



## Health Reform Monitor

Why and how did Israel adopt activity-based hospital payment? The Procedure-Related Group incremental reform<sup>☆</sup>Shuli Brammli-Greenberg<sup>a,b,\*</sup>, Ruth Waitzberg<sup>a,c,d</sup>, Vadim Perman<sup>e</sup>, Ronni Gamzu<sup>f</sup><sup>a</sup> Smokler Center for Health Policy Research at Myers-JDC-Brookdale Institute, Israel<sup>b</sup> School of Public Health at the University of Haifa, Israel<sup>c</sup> Department of Health Systems Management at Ben-Gurion University of the Negev, Israel<sup>d</sup> Department of Health Care Management at Technische Universität Berlin, Germany<sup>e</sup> Department of Planning, Budgeting and Pricing, Ministry of Health, Israel<sup>f</sup> Tel Aviv Sourasky Medical Centre and Tel Aviv University, Israel

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## ABSTRACT

Historically, Israel paid its non-profit hospitals on a per diem (PD) basis. Recently, like other OECD countries, Israel has moved to activity-based payments. While most countries have adopted a diagnostic related group (DRG) payment system, Israel has chosen a Procedure-Related Group (PRG) system. This differs from the DRG system because it classifies patients by procedure rather than diagnosis. In Israel, the PRG system was found to be more feasible given the lack of data and information needed in the DRG classification system. The Ministry of Health (MoH) chose a payment scheme that depends only on inhouse creation of PRG codes and costing, thus avoiding dependence on hospital data. The PRG tariffs are priced by a joint Health and Finance Ministry commission and updated periodically. Moreover, PRGs are believed to achieve the same main efficiency objectives as DRGs: increasing the volume of activity, shortening unnecessary hospitalization days, and reducing the gaps between the costs and prices of activities. The PRG system is being adopted through an incremental reform that started in 2002 and was accelerated in 2010. The Israeli MoH involved the main players in the hospital market in the consolidation of this potentially controversial reform in order to avoid opposition. The reform was implemented incrementally in order to preserve the balance of resource allocation and overall expenditures of the system, thus becoming budget neutral. Yet, as long as gaps remain between marginal costs and prices of procedures, PRGs will not attain all their objectives. Moreover, it is still crucial to refine PRG rates to reflect the severity of cases, in order to tackle incentives for selection of patients within each procedure.

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## 1. Background

Since 1995, Israel has had a national health insurance (NHI) system that provides a broad benefits package to all Israeli citizens and permanent residents, which the government updates each year. The system is financed primarily from public sources via payroll and general tax revenues.

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The share of public financing has declined to 61% of total health system financing [1].

Four competing, non-profit health plans (HPs) are responsible for providing their members with the NHI package and ensuring reasonable accessibility and availability of services. They provide care in the community and procure hospital services. There are four HPs; two of them, Clalit and Maccabi, cover almost 80% of Israel's residents. Both own general hospitals: Clalit owns eight general non-profit hospitals (30% of acute care beds) whereas Maccabi owns five for-profit hospitals (about 3% of acute care beds).

In addition to its regulatory, planning and policymaking roles, the Israeli Ministry of Health (MoH) owns and operates about half of the nation's acute care hospital beds.

Approximately 80% of the revenue of all 45 public general hospitals in Israel comes from the HPs' payments for services. The remaining 20% comes from sales of services to other public bodies (e.g., the National Insurance Institute) and private services such as those not included in the NHI package and medical tourism [2]. In 2014, the rate of acute care beds per 1000 populations in Israel was lower than the OECD average (1.9 compared to 3.3) [3].

From the late 1970s, public hospitals in Israel were paid per-diem (PD) fees for inpatient care; during the 1990s, activity-based payments were introduced through the establishment of 30 Procedure Related Groups (PRG). Emergency and ambulatory care in hospitals are paid on a fee-for-service (FFS) base. In 2012, 23% of the gross revenue of government-owned hospitals was for inpatient care paid by PRG, 40% for inpatient care paid by PD, 21% for ambulatory care paid by FFS or PRGs, 8% for births paid by PRGs and 6% for emergency care paid by FFS [4]. Maximum price lists for all hospital services are mandated by law and set by the government, through a joint MoH and Ministry of Finance (MoF) pricing committee. Since June 2015, as part of the mental healthcare reform, HPs have been purchasing inpatient care from psychiatric and general hospitals. Payments for these services are based mainly on PD fees. Prices for these services, similarly to those for other hospital services, are set by the MoH [2].

