Slovenian health care in transition: Studies on the changes in the Slovenian health care system from 1985 until 2010
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Abstract

Background: Health policy in Slovenia tried optimising hospital care performance through reimbursement systems. This paper describes the organisation, management and developments in the volume and types of care, explores the policy choices and the impact the two interventions - introduction of case-based payments and of the diagnosis-related groups (DRGs) – had on the average length of stay (ALOS).

Methods: Routine statistical data prepared by the National Institute of Public Health (NIPH), strategic and planning documents of the health care reforms in the period explored, database of hospital treatments under the national hospital reporting system in the period 1997-2007. Comparisons of three distinct periods by carrying out a regression analysis.

Results: Slovenian hospital sector remained state-owned with a decline in the number of hospital beds of 20% and an increase in the number of cases of 17.7%. Employment rose by 6.9% while the ALOS dropped by 36.7%. Comparing the period 2001-2003 with the period 1997-2000 five variables (diagnosis of a complication, male sex, death of patient, clinical hospital, general hospital) were predicting a reduction of the ALOS, while in the comparison between the period 2004-2007 and 2001-2003 only male sex and death of patient predicted the reduction of the ALOS.

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Conclusion: In the past 18 years hospital care has had a shorter length of stay and increased turnover of patients. This has happened in a predominantly public system that improved its overall performance. Changes were due both to the reimbursement mechanisms and to the adoption to a changed environment.

Keywords: hospital care, reimbursement systems, DRGs, health care reform, Slovenia

6.1. Introduction

Hospital care in developed countries consumes roughly a half of the total health care budgets [1] and becomes a key issue in all health care reforms. Reasons include optimisation of hospital services, opening up of the health care market, containing costs related to the treatment of chronic conditions and managing costs in the most expensive sector of health care.

By the end of the 1980s Slovenia was facing a serious economic and financial crisis extending into health care. Following upgrades during the 1970s and the beginning of the 1980s, problems in the hospital sector were similar to those in other countries:

a. large facilities with too long an average length of stay (ALOS) – in 1990 - 11.4 days in internal medicine and 8.4 days in surgery [2],

b. inappropriate capacity to meet the demographic challenge – declining birth rates, ageing and the need for supportive care [3],

c. imbalance between supply and demand with long waiting times for diagnostic and outpatient therapeutic procedures (e.g. in year 2000 – 2 years for cataract surgery and 3-5 years for a hip replacement) [4].

Political changes in 1990 triggered a process that provided the following theoretical models for the privatisation of hospitals [5]:

1. privatisation of smaller hospitals, based on public-private partnerships or internal privatisation,

2. transformation of a part of hospital capacity into a nursing care facility,

3. complete privatisation of smaller hospitals and partial privatisation of bigger hospitals,

4. opening the market of hospital services by attracting foreign or mixed investments.

None of the above materialised as the political decisions resulted in keeping all hospitals within the public sector. Hospitals owned by the municipalities and regional health authorities prior to 1990 were brought under state ownership. The Ministry of Health (MoH) supported the setting up of smaller in-patient private facilities. The case of the Surgical sanatorium in Ljubljana is typical of the process, starting off as a private for-profit facility and gradually turning into a predominantly publicly financed in-patient structure. The state was seeking to optimise performance through different reimbursement models.
Challenges of this kind had been present across Western Europe since the 1970s and with the socio-economic and political changes entered into Central and Eastern Europe. Previous systems of hospital reimbursement allowed for inefficiencies due to retrospective budgets, which have gradually been discouraged and different prospective payment models were developed. Since the 1980s a lot of attention was given to the initiatives launched in the USA [6,7], Canada [8] and Australia [9] related to the systems of diagnosis-related groups (DRGs). They had their most important adoption in systems financed through public funds, such as Medicare (both US and Australia). In the 1990s pressures were rising to achieve better technical performance and better quality at all levels of health care. Several European countries chose to introduce DRGs early, such as France in 1985 (Programme de Médicalisation des Systèmes d’Information (PMSI)) [10] and Italy in 1993 [11]. Some, as were the cases of the Netherlands (Diagnose Behandeling Combinatie – DBC) [12] and England (Healthcare Resource Group – HRG) [13], preferred modified versions of DRGs. The earliest introduction of DRGs in Central and Eastern European countries occurred in Hungary [14] in 1993, followed by Bulgaria, where DRG introduction was piloted in 1993/94 [15].

