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How do tensions between medical professionalism and financial incentives play out under case-based payment reform in China

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ABSTRACT

To address rapidly increasing healthcare expenditures of social health insurance, the Chinese government has recently introduced a provider payment reform. While some studies have examined the payment reform effects, findings are mixed, and the deeper mechanisms of how these changes influence physicians' behaviours remain unclear. Drawing on semi-structured interviews conducted in 2024 with 21 hospital-based physicians from two hospitals with different incentive structures, we examine how they have responded to the new system reform in China and the underlying factors driving these responses. We use thematic analysis on the verbatim transcriptions of digital recordings of face-to-face interviews. We find that physicians simultaneously serve as agents for health insurance authority, hospitals and patients, with their service delivery decisions shaped by awareness of the principles that underpin these priorities. We describe five tensions that physicians perceive as conflicts within their agency relationships: optimal care and cost control pressure; institutional policy and professional autonomy; immediate gains and future sustainability; professional development and financial returns; and information asymmetry and relationship risk. The tensions physicians experience, and their preferred response tendencies are notably shaped by hospital incentive mechanisms. We conclude that designing incentives that align principal and agent objectives and incorporating organizational mediation are needed to improve healthcare efficiency under the new payment reform.

1. Introduction

1.1. Case-based payment reform in China

A fundamental aspect of all health systems is the financial flow from the population, through a variety of agencies, to the providers of health care (Smith et al., 1997). To increase financial protection for residents when seeking health care, and in support of its objective to achieve universal health coverage, China is steadily promoting the reach of its social health insurance (SHI) programs, making them the agents for residents' health service purchases. SHI has successfully covered 95% of the total population (National Healthcare Security Administration, 2025), and the total payments from these programs are estimated to account for over 60% of provider revenues (National Healthcare Security Administration, 2024). However, although hospital service expenditure accounts for a significant portion of total health spending globally (Etienne et al., 2010), China's healthcare system is particularly reliant on hospital-based care. Between 2015 and 2023, hospital services in China accounted for 60.1% to 64.0% of total health expenditures, significantly higher than the Organisation for Economic Co-operation and Development (OECD) average of 39% reported in 2021, the most recent year with comparable cross-country data (OECD, 2023; Yan et al., 2025). The overreliance on hospital services may reflect resource wastage and inefficiencies in the healthcare system. Moreover, given the high

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proportion of provider revenues derived from SHI payments, the SHI system is facing significant financial pressure.

The reform of hospital payment mechanisms could result in significant efficiency improvements (Mihailovic et al., 2016). In response to the rising hospital expenditure, the Chinese government introduced a provider payment reform for inpatient care, transitioning from a fee-for-service (FFS) model to a case-based payment system. Unlike the FFS payment system, which often results in provider-induced demand where healthcare providers can gain greater profits by increasing the quantity of medical services, the case-based payment method reimburses hospitals by diagnosis of disease (cases) using a fixed rate, capping individual patient costs (Busse et al., 2013). This is intended to encourage cost control by shifting the risks associated with healthcare expenditures from the payer to the provider. Under the payment reform, the National Healthcare Security Administration (NHSA) leads the design and steering of national policies and standards, while provincial Healthcare Security Administrations (HSA) are responsible for implementation and supervision within their jurisdictions, and local administrations handle operational execution and coordination with healthcare institutions. The nationally mandated DRG reform framework, which defines the core design principles, has established broadly consistent incentive structures for health providers, despite variations in local implementation. In 2019, diagnosis-related groups (DRG) payment pilots were launched in 30 cities in China, and the reform expanded to 190 pooling areas nationwide by the end of 2023 (Gansu Healthcare Security Administration, 2024). As a prospective, case-based, payment system, the DRG reform has granted HAS greater control and initiative in their contractual relationship with hospitals, while hospitals still retain some room to negotiate or coordinate implementation specifics.

The DRG system was derived from a system developed in the United States in 1983. It sets payment standards by grouping cases with similar clinical profiles and resource consumption, considering factors such as disease severity, diagnostic complexity, treatment methods, and resource use (Hervis, 1993). Many countries have achieved results in cost containment by adopting this payment method (Busse et al., 2013; Mathauer and Wittenbecher, 2013). However, Case-based payment models have been criticized for encouraging physicians to cut costs by delaying or omitting necessary treatments and tests, which in turn may compromise care quality (Eijkenaar, 2013). Although the implementation of the case-based payment has been shown to be effective in cost control in China by a growing body of research (Chen et al., 2023; Wang et al., 2023), its impact on health quality remains ambiguous and relatively underexplored. A systematic review found that the DRG-based payment system in China modestly enhanced healthcare efficiency by shortening the length of stay (LOS), but its influence on overall quality yielded mixed results (Zou et al., 2020).

Research (World Health Organization, 2015) has suggested that the overall effects of the DRG payment model are largely determined by the way hospitals react to the different types of financial incentives induced. In China, hospital administrators are responsible for interpreting payment policies and translating them into internal management mechanisms, while physicians exercise professional discretion within these managerial and financial constraints. At the same time, clinical departments maintain a degree of managerial autonomy within the hospital's overall administrative framework. This autonomy is most evident in the management of performance-based remuneration. Public hospitals in China operate under a performance-based salary system in which a large portion of physicians' income is closely linked to hospital revenue. Within hospitals, a two-tiered distribution system is implemented, applying consistent performance-based principles, funds are first allocated by the hospital to departments based on departmental income and performance, and then redistributed by departments to physicians, nurses and other staff withing departments, according to set criteria (Zhou et al., 2025). In addition, these internal mechanisms are embedded within the broader policy environment, with efforts to enhance physicians' working motivation, public hospitals are encouraged by the government to allocate health insurance surpluses toward performance-based pay (National Health Commission, 2021). Together, these factors serve as mechanisms for translating external financial pressures into internal hospital incentive structures. However, due to concerns among some hospital managers about potential negative consequences of implementing direct individual financial incentives, hospitals have mainly adopted two different responses to the DRG induced financial incentives. One approach links the DRG-surplus (the gap between the actual cost of health services provided and the fixed reimbursement based on the case mix) directly to physicians' performance-based pay, while the other does not link financial incentives directly to DRG surpluses, but instead provides feedback on surplus information to indirectly influence physicians' behaviour (Xing et al., 2024). Despite the recognition of the importance of hospital incentive mechanisms, research on how these incentives affect the implementation of DRG is limited.

