emerging central themes

The quality and safety of patient care in general

A *general* answer as to whether quality of care has changed after the introduction of DRGs is, at this stage, not possible. Even in the future it may not be possible to answer this question on a *general* level for several reasons:

First, at this stage our study cannot detect any major changes in quality of care as DRGs have only recently been introduced Swiss-wide. Long-term effects on quality of care can only be identified if the monitoring of quality of care continues over the next years and decades. It will therefore be of crucial importance to continue the monitoring of quality of care.

Secondly, a *general* assessment of quality of care will fail to provide differentiated answers. A crucial result of our study is that quality of care needs a nuanced definition and understanding. Only once we have such an understanding can different aspects of quality of care be evaluated. On the one hand, such a differentiated assessment would need to look at "hard data", such as measurable clinical indicators like patient mortality or infection rates. On the other hand, soft or indirectly related factors such as quality of nursing care, time for patient-physician interaction, teamwork, and the education of healthcare professionals also need to be taken into account for a more differentiated assessment of quality of patient care.

A third issue is the difficulty of causal attribution of changes in quality to a specific intervention such as the introduction of DRG-based reimbursement. If changes do occur in the quality of care, it is very difficult to determine whether a particular intervention is responsible for that change. For this reason, we consider the perceptions of healthcare professionals, who have first-hand experience with DRGs as well as with other reimbursement systems, to be of particular importance as they may point to causal relationships that merit further scrutiny. However, the perceptions could also be related to other changes in healthcare such as increasing competition between hospitals or increasing transparency, and not explicitly to DRGs. Future quality assessments that try to link certain changes in quality to certain reimbursement systems will have to deal with the problem of causal attributions.

Specific answers to determining the quality and safety of patient care

For a more nuanced understanding of quality and safety of patient care it could be promising to try to identify "hot spots", i.e. specific ethically problematic areas related to the increased emphasis on cost containment and to try to monitor and assess these in relation to quality of care. According to our experiences within the IDoC project, "hot spots" include for example: insufficient quality management (A), the existence of over- and under-treatment as a result of the incentives inherent in DRGs (A), less time for communication with patients, relatives and within the care team (A), more time for administration (A), limitations to

realising important professional principles in daily practice that may influence quality of medical care (A), the existence of case splitting (A), a decrease in "patient-oriented care" (A), the delay or cancellation of necessary patient care provided by nurses (C), worse in-hospital outcomes for some "vulnerable patient groups" (D), inadequate collaboration with home care, long-term inpatient care and rehabilitation clinics (B), omission of treatment for which success is estimated to be low (B), and the problem of cost reduction, for example in laboratories, without risking patient safety (B). It will be important to identify further "hot spots", but also to monitor and assess the intended positive changes of DRGs, such as the following in order to reach a balanced evaluation of changes in healthcare.

Possible improvements related to the introduction of DRGs were for example: earlier discharge without a reduction of adherence to clinical guidelines or worse outcome (D, B), quality leap due to more accurate processes (B), an increase in process quality and patient safety due to standardised patient pathways (B), better functioning of hospital information systems with the possibility to access important data quickly and safely (B), improved possibilities for working towards structural reforms as it is easier to see where medical priorities need to be set and where hospitals should invest (B), and a concentration on certain areas of clinical expertise which helps to reduce costs and at the same time to reach a critical mass per intervention allowing good quality (B).

In the attempt to capture quality in a more nuanced way, IDoC also encountered various methodological challenges e.g. in relation to the collection of data or the permission to access certain databases or study groups. Future assessments will have to deal with such constraints. As an example we had to work with a (previously known) delay in accessing the official source data from the Federal Office of Statistics (more than 2 years after the index year) (E), the lack of possibility to follow hospitals from year to year, because the data is anonymised and the anonymised identity is changed from year to year (E), and a lack of resources for validating PSI using a chart review of medical records, including the cost for collecting data, and for obtaining appropriate sampling from various hospitals (E).

The state of professional practice for nurses and physicians

Our research indicates that in Switzerland job satisfaction among nurses and physicians is high. However, the participants report a number of problems related to the adherence to professional ethos and to their working conditions. Whether and how they are related to DRGs is difficult to assess, given the complexity of the healthcare reform in Switzerland. At this point we can only rely on the subjective attribution of these experiences to the introduction of DRGs.

The problems detected by the IDoC project include: the deterioration of the work satisfaction of physicians attributed to SwissDRG (A), difficulty for physicians to implement professional principles – such as focusing on the wellbeing of the patient, respecting patient preferences, and having sufficient time for patients – under current working conditions (A), less time for their own training and continuing education and that of young colleagues since the new hospital reform (A), an increase in the multi-morbidity of patients and a growing complexity of care that needs to be met by adequate nursing staff (C), experience of moral distress among nurses (C), and the intention of some physicians and nurses to leave their jobs or reduce work hours (A, C).