In this paper we present a descriptive evaluation of the policy context and of the changes in the hospital sector in Slovenia between 1990 and 2008 based on statistical indicators. We start by describing the organisational and managerial changes, followed by an overview of trends in hospital resources and their overall capacity. Through the exploration of the health policy decisions over the past 20 years, we discuss dilemmas around the possible policy choices regarding hospitals in Slovenia. We conclude by studying the impact that the two reimbursement models introduced early in 2000s had on the hospital performance as measured by trends in the average length of stay (ALOS). Our analysis focuses around the following research questions:

1. What were the changes in the organisation and management of the hospital sector in Slovenia in the course of the last 18 years?
2. What were the developments in terms of volume and types of hospital care?
3. What policy choices were developed in Slovenia regarding hospital care in terms of their structure and market orientation?
4. What impact did the two major policy interventions – introduction of case-based payments in 2001 and of the DRGs in 2003/4 – have on the ALOS?

6.2. Material and methods
We describe developments in the hospital sector in Slovenia using the following materials and methods:

1. routine statistical data prepared by the National Institute of Public Health (NIPH),
2. strategic and planning documents of the health care reforms between 1990 and 2008,
3. database of hospital treatments under the national hospital reporting system, including anonymised data of all in-patient treatments in the period 1997-2007.

The national hospital reporting system, BOLOB, was the main source of our data on hospital treatments. It is based on single episodes of care defined by their specific subspecialty. Episodes are merged into hospitalisations based on the broader specialist groups with the principal diagnosis defined as the cause for admission. The system of DRGs introduced in 2003 applies to all acute hospital treatments, including elective surgery and excluding all types of psychiatric care, rehabilitation services, and healthy newborns, services for disabled and handicapped children as well as transplantation services. In these cases providers may use DRGs for their internal purposes, but they are not reimbursed based on DRGs. For the purpose of this analysis we included only acute care cases. We carried out the analysis in several steps:

1. Forming a database including 3,520,260 in-patient cases, stratified by age and calculated hospitalisation rates for age groups 0, 1 to 6 years, 7 to 14 years and then for five-year age groups between 15 and 100 years.
2. Exclusion of all hospitals and ICD-10 group combinations, where less than 660 cases occurred in the entire period.
3. Grouping of all hospitals into either tertiary, general or mono-specialist and a presentation of the nominal ALOS trends per hospital for the entire period analysed.
4. Selection of the most frequent diagnosis per ICD-10 group, based on the volume of patients treated.
5. Calculation of the standardised ALOS within hospital type and chosen diagnoses.
6. Selection of variables relevant for regression.

6.3. Results
6.3.1. Organisation of hospital care in Slovenia
There are 25 public hospitals in Slovenia, among which there are six tertiary hospitals: the two university clinical hospitals of Ljubljana and Maribor (also acting as general hospitals for the respective regions), Institute of Oncology in Ljubljana, Psychiatric Clinic in Ljubljana, University Rehabilitation Institute and the Clinic for pulmonary diseases and allergy Golnik. The previous General Hospital Maribor transformed into the University Clinical Centre of Maribor with the medical faculty established there in 2003. Other hospitals are of two types – there are ten general hospitals and nine mono-specialist hospitals (pulmonary diseases, psychi-
Hospital care in Slovenia between 1990 and 2008... atric, maternity). The entire hospital capacity in 2008 was of 9,586 beds (4.7 beds per 1,000 inhabitants) with an average length of stay of 6.9 days [16] (both acute and non-acute). This was down from 11,881 beds in 1990 (5.9 beds per 1,000 inhabitants) with an average length of stay of 11.5 days. The turnover of patients increased by 10% on average represented by the number of cases per employed in hospitals (1990-16.67 cf. 2008-18.35). This is a result of a 17.7% rise in the number of cases compared with a 6.9% increase in the number of employed. There were five private in-patient providers (predominantly not-for-profit), providing mainly diagnostic procedures and routine short-term surgery (e.g. cataract surgery, hernia, gallbladder stones, varicose veins stripping). They all have contracts with the Health Insurance Institute of Slovenia (HIIS) for over half of their services and a total of 106 hospital beds. Table 1 shows how waiting times for certain procedures shortened.

Secondary general hospitals exist in regional capitals and have at least four departments each – internal medicine, surgery, paediatrics and gynaecology&obstetrics. Seven general hospitals also have other clinical departments. Mono-specialist hospitals are a result of historic traditions, when hospitals were developed for certain major conditions. There are two gynaecological and obstetric hospitals, a pulmonary disease hospital, four psychiatric hospitals, an orthopaedic hospital and a long-term care hospital for children.