Previous studies have predominantly employed quantitative methods to analyse the impact of payment reforms on healthcare delivery, focusing on isolated measurable outcomes such as LOS, readmission rates, and cost indicators. A significant gap remains in the literature regarding the effect of diverse incentive mechanisms employed by hospitals, as well as an in-depth examination of the decision-making processes and underlying factors that drive provider responses to DRG implementation.

1.2. *Rationale for this study*

Principal-agent models have shown high applicability for analysing health care dynamics (Preker, 2007; Smith et al., 1997). According to these models, one or more principal(s) hire(s) an agent/agents to act on their behalf. Two main assumptions in agency theory about principal-agent relationships are considered in our study. One assumption is that both the principal and the agent act as utility maximisers, each driven by self-interest to optimize their own welfare. Another assumption is that inherent goal conflicts exist within principal-agent relationships, as the two parties have different goals and risk-taking preferences (Kenneth et al., 1985; Pontes, 1995). Furthermore, information asymmetry exists, whereby the agent typically holds more information than the principal. These conditions result in a misalignment between the agent's behaviour and the principal's objectives. Therefore, the primary goal of agency theory is to determine the most efficient contract based on specific assumptions about the principal and the agent (Kenneth et al., 1985).

In the healthcare system, each transfer of health funds involves a multifaceted set of principal-agent relationships, leading to potential conflicts of interest and control issues. However, qualitative approaches that explicitly apply the agency theory framework are rare in this field. In this study, we extend existing research by employing a qualitative approach to empirically examine how physicians interpret and navigate their multiple responsibilities in a cost-containment healthcare environment. Physicians were the focus of this study because they are frontline healthcare providers who are expected to translate payment policy goals into everyday clinical practice. Agency theory was used to examine the contractual relationships of individual physicians (agents) and their corresponding principals, and the impact of incentive mechanisms in these relations. The principals we focused on in this study are (1) the HSA, which oversees social health insurance, and is acting as the large third-party payer of health care expenditures, (2) the hospital which is the physicians' employer, and (3) patients who may have limited medical knowledge, appoint the physician to assist in treatment decision-making or to make decisions on their behalf.

2. Methods

2.1. Study design

This study adopted a qualitative design using a phenomenological approach, in which semi-structured in-depth interviews were conducted with physicians from two hospitals in Nanjing, Jiangsu province. Nanjing was designated as a provincial-level pilot city to launch the DRG payment system in 2019. Since 2021, Nanjing has officially implemented the new payment system for all eligible medical institutions. The two hospitals were purposefully selected because of their distinct management models, one links staff performance incentives to DRG surpluses, while the other does not. The first author, who had been working as an academic researcher in Jiangsu Province for several years, already had established connections with these institutions, which facilitated the recruitment process. Purposive sampling was used to identify physicians within the two hospitals who can give rich information regarding DRG payment policy and clinical health service decisions. Physicians were contacted according to the selection criteria (that they must be resident doctors who started working before 2019, the year DRG was piloted in Nanjing for inpatient services), ensuring they were more attuned to the changes brought about by these policies and could provide more informative responses. We tried to achieve a balance in terms of gender, medical specialties and career stages, ensuring a diverse range of hospital work experience. All physicians approached for this study consented to participate. We employed triangulation by cross-verifying data from formal interviews and informal conversations. When inconsistencies or ambiguities arose during formal interviews, we clarified them through additional consultations with physicians and administrative staff from the study hospital and other institutions. These consultations provided probing questions in subsequent formal interviews. This iterative process helped inform our interpretations of policy-related information and facilitated deeper exploration in formal interviews.

2.2. Data collection

We recruited participants until data saturation was reached, defined as when no new information required modification of the codebook (Guest et al., 2006). Data collection occurred between May and June 2024. All the interviews were conducted one-on-one in person, and most interviews took place in empty offices or meeting rooms at the physicians' hospitals to protect participants' confidentiality and reduce the likelihood of interruptions. Interviews ranged in length from 33 min to 126 min, with most interviews being approximately 60 min. Disparities in interview length were due to physicians' availability and level of engagement. Interviews were conducted in Mandarin and audio-recorded with the participants' approval. The interviewer (the first author) was female, had backgrounds in health policy and health economics, was educated to Master's level in China, received qualitative research training in Australia during her PhD study, and had prior experience conducting field-based research on health system reforms in China. Field notes were made after each interview to enable reflective practice. Participants were not compensated.

An iterative process of data collection and analysis was adopted, with emerging concepts from the data guiding participant recruitment for further exploration in subsequent data collection. In this process, early interviews effectively acted as a pilot. They helped us to identify participants' concerns, ensure a comfortable and respectful interview process, and improve the clarity of the questions. Interviews were conducted with the aid of a semi-structured interview guide which prompted discussion regarding participants' understanding of the DRG reform, its impacts on clinical practice, challenges and adaptations, and recommendations for improvement (see Appendix 1). Interviews commonly went beyond these specific questions and explored areas consistent with the research aims that were prioritised by respondents. All of the quotes in this paper are directly from the conversations with the participants, where they share their experiences of the process of clinical decision making and their reflections on their practice.

