

# An analysis of the length of hospital stay for cataract patients in Japan using the discrete-type proportional hazard model

Kazumitsu Nawata<sup>a,\*</sup>, Masako Ii<sup>b</sup>, Aya Ishiguro<sup>c</sup>, Koichi Kawabuchi<sup>d</sup>

<sup>a</sup> Graduate School of Engineering, University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656, Japan

<sup>b</sup> Graduate School of International Corporate Strategy, Hitotsubashi University, 2-1-2 Hitotsubashi, Chiyoda-ku, Tokyo 101-8439, Japan

<sup>c</sup> Data Analysis Department, Millennia Corporation, 2-8-5 Hihonbashi-Kayabacho, Chuo-ku, Tokyo 103-0025, Japan

<sup>d</sup> Division of Health Care Economics, Tokyo Medical and Dental University, 1-5-45 Yushima, Bunkyo-ku, Tokyo 113-8549, Japan

Received 21 May 2008; accepted 21 May 2008

Available online 7 July 2008

## Abstract

We analyze the length of hospital stays of patients hospitalized for cataract and related diseases (Diagnosis Related Groups (DRG) 2041) in Japan, utilizing the data pertaining to 3436 patients on whom one-eye lens operations are performed. We use the discrete-type proportional hazard model to analyze variables that may affect the length of stay.

We find that estimates of the Child and Other Facility Dummies are negative and significant. These variables affect the leaving rate and the length of stay. The length of stay also changes at age 40. With regard to the types of affiliated operations and treatments, the estimates of dummy variables are negative and significant at the 1% level. We also find large differences in the length of stay among hospitals, despite eliminating the influence of both the characteristics of the patient and the types of affiliated operations and treatments. The longest average length of stay is over 3.5 times as long as the shortest average length of stay.

Finally, we analyze the factors pertaining to hospitals that may affect the length of stay. The estimates of the Profit and Cold Region dummies are negative and significant; in other words, the leaving rate is reduced and the length of stay is increased if the hospital becomes more profitable and is located in the cold regions of Hokkaido and Tohoku.

© 2008 IMACS. Published by Elsevier B.V. All rights reserved.

**Keywords:** Cataract; Eye surgery; Length of stay; Diagnosis related groups; Proportional hazard model

## 1. Introduction

With medical care expenses having risen rapidly, shortening the average length of stay in hospitals by reducing incidences of long-term hospitalization has become an important political issue in Japan. The requisite average length of stay in general hospitals was shortened by the Revision of Medical Service Fee Schedule, which was implemented in April 2002. It continues to be important to evaluate the length of hospital stay when considering future medical policies, such as medical care payments.

As a result of technological advancements in recent decades, numerous eye surgeries, such as those for cataract, have been performed worldwide. For example, approximately 1.5 million cataract surgeries have been performed annually

\* Corresponding author. Tel.: +81 3 5841 8756; fax: +81 3 5841 8832.

E-mail address: [nawata@tmi.t.u-tokyo.ac.jp](mailto:nawata@tmi.t.u-tokyo.ac.jp) (K. Nawata).

in the United States [5]. It has also been reported that with the ageing of the population the number of such surgeries has been increasing in Sweden and other countries [2,3].

The number of cataract patients in Japan has also been increasing rapidly with the ageing of the population. According to surveys conducted by the Ministry of Health, Labor and Welfare, there were 1.29 million cataract patients in 2002 and the number of cataract operations in the month of June was 33,286 in 1995, 61,117 in 2000, and 65,864 in 2002. This implies that nearly 1 million cataract surgeries are performed annually. In the United States and Europe, a majority of the cataract surgeries are outpatient procedures; in other words, patients are discharged from the hospital in 1 day.

In contrast, cataract patients in Japan remain in the hospital for a long period after undergoing an operation. As a result, analyses of the length of hospital stays have become very important. Under the diagnosis procedure combination (DPC) system, the daily payment to the hospital is 2661 points for up to 2 days, 2140 points for 3–6 days, and 1819 points for 7–12 days, and for over 12 days it is based on the actual expense. (The medical care fee is measured by points in Japan; this system was introduced in 1943, and 10 yen per point has been paid to hospitals since 1958.) A longer length of stay causes the medical expense to increase. If the average length of stay for cataract patients can be reduced by 1 day, the total medical expense for the country could decrease by as much as 20 billion yen. However, a sufficient number of analyses on the length of stay have not been conducted thus far.

We analyzed the length of hospital stay using data pertaining to 3436 patients hospitalized for cataract and related diseases on whom one-eye lens operations were performed. The discrete-type proportional hazard model is used in the analysis.

## 2. Data

### 2.1. Surveyed hospitals

We utilized the data set collected from 36 general hospitals (Hp1–36) in Japan. These hospitals were part of “The Project for Information Standardization and System Developments for Efficient Hospital Management.” The project was supported by the grant of the Information-Technology Promotion Agency, Japan. The items surveyed for hospitals are number of beds, financial data, number of doctors and nurses, lease, prices and depreciation costs of medical appliances, and the number of new and total patients. The dates of admission and discharge from the hospital, dates of birth, sex, placement after hospitalization, names of principle and secondary diseases, and types of medical operations and treatments are reported for patients. To protect the privacy of individual patients, we utilized only a general data set. The names of principle and secondary diseases are based on the International Classification of Diseases 9 (ICD-9) or ICD-10, and the type of operation and treatment is based on the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM).

In this study, we analyzed the data pertaining to patients classified in the 2041 category of the Diagnosis Related Groups (DRG 2041); that is, patients who underwent lens operation without complication. DRG were developed in the United States in the 1970s. These groups categorize combinations of diseases, operations, and treatments into groups based on ICD-9 or ICD-10. In this survey, the International Refined Diagnosis Related Groups (IR-DRG) is used (hereafter referred to simply as DRG.). The patients belonging to DRG 2041 were hospitalized for cataract (and related diseases) and underwent lens operations from April 2000 to March 2001. The type of operation and treatment was reported using the ICD-9-CM, which classifies the operation and treatment by codes up to four digits from general to detailed categories. For example, 13 represents “Operations on lens,” 13.1 is “Intracapsular extraction of lens,” and 13.11 more specifically represents “Intracapsular extraction of lens by temporal inferior route.” To eliminate patients who were hospitalized for other diseases and also underwent lens operations, we only utilized the data of patients who underwent the operation and treatment classified in categories 13 (operations on lens) and 14 (operations on retina, choroid, vitreous, and posterior chamber). We selected “Phacoemulsification and aspiration of cataract” (ICD-9-CM13.41), which is currently the standard operational method, as the primary operation and treatment. We did not utilize data pertaining to patients who underwent any operation and treatment in other categories.

In Japan, in addition to one-eye operations (in which a single eye is operated on during a single period of hospitalization), two-eye operations (in which both eyes are operated on during a single period of hospitalization) are also performed. It is natural that the two-eye operation requires a patient to remain hospitalized for a longer period of time. Therefore, we utilized data pertaining to only those patients who underwent one-eye operations. Since 13 hospitals from among 36 did not perform one-eye operations, we analyzed the data pertaining to 23 general hospitals (Hp1–3,

Download English Version:

<https://daneshyari.com/en/article/1141122>

Download Persian Version:

<https://daneshyari.com/article/1141122>

[Daneshyari.com](https://daneshyari.com)