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<tbody>
<tr>
<td>Angiography</td>
<td>3.28</td>
<td>1.74</td>
<td>1.54</td>
<td>-47%</td>
</tr>
<tr>
<td>Cataract surgery</td>
<td>5.89</td>
<td>1.86</td>
<td>4.03</td>
<td>-68%</td>
</tr>
<tr>
<td>Hip replacement</td>
<td>20.28</td>
<td>17.39</td>
<td>2.89</td>
<td>-14%</td>
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<td>2.04</td>
<td>11.14</td>
<td>-84%</td>
</tr>
<tr>
<td>Hernioplasty</td>
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<td>3.42</td>
<td>4.28</td>
<td>-55%</td>
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<tr>
<td>Coronarography</td>
<td>8.52</td>
<td>2.93</td>
<td>5.59</td>
<td>-66%</td>
</tr>
<tr>
<td>Gallbladder stones</td>
<td>6.05</td>
<td>3.68</td>
<td>2.37</td>
<td>-39%</td>
</tr>
<tr>
<td>Vascular surgery</td>
<td>10.21</td>
<td>4.76</td>
<td>5.45</td>
<td>-53%</td>
</tr>
</tbody>
</table>

6.3.2. Management of hospitals

Public interest has been preserved through state ownership over most of the hospital infrastructure. In 1989/1991, the State effectively brought all hospitals under state control, many of which had been previously managed through regional and local health authorities. In 1994 the draft Law on Privatisation of State Property [17] opened a possibility to privatise hospitals. It was supposed to define principles of privatisation of all state property, including health care, but it never passed the first stages of the legislative process. Public hospitals are usually managed by a general manager. This function may be performed as a single executive or, alternatively, there is also a medical director, who is responsible to the general manager, but remains independent in all professional matters. General managers are supervised by a management board, half of which is nominated by the Government.
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tals depend on financing from the compulsory and supplementary health insurance, which constitute between 90% and 98.5% of their total incomes [18].

6.3.3. Developments in the volume and types of hospital care

From Figure 1., we can identify three distinct periods in developments of ALOS over the last 18 years.


Another feature of the changes in hospital throughput is changes in the hospitalisation rates (HRs), which are represented in relative indices in Figure 2. and compared with the relative indices of the ALOS in similar periods as ALOS trends. The biggest increase in HRs occurred after the introduction of DRGs in 2003.

6.3.4. Policy choices regarding structure and market orientation

There was no change in the number of hospitals and in the type and range of services they provide, but the number of hospital beds was reduced by 19.3%. The bed/population ratio decreased from 605 per 100,000 inhabitants in 1990 to 470 per 100,000 in 2007. Around half of these were in internal medicine and related medical specialities, where the absolute number of beds was reduced by 26%. At the same time, the number of hospital beds in the surgical specialties was reduced only by 9%. Demographic changes are reflected in the reduction in the number of beds in gynaecology&obstetrics by 35% and in paediatrics by 39%. In 2008, 28% of all admissions were to internal medicine departments, 23% to surgical departments, 11% to gynaecology&obstetrics departments and 10% to paediatric departments. As the government did not opt for closures of hospitals or their restructuring, the main policy option that should impact the structure of hospital care delivered were the reimbursement mechanisms.

Over the last 18 years there were major changes in financing of hospitals. Between 1990 and 2001, hospitals were financed by the number of bed-days (calculated on the retrospective performance). Up to 1993 there had been additional reimbursement of certain very expensive services. Reimbursement based on bed-days led to inefficiencies and false incentives with full bed occupancy as the main priority. By 2000 the problem of waiting lists for inpatient treatments and outpatient specialist visits became an important political issue, which resulted in additional funding provided since 2002.

A system of case-based flat-rate payments was introduced in 2001, which were based on the departmental (or specialty-based) grouping of patients. Alongside this change the first provisional list of procedures (i.e. the Slovenian classification of procedures [19]) was set up and up to three procedures could be reported with each case. The MoH decided to proceed with the introduction of case-based payments as a step towards introducing DRGs in 2003/2004. Reimbursement of hospitals is still based
Figure 1. Trends in the ALOS for all and for acute hospitals between 1990 and 2008 and for the total number of hospital beds per 100,000 population. Source: BOLOB database, National Institute of Public Health of Slovenia.