2.3. Data management and analysis

Interviews were audio-recorded and transcribed verbatim in their original language and imported into QSR NVivo 14 for coding and storing. We adopted reflective thematic analysis to explore and interpret the data (Braun and Clarke, 2019) and combined inductive thematic analysis and deductive framework analysis. The first author (XYZ), as a bilingual researcher, transcribed all the interview data and translated the first three interview transcriptions to facilitate team review. For the remaining interviews, key excerpts were translated as needed for establishing the codebook and team discussions. To preserve the interviewees' culturally distinctive terminology and subtle cultural assumptions, the data analysis was conducted in the original language. Chosen quotes were translated into English for this paper. The quotes were back translated to mandarin by a bilingual Mandarin/English speaker to check for accuracy with minor changes made as a result. For the data analysis, XYZ conducted initial open coding of three transcripts. Through discussion, XYZ and DS developed a preliminary coding framework, during which the Theory of Agency emerged as a useful analytical lens for understanding patterns in the data. XYZ coded the remaining transcripts using this theory-informed framework, adding emergent codes when necessary to capture unanticipated themes. Three analytical threads were generated from the interplay between data and theory: stakeholder priorities and responses, conflicts and navigation strategies, and influence of incentive mechanisms. Themes were defined and named to distil their essential meaning and conceptual boundaries. Codes and themes were further reviewed by the research team members (co-authors). Any disagreements were further discussed and resolved within the research team.

2.4. Ethical considerations

Ethics approval was provided by the University of Melbourne (reference number: 2024-28945-51804-3). The study protocol was reviewed by the local institutional ethics committee in China, which deemed the study exempt under national minimal-risk research guidelines. A written consent form and a plain language information statement were provided to all participants before the interview. Prior to each interview, we discussed the research background with each participant to ensure that they fully understood its aims and objectives, as well as who comprised the research team. We emphasised that responses would be kept confidential and de-identified, and would not be linked to any performance assessment or reported to their superiors. This assurance was intended to help participants feel comfortable and safe in expressing their honest perspectives on the policy and sharing their experiences of daily clinical practice.

3. Findings

This paper explored how participants perceived their roles as agents balancing the priorities of three key stakeholders under the case-based payment policy: health insurance (hereafter referred to as HSA), hospital, and patients. We examined how these influenced the factors considered in clinical decision-making and followed three main analytical threads: first, how participants perceive each stakeholder's priorities and their corresponding responses; second, the conflicts and tensions participants face between competing priorities of these stakeholders in clinical practice, and how practitioners navigate them; and third, how incentive strategies influence these conflicts and tensions.

Twenty-two participants were recruited. Among these, six held dual clinical and managerial roles, with four serving as department directors and two in administrative positions within the hospital's health insurance department. One participant was found to hold only an

administrative role in the hospital's health insurance department, rather than serving as a physician, so their interview was not formally included in the data analysis but was used to support data triangulation(see Table 1).

3.1. Physicians' agency roles

The thematic analysis of the data is organised by agent category and the results are structured accordingly, covering the following aspects: participants' awareness of each principal's objectives, the behavioural responses and mediating factors shaping these responses, and the tensions they experienced due to competing principals' priorities. A logic model outlining the pathways through which these mechanisms operate based on analysis of the data is presented in Fig. 1.

Note: 1) The top box in the figure lists the expected effect domains based on the objectives of China's DRG reform (National Healthcare Security Administration, 2019). 2) This figure presents a conceptual illustration of the key mechanisms and relationships identified in our analysis, without implying a linear or deterministic process.

3.1.1. Physicians as agents for the health insurance administration (HSA)

3.1.1.1. Awareness of health insurance priorities. Almost all participants perceive cost control as the main policy objective of the health insurance payment reform, and they perceive that this objective is expected to be achieved by curbing wasteful use of medical resources while enhancing service efficiency. Standardizing diagnosis and practice is another policy objective participants consistently report. Some participants suggest that health resource-wasting behaviours exist in the health system and link this to the new health insurance payment approach aiming to promote standardized medical practice by leveraging cost control as a mechanism for behavioural change. Some participants report equity improvement as another aim, as it controls the average cost for each insured individual, thereby expanding access to healthcare services for more beneficiaries.

I believe one of its purposes is to manage the health insurance funds more precisely, and to save health insurance spending as much as possible. (Resident Physician, Hospital A, P05)

This policy might aim to regulate the behaviour of some doctors who may not adhere to proper medication practices, such as excessive or inappropriate prescribing, by deducting their pay to regulate their behaviour. (Chief Physician, Hospital A, P01)

Table 1
Sociodemographic data of participants.

Attributes	n (%)
Gender	
Male	10 (48)
Female	11 (52)
Age	
30-39	11 (52)
40-49	6 (29)
50-59	4 (19)
Department	
Internal Medicine	9 (43)
Surgery	7 (33)
Rehabilitation Medicine	1 (5)
Paediatrics	1 (5)
Intensive Care Unit (ICU)	1 (5)
Department of health insurance[a]	2 (10)
Professional experience	
6-10 years	5 (24)
11-15 years	9 (43)
16-20 years	4 (19)
20+ years	3 (14)
Affiliation[b]	
Hospital A	12 (57)
Hospital B	9 (43)

[a] Participants' have clinical backgrounds.
[b] Hospital A - without direct personal financial incentives; Hospital B - with direct personal financial incentives.

3.1.1.2. Physicians' responses to health insurance priorities. In the context of external DRG incentives, physicians adopt behaviours that appear to align with health insurance priorities. At the beginning of the payment reform, they proactively seek to understand the policies through self-learning online or communicating with colleagues or friends. Then, based on their understanding of the policy, physicians aim to control costs in accordance with its guiding principles. These principal-adherent cost control approaches include avoiding unnecessary examination, improving bed turnover rates, increasing their workload to achieve outcomes similar to those before the policy was implemented, and choosing medicines and supplies based on cost.