The objective of this paper is to analyze how and why Israel adopted activity-based hospital payment by PRG.

The paper proceeds as follows. In Section 2, we introduce the PRG system and reform, in Section 3, we discuss problems that the PRG reform aims to address. In Section 4, we analyze the stakeholders' positions and influence. In Section 5, we describe the current tools available to assess the payment reform and in Section 6 we conclude and discuss the paper.

## 2. The Procedure-Related Group incremental reform

In the last decade, efforts to reform the Israeli health-care system have been more intensive than at any time since the passing of the NHI law. Many of these efforts have been, or are in the process of being, implemented, among them the PRG payment reform, which consolidates hospital costing, pricing, and payment mechanisms by the MoH. It is part of the Ministry's broader policy of strengthening the public health system, particularly the hospital market. The

reform has been implemented incrementally since 2002 and boosted since 2010.

The objectives of the PRG reform are:

1. To set consistent costing and pricing mechanisms and improve public hospitals' financial balance.
2. To refine the unit of payment, by shifting from PD to activity-based payments.
3. To improve the MoH's capacity to set policy and priorities and to supervise and control.

### 2.1. Description of the PRG payment system

Characteristically, the PRG payment method is based on the principal procedure carried out, rather than diagnosis. When Israel needed to implement a new payment mechanism, there were insufficient data to build accurate diagnosis-related groups (DRG groups), as is done in most European countries. The solution proposed by the MoH was to build "in house" PRG codes based on its own data collection for micro-costing and pricing.

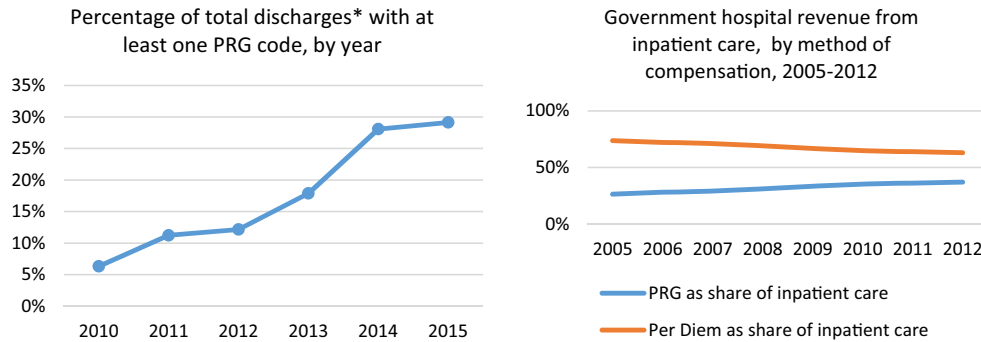
The PRG tariff includes all hospital costs involved in performing the procedure (i.e., operating room, equipment, overheads, and wages). The PRG tariffs are regularly updated based on the health cost index and, sometimes, on improved costing methods. There is an additional payment for patients who undergo more than one major procedure in different organs.

PRG codes are calculated based on the International Statistical Classification of Diseases and Related Health Problems (ICD-9-CM) codification, where each PRG can be one or a group of ICD-9-CM procedure codes. The description of each PRG is based on Current Procedure Terminology (CPT) codes.

PRGs do not take account of diagnoses or patient characteristics (e.g., age, sex, co-morbidities, severity). The PRG pricing is "budget-neutral; when determining the price of a new PRG or updating the price of an existing PRG, the hospitals and HPs do not earn or lose funds. However, the mechanism might change the budget allocation within each group (i.e., across hospitals or across HPs). This restriction requires two parallel items of information for the pricing of a certain PRG: its costing and the quantities used. The "budget-neutral" requirement poses one major constraint for the reform if it is to attain its objectives, as it might force the pricing to be inaccurate or be such that it provides perverse incentives and does not necessarily reduce the gaps between costs and prices for certain procedures. If the marginal cost of a procedure is higher than its marginal price, hospitals might have incentives to underprovide care or avoid the procedure. Similarly, when the marginal cost of a procedure is lower, then the incentive is to overprovide care or to prefer a profitable procedure to another one. For details of the PRG costing and pricing mechanism, see Appendix of Supplementary material.