Changes in incentives structure

Another recurring topic in our joint discussions was the ways in which cost containment instruments can incentivise behaviour. Before the introduction of DRGs in Switzerland many hospitals were reimbursed according to day rates. At that time physicians were incentivised to keep patients longer than necessary. According to the interviews with hospital managers and legal experts (B), the implementation of SwissDRG has changed the incentive structures in various ways, namely with respect to a decreased length of stay, more efficient use of resources and higher productivity, general cost awareness, improvement of the quality of treatments, structures, processes, and increased transparency.

However, we also found examples of ways in which DRGs may be incentivising behaviour that raises concerns: case splitting, unnecessary care, rationing of medical services, unnecessary hospital admissions if outpatient care is also possible, and keeping patients in hospital longer than necessary because the minimum length of stay was not reached (A) as well as a reduction of medical training activities and misdirected incentives resulting in disadvantages for vulnerable groups [24].

In the area of nursing, we found that DRGs can incentivise the reduction of nursing interventions when they are in competition with interventions required immediately by the patient or with interventions ordered by physicians (C). Focus group interviews showed how the failure to carry out nursing interventions can have consequences for patients and for nurses (C). It was reported that adverse events such as patient falls or pressure ulcers occur more often in these situations. In addition, recovery time is lengthened and it can take longer for patients to reach the desired level of self-care and self-management. Our studies have shown that this inadequate setting of priorities can lead to nurses experiencing feelings of guilt, moral distress, dissatisfaction, frustration, and even anxiety [35].

Even though we detected problems with the incentives inherent in DRGs, we believe that most, if not any, alternative hospital reimbursement system brings with it incentives. The challenge is to monitor the effects of any incentive system and to compare them to alternative strategies for containing costs in healthcare.

Vulnerable groups and access to healthcare services

Another recurring topic was the "vulnerability" of patient groups. Firstly, we found it difficult to define vulnerability in the context of DRGs and secondly, it was a methodological challenge to prove that vulnerable groups have been affected. In the literature there has been a large amount of speculation in terms of which groups might be vulnerable under a DRG-based system. Although very little empirical data is available up till now, we can cautiously draw

some general results regarding DRG-related vulnerability in Switzerland.

Fair and appropriate access to healthcare is required by Swiss law. Ensuring access is primarily an issue of social, fiscal, or health policy that should be defined by policy makers. "Vulnerable groups" within the Swiss DRG system can be defined in two ways. There are pre-defined groups, mostly based on social characteristics, such as migrants, poor patients and patients without family or other social networks, who are at risk of suffering disadvantages in the DRG system. A second definition is also required in order not to miss certain vulnerable persons who do not fit such predefined categories. As part of that definition, groups that are vulnerable in the DRG system are defined *post hoc*, which means patients for whom refunding is not properly represented within the tariff structure which has been agreed upon with the Swiss cantons. However, according to hospital experts, this problem is mostly passed on to the individual healthcare service providers, and no solution has been provided at the more general cantonal level (B). Hospitals are currently trying to negotiate the refunding of these groups. If the cantons accept the "vulnerability" of these groups and the importance of refunding them, additional support can be negotiated between hospitals and cantons. This could help to at least partially address discrimination in care for vulnerable groups. Efforts of hospitals to obtain certifications like, for example, "migrant friendly hospital", can contribute to strengthening the awareness to keep entrance thresholds low. Especially public hospitals stress their mandate to guarantee access to healthcare services to all patients groups at all times and avoid selective treatments [25].

Discussion

The IDoC project aimed to identify systematically the ethically relevant issues related to the implementation of DRGs. As a project funded as part of the Sinergia programme of the Swiss National Science Foundation, IDoC has been working on two levels over the course of three years of research. On the individual level, sub-projects have conducted independent research, and specific results have been provided in each of the different disciplines. Additionally, IDoC has functioned synergistically, identifying recurring themes, discussed in the previous section. Given that DRGs affect the macro-, meso- and micro-level of the healthcare system and are perceived differently from various perspectives, such a collaborative effort was the appropriate strategy for addressing the research topic.

Our project can serve as a preliminary model for future more comprehensive and systematic research on the effects of DRGs or other provider payment systems. The ethical matrix is particularly significant in terms of being able to structure research within an ethical context. While the matrix was developed in light of the Swiss healthcare reform, it can also be used as a basis for identifying the ethical implications of DRG-based systems in other countries and for highlighting the ethical implications of other kinds of payment provider systems. As healthcare reforms and the introduction of cost containment instruments are usually not systematically assessed from an ethical point of view and there is a lack of guidance in the literature, our project can be seen as one of the first attempts to model such an assessment. The success of the assessment depends on various factors, such as starting to plan early enough in order to gather before-and-after-data adequately and to build up functioning interdisciplinary networks further, as well as being aware of and meeting the array of methodological problems that come with such a complex project. So far, IDoC has only been able to work with pre- or early-implementation data. More analyses will be needed as post-implementation data become available.