For a pilonidal sinus case, even if I perform a flap surgery, I might use some low-cost, handmade materials. For instance, I could apply several layers of gauze, place a negative pressure drainage tube in the middle, and seal it with a membrane to create a vacuum effect. We can only use this approach to achieve a similar effect to using a ready-made VSD (Vacuum Sealing Drainage) product. However, if there were no cost-control pressure from DRG, I might simply use a VSD product directly. (Chief Physician, Hospital A, P09)

To ensure that cases are accurately grouped under the DRG scheme and meet classification requirements, physicians are required to maintain consistency in diagnosis, treatment, and medical record-keeping in the health insurance information system. Participants report that this standardised diagnosis and practice serves not only to meet the regulations of the health insurance policy, but also to achieve cost control outcomes, as they become more cautious when prescribing medication.

I think it is obvious that the diagnosis and treatment may be more standardised. In the past, when there were some tests that could be done or not done, I might choose to provide the test, but now in the same situation, I might choose not to do it, and then the medication also becomes simpler, as I only prescribe what's truly necessary. (Associate Chief Physician, Hospital B, P14)

3.1.1.3. Factors mediating physicians' responses to health insurance priorities. The thematic analysis reveals that physicians' role as ideal agents of the health insurance system is influenced by mediating factors. The key mediating factors are identified by participants as compliance monitoring, implementation support and policy transparency. For instance, physicians report that the current DRG information system monitors the cases of readmissions and irregular medical practices, prompting them to prioritize compliance with the health insurance policy. Irregular medical practices that are not consistent with insurance authority standards, as identified in DRG regulatory information system, such as the absence of core treatment measures corresponding to specific diagnoses, and cases with unusually low total treatment costs, might result in a deduction of reimbursement.

The pressure is heavy, since all expenses are monitored under the health insurance system … some oversights can result in deductions and fines. (Associate Chief Physician, Hospital B, P16)

However, some cases flagged as violations by the health insurance monitoring system that are considered unreasonable by physicians can be resolved through appeal. The policy's implementation support measures include an appeal channel that offers doctors the opportunity to contest this situation and a formal negotiation channel that gives extra reimbursement consideration for special cases. As a result, some physicians maintain their usual practice, while others adopt conservative measures to avoid potential violations due to the cumbersome process and delayed outcome of the appeal.

*Some [cases flagged as violation] were quite unreasonable. We have appealed before, but we never received any response, so we became unwilling to continue with the process. (*Associate Chief Physician, Hospital B, P19*)*

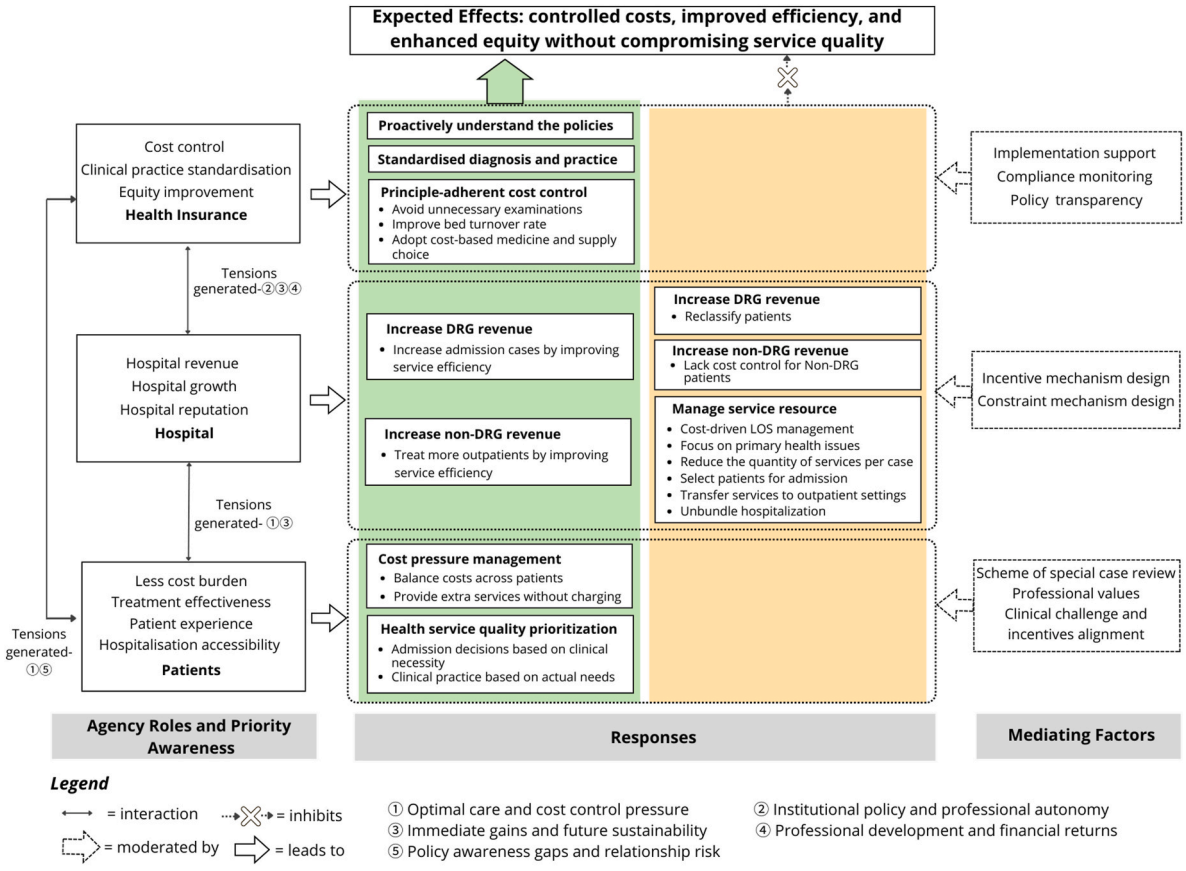

Fig. 1. Causal mechanism of physicians' behavioural responses under DRG payment reform.