### 2.2. The PRG adoption process

Since 2010, the amount of PRG codes and hospital revenues from activities paid by PRGs have significantly increased. Fig. 1 (left) shows the upward trend in the



\* Includes only elective non-birth hospitalizations  
Source: Special analysis by the authors of MoH data

**Fig. 1.** The PRG adoption process, by year.  
Source: Special analysis by the authors of MoH data.

percentage of total discharges with at least one PRG code; and (right) the increase in hospitals' revenues from PRGs, which have been replacing PD payments.

Fig. 2 and Table 1 present the reform timeline. Until 2002, there were few PRG codes for the most common procedures. The first wave of the reform was 2002–2009 when 70 new codes were created. In 2010, the reform gathered momentum and an additional 73 codes were created that year. Since then, the MoH has been defining PRGs as waves, with dozens of codes by specialty-groups, e.g., trauma (mainly “high-energy” orthopedic surgeries), urology and orthopedics. At the beginning of 2016, there were 281 PRG codes, which accounted for more than a third of inpatient care and more than half of total procedures [5].

The trend is to keep adopting PRGs for surgical departments and departments where invasive procedures are performed (i.e., cardiology, gastroenterology). The PD will remain the main payment scheme for other inpatient care departments.

### 3. Problems that the PRG reform aims to address

The PRG reform does not purport to resolve all system level challenges but it has several goals (mentioned above) that were meant to address the following problems:

#### 3.1. Lack of transparent costing and methodical pricing mechanisms that led to inappropriate payment levels

Until 2010, MoH PD fees were not based on a methodical costing and pricing process. Prices were set about two decades ago, based on the historical expenditures of certain hospitals. Since 1985, a pricing committee has periodically updated the rates, but has not revised the calculation formula and despite annual adjustments, there were no clear costing and pricing methods [6].

The hospitals were underpaid for many activities, while they were overpaid for others. Since all public hospitals have been facing growing deficits, it can be assumed that during the last decade more activities were underpaid rather than overpaid. Under-compensation can lead to

\* Includes only elective non-birth hospitalizations

deficits and long waiting times. Over-compensation provides incentives to increase activity, which could result in the provision of financially unsustainable or medically inappropriate care. Both over- and under-compensation create incentives for selection [7].

The solution suggested by the reform was to set consistent and standardized costing and pricing mechanisms and to strengthen public hospitals' financial balance.

#### 3.2. Payment mechanism that was not sensitive enough to reimburse hospitals fairly

The payment mechanism prior to the PRG reform was based mainly on PD. The PD unit of payment (hospitalization day) is less sensitive to cost variation of the different cases, especially those in surgical departments and departments where invasive procedures are performed. Moreover, PD payments do not constitute an incentive for the hospitals to perform procedures. In the public sector, this led to underutilization of resources in hospitals and aggravated growing waiting times for elective procedures, particularly for procedures that were under-reimbursed.

A consistent costing and pricing mechanism was essential but not sufficient to solve this problem. Therefore, the solution suggested by the reform was to refine the unit of payment shifting from PD to activity-based payments for surgical departments and departments where invasive procedures are performed.

#### 3.3. Payment mechanism that made it difficult for the MoH to set policy and monitor activities

PD payments do not require hospitals to provide the MoH transparent data on their activities. The lack of data posed difficulties for the ministry to monitor and assess hospitals' performance and efficiency. It also limited its ability to prioritize hospital activities, such as improving or increasing outputs, prioritizing access to advanced technology, or shortening waiting times.

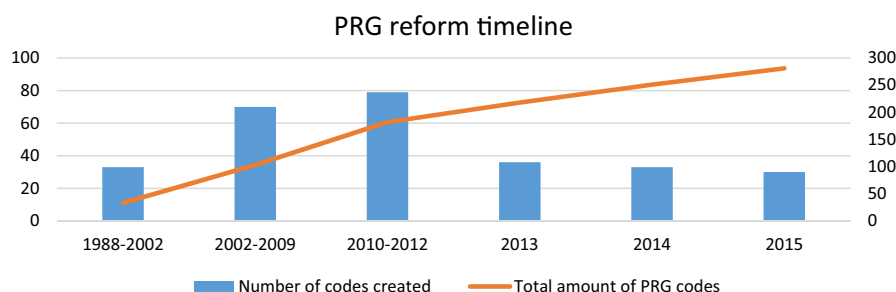


Fig. 2. PRG reform timeline (stages, dates and specialties covered).