Figure 2. Hospitalisation rates per 100 inhabitants and ALOS expressed in relative indices compared to the situation in 1990 (=100). Source: Same as Figure 1.

on the retrospective data, though DRG implementation introduced some prospective elements. Overall capped budgets, which represent the bulk of public hospitals’
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annual income, are allocated through a negotiation process led by the HIIS. This process is called ‘partnership negotiations’ and they are carried out in two rounds. In the first round the ‘general agreement’ on tariffs and overall allocation of budgets is agreed, which defines the total expenditure and the general sector specific allocation. Then, in the second round, decisions about specific provider budgets and tariffs are reached within each sector of health care and the ‘branch agreements’ are signed. They serve as the formula for the signing of contracts between the HIIS and the individual hospitals. They define the potential incomes to hospitals from the HIIS, except for ‘additional programmes’, services funded from the reserve funding. DRGs were introduced in 2003 with the full validity from 2004, applying the Australian-refined Diagnosis-related groups (AR-DRG). This was decided based on the outcomes of the Health Sector Management Project (HSMP), financed through a loan provided by the International Bank for Reconstruction and Development (IBRD). Statistical reports are still delivered through two systems – the annual statistical report - BOLOB and the system of DRG linkages.

6.3.5. The impact of reimbursement system changes on hospital performance measured by ALOS

A total of 3,520,260 cases of hospital treatments in Slovenia in the period 1997-2007 represented the basic resource base included in the analysis. The HRs per age group showed different developments over time. In infants HRs showed an increase of 40.8% in 2003 compared to 2002 (77.2% of it occurring in group P, diagnoses related to the perinatal conditions). After this initial increase, the HRs for all age groups increased only by 2.6% in the period 2004-2007. Two oldest age groups also showed increases, 11.6% in the age group 75 to 79 years of age, 14% in the age group 80 to 84 years of age and 25.8% in those with over 85 years of age. These increases were gradual and sustained through the entire period. In the observed period and in most diagnoses there had been declines in the ALOS in all three types of hospitals. The exceptions from this were ‘other sepsis’ and ‘epilepsy’, where no time trends could be observed.

Out of the total sample, we included 713,951 cases (20.3% of all) in the regression analysis. The dependent variable analysed was the average length of stay (ALOS). Seven independent variables were included in the regression model as predictors of ALOS – male sex, operation performed, death of patient, presence of an accompanying diagnosis, diagnosis of a complication, type of hospital and period of case occurrence. We formed three periods – Period I.: 1997-2000, Period II.: 2001-2003, Period III.: 2004-2007. We compared Period II. with Period I. (Regression 1) and Period III. with Period II. (Regression 2). All the variables listed above were significant at the level of p<0.001 in both regressions. In Regression 1 we established that five independent variables predicted a shortening of the ALOS – diagnosis of a complication, male sex, death of patient, clinical hospital and general hospital, while the accompanying diagnosis and operation performed were extending the ALOS. From
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Regression 2 we can see that only male sex and death of patient were predictors of a shorter ALOS, while all the other independent variables extended the ALOS.


<table>
<thead>
<tr>
<th>Variable</th>
<th>Regression 1</th>
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<th>Regression 2</th>
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<tr>
<td></td>
<td>B</td>
<td>Std Error</td>
<td>B</td>
<td></td>
<td>B</td>
<td>Std Error</td>
</tr>
<tr>
<td>Constant</td>
<td>0.173</td>
<td>0.010</td>
<td>17.845</td>
<td>0.000</td>
<td>0.038</td>
<td>0.009</td>
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<tr>
<td>Acc.dg</td>
<td>0.060</td>
<td>0.004</td>
<td>0.022</td>
<td>0.900</td>
<td>0.066</td>
<td>0.003</td>
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<tr>
<td>Compl.</td>
<td>-0.058</td>
<td>0.008</td>
<td>-0.011</td>
<td>0.934</td>
<td>0.069</td>
<td>0.007</td>
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<tr>
<td>Male</td>
<td>-0.010</td>
<td>0.003</td>
<td>-0.005</td>
<td>0.956</td>
<td>0.047</td>
<td>0.003</td>
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<tr>
<td>Operat.</td>
<td>0.197</td>
<td>0.003</td>
<td>0.093</td>
<td>0.900</td>
<td>0.079</td>
<td>0.003</td>
</tr>
<tr>
<td>Death</td>
<td>-0.050</td>
<td>0.009</td>
<td>-0.088</td>
<td>0.900</td>
<td>-0.131</td>
<td>0.008</td>
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<tr>
<td>Clinical</td>
<td>-0.068</td>
<td>0.004</td>
<td>-0.032</td>
<td>0.900</td>
<td>0.067</td>
<td>0.004</td>
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<tr>
<td>General</td>
<td>-0.053</td>
<td>0.004</td>
<td>-0.026</td>
<td>0.900</td>
<td>0.015</td>
<td>0.004</td>
</tr>
<tr>
<td>Total</td>
<td>-0.192</td>
<td>0.003</td>
<td>-0.093</td>
<td>0.900</td>
<td>-0.147</td>
<td>0.003</td>
</tr>
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Legend: Acc.dg=accompanying diagnosis, Compl.=diagnosis of a complication, Male=male sex, Operat.=operation performed, Death=death of patient, Clinical=clinical hospital, General=general hospital