Policy transparency is also a factor influencing physicians' implementation of health insurance policies. Although almost all the participants stated that the HSA has provided policy-related training and this facilitates their understanding of the policy, the findings indicate that some participants still lack clarity. For example, one physician misunderstood one of the policies to mean that patients couldn't be transferred to hospitals of the same level according to the regulations. When being asked for more details, the physician was unable to elaborate on the specifics of the regulation.

3.1.2. Physicians as agents for the hospital

3.1.2.1. Awareness of hospital priorities. Participants identify three hospital priorities, and these priorities are perceived as conflicting under the case-based payment policy. Specifically, hospitals are understood to aim to maintain or increase their revenue under cost-containment requirements, while they need to pursue growth in service volume and medical service capability, as well as reputation to strengthen their competitive position and contribution to social welfare.

When hospital leaders report on their annual performance, what do they present? Is it the decrease in outpatient visits, the reduction in inpatient admissions, or the decline in hospital revenue? or perhaps the amount of insurance fund *saving? Aren't these metrics contradictory? Instead, they must report the number of surgeries performed, the number of patients admitted, to show the hospital provided substantial benefits to the public and helped solve countless community issues.* (Associate Chief Physician, Hospital B, P20)

3.1.2.2. Physicians' responses to hospital priorities. In response to hospital priorities, physicians adopt a bifurcated approach to patient categorization that is closely tied to their cost management strategies. One group is designated as 'DRG patients', referring to the patients whose payments were covered by the local DRG policy, while the other category, the 'non-DRG patients' is the group whose payment is not covered by local social health insurance, including self-paying patients, those with commercial insurance, and with social health insurance from other areas, as well as outpatients.

3.1.2.2.1. Increase DRG revenue. To increase the DRG patient revenue, physicians use strategies to reclassify patients and increase admission cases. Payment-driven diagnosis, upcoding and surgery indication inflation are perceived as the common ways to reclassify patients. As one participant noted, when patients have multiple conditions, reimbursement considerations may influence which condition receive priority during treatment. Participants justify upcoding as a measure to compensate for insufficient reimbursement. "*We have to figure out ways to see if we can get the case upgraded to a higher DRG payment level, otherwise, the reimbursement just won't cover the costs.*" (Associate Chief Physician, Hospital B, P15)

Although participants believe they can rationalize their upcoding practices arguing that *"diagnoses can be seen from different perspectives, and everyone may have their own reasoning"*, they also feel that such practices could lead to criticism by peers due to the disconnect between the diagnosis and the patient's chief complaint. *"However, a problem that is widely criticized, from a clinical standpoint, a patient's chief complaint and history of present illness should lead to a diagnosis. Now, if you derive a diagnosis solely from the chief complaint, the result will astonish you. That's because the final diagnosis was largely shaped by payment points considerations."* (Department Director, Hospital B, P18)

3.1.2.2.2. Increase non-DRG revenue. For patients not under DRG coverage, and therefore not restricted to the case payment budget, physicians appear to have less cost control awareness. They view treating more non-DRG patients as a way to offset the reduced revenue from DRG cases. As one participant noted: *"No one talks about bed counts anymore. It'll all be about outpatient services …"* (Associate Chief

Physician, Hospital A, P03)

3.1.2.2.3. Manage service resources. In addition to increasing revenue to offset the reduced payments from health insurance, physicians describe adopting a series of resource management approaches within existing institutional and payment constrains to control costs. Six approaches are identified, among which managing patients' length of stay based on treatment costs, prioritizing patients perceived as more manageable within inpatient cost constraints, and limiting the scope of diagnosis to the main health concern during a single hospital stay appear to be the most prevalent. Other approaches reported include reducing the quantity of services per case, shifting certain services from inpatient to outpatient settings, and what participants described as the unbundling of hospitalization episodes (Details are provided in Appendix 2).

3.1.2.3. Factors mediating physicians' responses to hospital priorities. The themes generated from the data indicate that physicians' behaviour is influenced by mediating incentive and constraint mechanisms introduced by their hospital management and by other hospital strategies.

Incentive mechanism design. Aiming to increase the hospitals' DRG surpluses, financial incentives that directly link DRG surpluses with physicians' performance pay, and non-financial incentives, such as ranking and management hierarchy approaches, were reported by participants. Most participants express cautious attitudes towards direct financial incentives: *"If leaders say, 'Doctors don't need to worry about this policy, the hospital will coordinate it,' but still warn doctors to stay alert, this expression would bring a different feeling for us … but when this policy is linked to personal interests, behavioural responses are likely to follow."* (Associate Chief Physician, Hospital B, P16) Some participants from the hospital that adopted non-financial incentives felt satisfied with their current incentive mechanisms. *"They (other hospitals) can also regulate through other ways, such as rankings, without necessarily using money-related ways. For example, it could involve things like honours or regular conversations with you if your ranking is poor. This is also a kind of incentive policy"* (Administrator, Hospital A, P20)

Since the implementation of departmental accountability within the hospital, the relative weight of financial incentives and the specific strategies of non-financial incentives may vary across departments. It emerged from the interviews that the incentives implemented within departments may have a more immediate influence on physicians' responses. One participant from the hospital that adopted financial incentives described how departmental financial accountability for losses could shape decision-making, noting that "*it acts like a conductor's baton."* (Associate Chief Physician, Hospital B, P16)