Source: Special analysis by the authors of MoH data.

**Table 1**  
PRG waves and specialties.

PRG stages	Pre-reform 1988–2002	2002–2009	2010–2012	2013	2014	2015
Specialties covered	All specialties	All specialties	Trauma focus on orthopedics, hand surgery	Urology, general surgery	Ophthalmology, ENT, general surgery	Orthopedics (non-trauma), MRI

Source: Special analysis by the authors of MoH data.

Payment mechanisms can be used by regulators to promote policy objectives because they offer incentives that affect the behavior of providers [8]. In this view, *the solution suggested by the reform* was that the MoH use PRGs to enhance collection of data about hospitals' activities and quality of care to improve the ministry's capacity to set policy and priorities and to supervise and control. PRGs also enable the MoH to intervene in hospitals' activities. For instance, they can raise the price of a certain procedure to shorten its waiting times or reduce the price of another procedure that was less cost-effective than its alternative.

#### 4. Stakeholders' positions and influence on the PRG reform

The four main stakeholders in the hospital market are powerful: the MoH, MoF, HPs and hospitals. The MoH aims to increase the public budget for healthcare, particularly for public hospitals, in the most effective way. The MoF is more concerned with fiscal responsibility and sustainability and consequently prefers to curb inpatient care expenditure. The MoF sets the annual government funding level for NHI and is influential in all healthcare decisions that have budgetary implications. [9]. The four HPs prefer to reduce their expenditures, especially on services provided by others, e.g., those purchased from hospitals. Hospitals, in turn, are important players because their cooperation is crucial for the implementation of the reform.

Fig. 3 represents our analysis of the positions of each of the players, who can be divided into two groups: *regulators and providers*.

The regulators have strong influence on the reform. At the beginning of the reform, they held different positions. The MoH was more strongly in favor of the reform than the MoF. The MoF was very concerned about the possibility of supply-induced-demand, i.e., that the reform would increase the incentives for hospitals to over-treat. Since it

was clear that the current situation of compensation by PD was much more problematic, as long as the budget-neutral requirement was kept, the MoF played along with the MoH's enhancements to the PRG reform. It was only in 2014, when the data regarding the impact of the reform, i.e., procedures' quantities and prices, began to accumulate that the MoF changed its position and became more in favor of the reform. In the regulators' group, while the MoF is more concerned with "how much" is to be allocated to hospitals, the MoH is more concerned with "how" these resources will be allocated across hospitals and between hospitals and HPs.

Within the providers' group, both players are concerned with "how much" the reform adds to or takes away from their income or expenditures. The HPs claim that the budget-neutral requirement will not necessarily be accurate or maintained at the HP level and are therefore concerned about the increase in their expenditure on inpatient care. For the same reason, the hospitals are concerned that their income will be reduced. Therefore, budget-neutral reform seems to be the closest solution possible to reconcile all interests.

Bearing in mind each player's considerations, the MoH opted for an incremental reform, which would be smooth enough for the players to adjust to the changes during the implementation process. In addition, while consolidating the reform, the MoH strategically kept all players in the picture – either actively involved (MoF) or informed in advance (hospitals and HPs) – in order to avoid their opposition.

In conclusion, the MoH has attempted to develop a simple payment scheme that is relatively easy to implement and will be acceptable to all players involved. Although the reform chosen was not the only way to address the mentioned market failures, it was the one that policymakers believed implementable—practically, politically and strategically.