6.4. Discussion

Slovenia had a smaller hospital capacity (in terms of hospital beds or number of personnel) at the reform start than other central and Eastern European countries. A part of hospitals were managed and owned by local and regional health authorities. There was no aggressive remodelling of hospital facilities as we have seen no structural change with respect to the number of public hospitals and the services they continue providing. There has been a gradual reduction in the number of hospital beds, unrelated to the reimbursement changes. Health policy makers were aiming more at increasing throughput of hospitals through a shorter ALOS and an increase in patient turnover. These facts facilitated the reduction of waiting times for a number of procedures. When comparing Slovenia to the Baltic states, we see a smaller number of beds and a shorter ALOS (e.g. in 1992 there were 625 beds per 100,000 population in Slovenia, compared to 968 beds in Estonia or 1294 beds in Latvia; the ALOS was 11.5 days in Slovenia, 16.1 days in Estonia and 17.5 in Latvia [20]).

From the data we presented we can see that hospital care in Slovenia remained under state control with a few private providers stepping in for a limited number of short-stay interventions (for public financing). There have been no initiatives leading to the privatisation of the existing public facilities or developing public-private partnerships. All hospitals that existed in 1990 are still in function and their typology and services remain unchanged. An exception is the pulmonary disease hospital in Sežana where a nursing department was set up 6 years ago [21]. More explicit attempts [22,23] to reduce or transform the previous hospital infrastructure failed, mainly due to resistance of the local authorities.
In trying to address the restructuring of the public hospital sector, health policy was focused on changing the reimbursement mechanisms. In the observed period this took place twice. In 2000 flat-rate case payments were introduced for reimbursement. However, these payments did not distinguish patients by their complexity as only up to three diagnoses were noted along with the same number of diagnostic or therapeutic interventions. Patients were not given different weights to allow for different reimbursement. After 4 years of preparation and design, a DRG reimbursement system was provisionally introduced in 2003 and fully implemented in 2004. Introduction of DRGs did not bring about the main expected effects, such as a greatly increased turnover of patients and rapid shortening of the average length of stay. But the total hospital capacity measured by the number of beds reduced significantly with an increase in the hospital throughput. The number of hospitalisations gradually increased and was accompanied by a declining ALOS, which followed a trend independently of the two most important hospital reimbursement changes, carried out in 2001 and in 2003.

Looking at the impact of the reimbursement systems on the hospital performance, we can see that these interventions were only partly reaching their declared goals. The positive side of these managerial pressures was the increase of hospitalisation rates, resulting in the reduction of waiting lists. The less encouraging trend was the slowing down of the decline in the average length of stay.

An important limitation of this study was the lack of time series data on performance of individual providers and of the respective waiting lists. Data on procedures were first introduced in 2001, but the classification used was relatively modest and not comparable to the extensive Classification of diagnostic and therapeutic procedures [24] that came into use in 2003/2004. Finally, a limitation of the present study was in the inability to analyse a linked database based on personal data, which would, based on individual’s hospital treatment data provide possibilities of more refined explorations. Among these there would be readmission rates and causes for readmissions.

6.5. Acknowledgements
The authors would like to thank Ms Mojca Omerzu, statistician methodologist at the National Institute of Public Health of Slovenia for the help with the data organisation and the statistical analysis.

6.6. Conflicts of interest
None declared.

6.7. Key points
Over the period 1990-2008, the number of hospitals remained the same, but with a reduced number of hospital beds, shorter waiting times for a number of procedures and with a shorter length of stay.
Hospitals remained state-owned, apart from a few smaller private in-patient providers with a limited number of diagnostic and therapeutic interventions.

Rather than through changes in reimbursement hospitals adapted their infrastructure and performance to economic and demographic challenges reflected in the restructuring across clinical specialties.

Performance changes were proven also by comparing the different periods, in comparing the period 2001-2003 with the period 1997-2000 we found five predictors for a shorter ALOS, while in the comparison between period 2004-2007 with the period 2001-2003, there were only two variables predicting a shorter ALOS.

6.8. References
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