Constraint mechanism design. To align with health insurance policy requirements, both hospitals are reported to have implemented non-compliance penalties, mainly in the form of performance-based pay deductions to regulate physicians' behaviour. "*In our hospital, violations are linked to doctors' income. About DRG profits and losses, those aren't directly linked."* (Administrator, Hospital A, P02)

3.1.3. Physicians as agents for patients

3.1.3.1. Awareness of patient priorities. Treatment effectiveness and lower cost burden are consistently identified as the patients' primary priorities from the perspective of physicians. *"From a patient's perspective, they want both low costs and good outcomes."* (Associate Chief Physician, Hospital A, P03) Enhanced patient experience emerged as another frequently cited priority among participants, reflecting a more patient-centred approach, emphasizing enhanced service quality, care continuity, and comprehensive examinations. Further, concerns about access to hospitalization was reported, especially for those with severe illnesses. *"For seriously ill patients, there must be some departments that don't want to admit them. So where do these patients end up? I'm concerned about this."* (Associate Chief Physician, Hospital A, P04)

3.1.3.2. Patient advocacy. **Cost pressure management.** Participants perceive that the DRG payment standards are adequate for most cases, however, for certain diseases or patients with special conditions, the reimbursements are not sufficient. To protect the interests of these patients, most participants manage costs by balancing treatment expenses across different cases within their department during a period, while some have had to avoid incurring extra expenses by providing 'free' interventions that do not involve medications or medical equipment.

If the costs exceed the budget, so be it. While one patient's costs may exceed the limit, there might be other patients whose expenses remain below it, allowing for a balance across cases. (Chief Physician, Hospital A, P01)

Health service quality prioritization. When considering patient benefits, some physicians describe prioritizing quality of care, even if this may result in exceeding the case payment. Reported examples included admitting patients based on clinical needs rather than selecting patients with lower treatment costs and meeting individual needs to guarantee the quality of health services during hospitalization.

If it is because of medical needs, like needing to delay discharge or having higher costs, most of us would still exceed the DRG payment quota. (Associate Chief Physician, Hospital A, P04)

3.1.3.3. Factors mediating physicians' patient advocacy. However, patient advocacy does not appear to be a uniform response but is mediated by an interplay of multiple factors.

Scheme of special case review. The additional compensation mechanism provided by health insurance for special cases also reportedly influences physicians' practices when handling cases they perceive may result in cost overruns. One participant noted: *"For this disease, the payment is very low. So, initially, when admitting these patients, we were very concerned, every patient admitted meant a loss. Later, we brought this situation to the attention of the insurance authorities, and they took measures; by the end of the year, they might provide some subsidies for these cases."* (Chief Physician, Hospital A, P01)

Professional values. Participants commonly highlight that healthcare is a special field, and they underscore the importance of professional ethics in medical decision-making. Sometimes participants prioritize professional ethics over cost control when facing these two conflicts.

I believe conscience is crucial in the medical profession. Sometimes, when you believe a treatment is necessary, you'll do it even at a financial loss, because your conscience wouldn't be clear if you didn't. (Associate Chief Physician, Hospital B, P15)

Clinical challenge and incentives alignment. Participants describe balancing their clinical decisions based on patient benefits with institution incentive considerations. Several participants suggest that alignment between clinical complexity and performance metrics influence their willingness to accept more complex cases.

While some physicians have courage to admit severely ill patients, they also consider their performance metrics and potential rewards. When these two factors combine, they're more likely to take on challenges. (Associate Chief Physician, Hospital B, P19)

3.2. Tensions between physicians' different agency roles

Thematic analysis generated five conflicts and tensions across the different agency roles identified. Physicians describe these conflicts as affecting their daily clinical practices or as creating dilemmas for them, requiring them to continuously navigate trade-offs and strike a balance among these apparently competing dimensions.

3.2.1. Optimal care and cost control pressure

Participants repeatedly stated that they are facing conflicts between what they consider optimal care and cost control pressure. Some participants acknowledge that their ideal of care delivering without cost considerations is rarely achievable in practice. As one participant

explained:

Given our large population and broad health insurance coverage, if the aim is to provide every citizen with high-quality, top-notch healthcare services at low costs, how is this possible? I feel that DRG is like going out for eating. When you go to a restaurant, we can only guarantee that we'll offer you a public cafeteria where you'll be fed and remain healthy. But if you expect gourmet delicacies at a public cafeteria, then, frankly, we cannot provide that. (Chief Physician, Hospital A, P09)

Nevertheless, participants still express great concern regarding healthcare quality, particularly about the potential for inadequate recovery due to decreased hospitalization stays, which are exacerbated by the limitations to providing continuous care through re-admission. Further, participants realize that the pressure to lower clinical standards to meet cost-containment demands ultimately compromises their ability to address some patient preferences, including better medicine, comprehensive assessments and integrated healthcare services.

3.2.2. Institutional policy and professional autonomy

Participants view the DRG related policies including those implemented by HSA and the hospital's responses as 'shackles' – *"it puts another shackle on us. I don't need so many restrictions."* (Resident Physician, Hospital A, P08) and they make their clinical decisions based on their awareness of the compliance approaches. This includes following the grouping rules of DRG and meeting the requirement of the existence of 'core treatment' which regulates that corresponding treatment should be provided for each diagnosis. However, these rules are perceived as different from their previous practice habits and sometimes not consistent with actual clinical needs. One participant gave an example of a patient who refused their treatment recommendation: *"If this patient has a thyroid nodule, it tends to be malignant, and I diagnose them with this condition … However, if the patient did not receive corresponding treatment for the thyroid nodule during this hospitalization, then the DRG system would flag us for a violation for this diagnosis."* (Associate Chief Physician, Hospital B, P15)

3.2.3. Immediate gains and future sustainability

Under the case-based payment mechanism, hospitals can receive more health insurance payment surpluses through cost savings. However, DRG weights are recalculated periodically based on historical cost data, while the base payment rates are adjusted annually. A prevalent concern among physicians in our study is that cost-saving practices will result in decreased payment standards in the future. Some participants from the hospital that implemented direct financial incentives, believe that although their performance-based pay has increased through various cost-saving measures, this growth is unsustainable. Two participants describe their current cost saving strategy as "*drinking poison to quench one's thirst*" (Associate Chief Physician, Hospital B, P16), or as harmful to hospital and physician's financial sustainability. Participants also expressed concerns about patients' long-term health outcomes, arguing that the current focus on 'immediate' health problems rather than long-term health problems would lead to more serious health problems later in life and require greater expenditure of public funds.