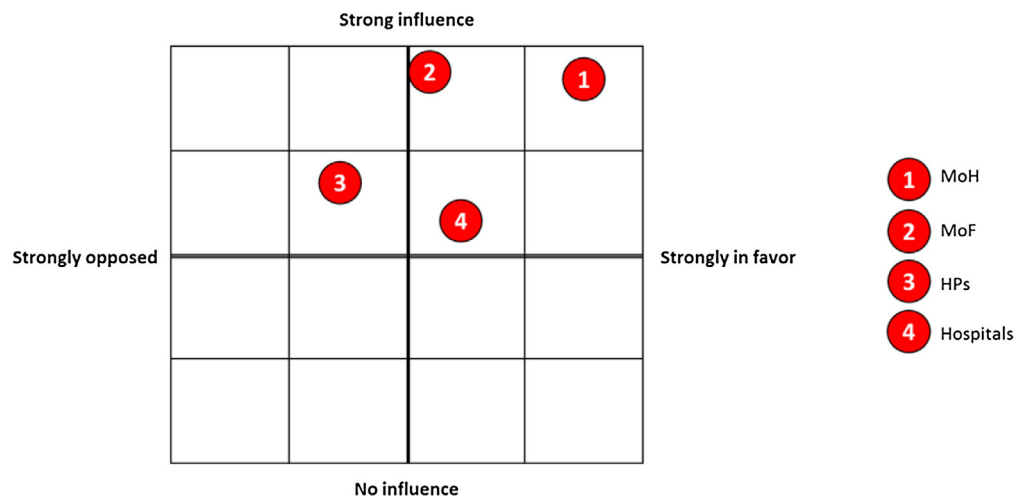


Fig. 3. Stakeholders' positions and influence on the PRG reform.

## 5. Tools to assess the payment reform

Alongside the payment reform, the MoH launched three initiatives to improve the hospital market whose outputs can be used to assess the effects of the payment reform:

1. The National Program of Quality Measures (NPQM) in Hospitals, launched in 2013, which measures and monitors performance and quality of care in general hospitals [10]. The MoH can use measurement outputs to monitor whether the increasing utilization of the PRG scheme affects the quality of care. Although, the NPQM in hospitals does not relate directly to the PRG reform, there is internal collaboration between two relevant teams in the MoH.
2. Measuring waiting times: Since 2012, the MoH has required all Israeli public and non-profit hospitals to report waiting times for 23 elective operations by source of funding [11]. Since 2014, the data have been collected and published in the public domain regularly. This might help the MoH to partially assess whether PRGs are reducing waiting times.
3. Refining PRG costing and pricing: The MoH has started re-evaluating and refining the micro-costing methods and units, recalculating the costs of the resources basic units (such as physicians' wages and operating room costs), and reviewing the quantities of resources used for each PRG.

Aside from these monitoring tools, no academic policy evaluation has been conducted to date.

## 6. Conclusions and discussion

Israel has been adopting activity-based payments for public hospitals (the PRG reform). The timing of the change was similar to other European countries [12–14].

Unlike most European countries, Israel did not "import" the DRG system, but chose instead to develop its own system based on PRGs because it was more feasible, given

the lack of data needed in a DRG classification system. The MoH chose a payment scheme that depends only on in-house coding and micro-costing, thus avoiding dependence on hospital data. Moreover, PRGs are believed to achieve the same main efficiency objectives as DRGs: increasing volume of activity, shortening unnecessary hospitalization days, reducing the gaps between the costs and prices of activities, and reimbursing public providers more fairly.

The method has several substantial disadvantages:

- It is not currently applicable for diagnoses or admissions that lack interventional procedures.
- As long as it is not adjusted for patients' characteristics and severity, it retains incentives for selection due to variations of cost across patients groups.
- The budget-neutral constraint weakens the ability of PRGs to narrow the unintended cost-price gaps.
- Similar to DRGs, PRGs raises concerns about impairing quality of care due to reduced ALoS. Quality of care must therefore be monitored.

*Lessons for other countries.* The Israeli experience can inspire other countries regarding the way to:

1. Implement a controversial reform by involving the main actors in its formulation and consolidation, thus avoiding opposition
2. Implement activity-based payments with a partial database with few consistent, uniform and transparent data on hospitals activities, or without a developed patient-classification group system
3. Implement an incremental reform of hospitals' payment system, constantly monitoring changes in quality of care and waiting times.

To conclude, in countries where there is evidence of gaps between the costs and payment of hospitals' activities, one of the recommendations is to shift to activity-based payments. Where there is a lack of data, platform, or polit-

ical environment, PRGs are an implementable alternative to DRGs with most advantages of the latter method.

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### Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.healthpol.2016.08.008>.

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