Some important limitations of our project should be mentioned. The first one is the lack of more relevant empirical information on healthcare quality and access in Switzerland long before the introduction of DRGs. There is insufficient data, for example, on access, vulnerable groups, disease management, ethos of healthcare professionals, in order to make precise pre-post comparisons. For example, our surveys of nurses and physicians aimed primarily at providing data on the status quo and cannot be compared to data in the past (as it does not exist) but at least could and should be compared to future data in order to measure and monitor nurses and physicians' perceptions of professional practice on a long-term basis.

Secondly, any changes found before and after 2012 cannot be solely attributed to the introduction of DRGs. A number of adaptations occurred along with SwissDRG, among them a new regulation of cost-sharing between cantons and insurers, the creation of a single hospital market with free choice of hospital, the guarantee of entrepreneurial freedom and the safe-guarding of quality (Botschaft betreffend die Änderung des Bundesgesetzes über die Krankenversicherung: BBl 2004 5551, 5564). It will remain difficult, if not impossible to settle on clear causal relations between the introduction of isolated measures in healthcare reform (such as DRGs) and surveyed changes, but it will be possible to ask professionals whether they attribute changes to a certain measure. This can serve at least as a signpost for potentially problematic areas.

A final limitation is the lack of additional perspectives, for example, those of patients. It would have been an asset to the international literature and to our project specifically to survey patients' experiences before and after the implementation of DRGs, and this perspective should be included in future studies. It will also be of interest to link results with economic issues in the future, for instance to cost shifting between inpatient and rehabilitative care.

Conclusion

In this paper we have given an overview of the IDoC project in Switzerland. We have described the advantages and limitations of our pioneering attempt to systematically assess and monitor ethically relevant changes in healthcare after the introduction of DRGs in Switzerland. As has become clear, this endeavour is a complex process and only in its beginning stages, not only in Switzerland, but worldwide. More concrete guidance on the situation in Switzerland can be given only once possible pre-post changes can be more fully captured a few years into the implementation of DRGs. Still, it has already become apparent that there

are various future activities needed in the field, which we briefly sketch as a conclusion:

Conceptual analysis: From our point of view, some concepts related to DRGs deserve closer analysis. For example, effects on the "quality of patient care" are frequently discussed in health economics, healthcare system research, and ethics. However, it is not clear, what exactly falls under "quality of patient care". As we have explained, effects can range from very obvious ones, e.g. on patient mortality, to much more subtle effects for example on the quality of interaction between healthcare professionals and patients. To capture these effects, a nuanced, comprehensive understanding of quality is necessary.

Methodological refinement: So far the methods for comprehensively assessing the impact of DRGs are not sufficient in any country. In the IDoC project we have made an effort to jointly develop methodological tools that capture more fine-grained aspects of the quality of healthcare. These tools were piloted during our studies and can, once they have been further refined and validated, enrich the instruments already available for assessing the quality of care. However, further joint efforts, also on an international level, are necessary to enhance such methods. It is crucial to plan an assessment of changes in healthcare according to a long-term perspective, in order to capture positive and negative effects well enough. We expect various methodological challenges for such a long-term assessment, such as the problem of causal attribution, and difficulties in accessing databases or study populations. Future projects will have to find appropriate ways to deal with such challenges.

Monitoring: Conflicts of interests caused by economic or other non-care related considerations can affect the quality and equity of patient care through, for example, medical errors and other patient safety problems. However, current monitoring still focuses on a very narrow set of indicators. This spectrum should be broadened to include the full set of issues that may arise from incentives introduced by DRGs (or other reimbursement systems). In doing so, the different dimensions of healthcare quality – e.g. safety, effectiveness, timeliness, and efficiency as well as personalised and equitable care [42] – should be taken into consideration.

Implementation: We need an increased effort to bridge the gap between research on the one hand and management and policy decisions on the other. Empirical data can provide important feedback on governance in individual healthcare institutions as well as at the level of national health systems. However, translating the results of academic studies into information useful for management or policy processes requires a targeted effort. This becomes ever more prominent as health systems are increasingly conceived as being "learning systems", that is, systems that constantly improve according to evidence and that effectively aim at the best value for the patient [43].

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Footnotes

[1] Some hospitals in Switzerland were already operating under a DRG system before 2012 although January 2012 was the first time that the new tariff structure 'SwissDRG' – developed from the German G-DRG – was made mandatory for all acute-care Swiss hospitals.

[2] The IDoC project has been funded by the Swiss National Science Foundation over the course of three years from 2011–2013.

[3] See also: Chapters "Emerging central themes" and "Discussion".

[4] AMIS plus registry is an ongoing observational clinical study, registered at ClinicalTrials.gov (identifier NCT01305785), approved by the Supra-Regional Ethics Committee for Clinical Studies, the Swiss Board for Data Security, and the Cantonal Ethics Commissions.

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