3.2.4. Professional development and financial returns

Participants perceive that the implementation of the DRG system places them in a dilemma: on one hand, they are expected to enhance professional skills by admitting patients with complex conditions and exploring new technologies, on the other, the imperative of controlling costs exerts pressure on them to select patients with low treatment cost. In addition, they acknowledge that the strategy of providing a greater volume of outpatient services might lead to the shrinking of hospital wards, which in turn is suggested to diminish physicians' teamwork ability. To avoid reinforcing these negative effects, many participants believe that the direct financial incentives hinder their professional development. For example: "*Inflammatory bowel disease has a long hospitalization period with high costs, so if a doctor is leading a group that's all about inflammatory bowel disease, and almost 90 % of their patients are in deficit, what are they going to do? If a group accounts for the profit and loss deduction to the head of a medical group, it will limit them from engaging in inflammatory bowel treatment.*" (Chief Physician, Hospital A, P09)

3.2.5. Policy awareness gaps and relationship risk

Policy awareness gaps between patients and physicians were identified, where patients are reported to have limited understanding of policy, resulting in confusion and misaligned expectations regarding healthcare provision. One participant complained: *"Many residents actually don't understand the insurance policy very well … they don't pay attention to the rules behind it."* (Administrator, Hospital A, P21) Meanwhile, physicians often need to make strategic adjustments to avoid cost overrun, but are unable to fully explain the reasons to patients, fearing potential complaints or misunderstandings. This is most reflected in physicians' perception of health insurance-imposed LOS limits, while insurance authorities clarify that there are no such LOS restrictions. One participant explained: *"The fixed cost basically determines the LOS …… Although not explicitly stated, the pressure has indeed been transferred to doctors."* (Associate Chief Physician, Hospital A, P20) Thus, participants indicated that they face the dual pressures of doctor-patient relationship risks and insurance penalties or reduced income.

3.3. Comparison of tensions and priorities in physician decision-making under different internal incentive structures

Although hospitals are subject to the same external economic incentives, the analysis reveals different patterns of physicians' decision-making in hospitals with different internal incentive structures. In hospital A, where internal financial incentives are less directly linked to DRG surpluses, the most pronounced tension is the conflict between institutional policy and professional autonomy, and physicians emphasise health service quality and non-DRG revenue generation in their decision making. As one participant put it:

Our hospital maintains a balance of revenue across departments at the overall level … …So the reform didn't affect our personal income that much. (How did you respond in this situation?) We stopped competing for the number of inpatient beds. (Associate Chief Physician, Hospital A, P03)

By contrast, in Hospital B, where DRG surpluses were closely linked to physicians' performance bonuses, the strongest tension is felt between optimal care and cost control pressure, while the conflict between immediate gains and future sustainability also emerges as a prominent concern. This appears to stem from a stronger tendency to adopt strategies aimed at DRG revenue generation, as reflected in one physician's account:

Under the payment reform, the overall development of a hospital is just like running a business. If you could sell a pot for 50 yuan before, now you can only sell it for 20 yuan and rely on low margins and high volume. (Administrator, Hospital B, P11)

4. Discussion

Our results indicate that, in our study setting, physicians recognize themselves as simultaneously serving as agents for health insurance providers, hospitals, and patients, making service delivery decisions influenced by an awareness of the underlying priorities of these three groups of principals. Participants identify emerging tensions as they attempt to align these priorities. Among them, the two most prominent are the conflict between delivering optimal care and managing cost-control pressures, and the conflict between institutional policy and professional autonomy. They make trade-offs according to their agency responsibilities and the influence of mediating factors. How hospitals react to the financial incentives induced by the case-based payment model plays a significant role in influencing physicians' decision-making and in the realization of policy effects.

Our analysis suggests that physicians in these two hospitals have

adapted to the new payment system. They have incorporated cost awareness into clinical practice routines as intended by the case-based payment policy. Simultaneously, the scheme of special case review provides a certain degree of space for professional autonomy, allowing them to accommodate special cases whose costs might exceed limits while adhering to the general principle of cost control. However, cost-containment is still viewed as a threat to the hospital development, patient care, medical technology innovation, and professional autonomy. This finding aligns with some research in other countries (Aktas, 2022; Notman et al., 1987).

Under these perceived threats, unintended physician behaviours seem to arise in our study setting. Our analysis finds that physicians, whether intentionally or unintentionally, are engaging in various forms of "DRG creep", which is one of the most common unintended consequences of DRGs identified in the literature (Barouni et al., 2020). DRG creep refers to health providers deliberately reclassifying cases into more intensive and expensive treatment categories to secure higher reimbursement (Hsia et al., 1992). In our analysis, potential behaviours including upcoding, selective coding, and unnecessary practices aimed at meeting DRG grouping requirements are recognized. We also found that cream-skimming, characterized by physicians as selectively treating low-cost/low-risk patients while avoiding high-cost/high-risk cases, is induced by the new payment system. Those physician behaviours have counterproductive effects on outcomes.

While agency theory emphasizes predetermining the most efficient contract, our research reveals complexities during implementation. The special case review scheme established by the health insurance authority aims to provide contractual flexibility and adaptability, allowing for physician's adjustments to non-standard cases. However, our findings suggest that this scheme has not fully achieved its intended purpose among physicians in these two hospitals. The cumbersome appeal processes, which physicians view as detracting from their time for professional patient care, as well as the delayed response create new transaction costs for physicians, leading them to prefer to avoid such situations in their initial service decisions rather than rely on the post-adjustment mechanism. This may result in some patients not receiving the most appropriate treatment. On the other hand, since precise cost data are lacking, DRG payment rates are generally based on historical charge levels (Peiyong, 2025). We found that this results in some payment levels not reflecting the marginal costs and risk characteristics of certain DRG groups. This pricing misalignment undermines the incentive compatibility of the principal-agent contract, driving physicians to avoid high-cost cases that are underpriced, consequently compromising equity in patient access to healthcare and overall healthcare effectiveness.

Similar to observations from other countries (Annear et al., 2018), our study demonstrates that DRG implementation may lead to shifts in care delivery patterns and expanded its impacts on non-inpatient departments. Our analysis reveals concrete examples of this phenomenon, under which physicians report that they manage service resources by strategically redirecting patients to outpatient services and facilitating earlier discharges to align with DRG reimbursement structures. This cost and patient shifting represents an adaptation strategy that physicians employ to navigate their competing responsibilities to both the hospital and their patients. While previous studies in China have primarily focused on cost-shifting between insured and uninsured patients (Jiabi et al., 2025; Suwei et al., 2019), our study suggests that cost-shifting may also occur between insured patients. We found physicians in this study categorise patients covered by SHI from other regions as ‘non-DRG patients’, for service resource management. The practice stems from China's city-level management of SHI, which means hospitals serving patients with SHI from other cities are not influenced by the DRG policies of the city in which they are located. This might lead to cost-shifting among inpatients, thereby undermining the overall effect of DRG policies in controlling costs.

Our study indicates that the tensions physicians face associated with the case-based payment reform are significantly influenced by the hospital incentive mechanism. The findings suggest that administrative pressure, rather than direct economic incentives, can be more effective in balancing cost containment with quality care. Moreover, organizational mediation, such as departmental management strategies can interact with incentive design. This is consistent with a study on upcoding in China (Zhou et al., 2025), which noted hospitals' financial risks can be passed down as administrative pressure on physicians through hierarchical structures, as hospital leaders and department chiefs play a key role in physicians' career advancement. Further, our research extends this understanding by demonstrating the value of the dual-level distribution system as internal risk-sharing. The department accountability mechanism allows hospitals to avoid one-size-fits-all incentive approaches that ignore the distinct characteristics of different clinical departments.

While some studies have suggested that China has effectively controlled healthcare costs through the DRG payment reform, without adversely affecting the quality of care (Wang et al., 2023; Zou et al., 2020), our analysis reveals mechanisms through which healthcare quality may be affected that may not have been detected by those studies. We found that, in our study setting, physicians are concerned about service quality when they control costs, and would like to ensure treatment effectiveness through patient readmission. However, low readmission rates serve as a performance indicator for hospitals and physicians’ readmission decisions are restricted by this metric. Therefore, the using of readmission rates by most existing studies as a proxy for healthcare quality may underestimate the true impact on care quality.

4.1. Study strength and limitations

A key strength of this study lies in its use of the qualitative approach providing the flexibility to probe deeply and capture rich narratives about principal–agent relationships and financial incentives in healthcare. A logic model was established to illustrate the causal relationships identified in our analysis. Our findings are indicative of these relationships, and future studies could employ formal process tracing (Johnson et al., 2024) to further test and elaborate the causal mechanisms presented in this model. While the first author's existing professional relationships with the study hospitals facilitated access, we acknowledge that such positionality is relevant to consider when interpreting qualitative accounts. However, interpretation was conducted collaboratively within a multidisciplinary team with backgrounds in health economics, health systems research, and sociology, and reflexive discussions among team members were used to minimise interpretive bias. This study primarily examines the impact of hospitals' internal economic incentives, as participants provided limited information on informal, non-economic performance systems. In addition, we primarily relied on interviews to collect data. While this approach provides valuable insights based on participant perspectives and reflections, incorporating observational data might have captured behavioural patterns that participants were unaware or potentially found difficult to articulate. Future studies could benefit from incorporating observation approaches to complement interview insights.

5. Conclusions

Our research indicates that while, in the context studied, the payment reform has achieved certain intended outcomes, it has also generated a range of unintended responses that may compromise healthcare quality and lead to efficiency gains that are slightly less than expected. In addressing the principal-agent problem, it is imperative to design incentives that align with both the principals' and the agents' objective functions. Suggested strategies include adjusting underpriced payment rates to mitigate patient selection, enhancing policy transparency to support principle-adherent cost control, strengthening

monitoring to promote standardised diagnosis and practice, and implementing incentive mechanisms aligned with measurement criteria and professional values to enhance physicians' professional motivation and job satisfaction. Our study also strengthens the argument that hospitals should exercise caution when implementing direct financial incentives, suggesting that creating supportive, risk-sharing mechanisms within departments as a form of organizational mediation may be effective in balancing cost control with quality care.

CRediT authorship contribution statement

Xiaoying Zhu: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing. **Daniel Strachan:** Methodology, Supervision, Validation, Writing – review & editing. **Tiara Marthias:** Methodology, Supervision, Validation. **Ajay Mahal:** Conceptualization, Writing – review & editing. **Shenglan Tang:** Conceptualization, Writing – review & editing. **Barbara McPake:** Conceptualization, Methodology, Supervision, Validation, Writing – review & editing.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.socscimed.2026.119079.

Data availability

The data that has been used is confidential.

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