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Diagnoses-based cost groups in the Dutch risk-equalization model: The effects of including outpatient diagnoses

R.C. van Kleef*, R.C.J.A. van Vliet, E.M. van Rooijen

Erasmus University Rotterdam, Institute of Health Policy and Management, The Netherlands

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ABSTRACT

Background: The Dutch basic health-insurance scheme for curative care includes a risk equalization model (RE-model) to compensate competing health insurers for the predictable high costs of people in poor health. Since 2004, this RE-model includes the so-called Diagnoses-based Cost Groups (DCGs) as a risk adjuster. Until 2013, these DCGs have been mainly based on diagnoses from inpatient hospital treatment.
Objectives: This paper examines (1) to what extent the Dutch RE-model can be improved by extending the inpatient DCGs with diagnoses from outpatient hospital treatment and (2) how to treat outpatient diagnoses relative to their corresponding inpatient diagnoses.
Method: Based on individual-level administrative costs we estimate the Dutch RE-model with three different DCG modalities. Using individual-level survey information from a prior year we examine the outcomes of these modalities for different groups of people in poor health.
Conclusions: We find that extending DCGs with outpatient diagnoses has hardly any effect on the *R*-squared of the RE-model, but reduces the undercompensation for people with a chronic condition by about 8%. With respect to incentives, it may be preferable to make no distinction between corresponding inpatient and outpatient diagnoses in the DCG-classification, although this will be at the expense of the predictive accuracy of the RE-model.

1. Introduction

The Dutch basic health insurance scheme for curative care includes a risk-equalization model (RE-model) to compensate the 26 competing health plans for the predictable high costs of people in poor health. During the last two decades the Dutch RE-model has evolved from a simple demographic model (only compensating for age and gender) to a sophisticated health-based model (also compensating for health status). Empirical literature indicates, however, that even the current health-based model undercompensates for particular groups of people in poor health [1–5]. Since insurers are not allowed to risk rate their premiums, these undercompensations confront them with incentives for risk selection. Risk selection is undesirable since it may reduce (1) the quality of health care (since health insurers have a disincentive to meet the preferences of the chronically ill), (2) the efficiency of care (since risk selection may be a more effective strategy for insures to reduce their costs than improving the efficiency of care) and (3) solidarity between the healthy and the chronically ill (when – due to market segmentation – the two groups concentrate in different health plans) [6]. Further improvement of the RE-model is necessary to reduce incentives for risk selection.

Since 2004, the Dutch RE-model includes the so-called Diagnoses-based Cost Groups (DCGs), i.e. a risk adjuster based on diagnostic information from the previous year [7,8]. The essence of DCGs is that enrollees are classified in

* Corresponding author at: Erasmus University Rotterdam, Institute of Health Policy and Management, P.O. Box 1738, 3000 DR Rotterdam, The Netherlands. Tel.: +31 10 408 8950; fax: +31 10 408 9094.
E-mail address: vankleef@bmg.eur.nl (R.C. van Kleef).

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risk groups using (selected) diagnoses from year $t-1$ and that the resulting classification is used as a risk adjuster in the RE-model of year t. Until 2013, the DCGs in the Dutch RE-model have been mainly based on diagnoses from inpatient hospital treatments (further: inpatient diagnoses). This paper examines (1) to what extent the Dutch RE-model can be improved by extending the DCGs with diagnoses from outpatient hospital treatments (further: outpatient diagnoses) and (2) how to treat outpatient diagnoses relative to the corresponding inpatient diagnoses. The rationale of the second objective is that inpatient diagnosis X and outpatient diagnosis X may refer to different states of disease X (with different follow-up costs). Classifying patients with inpatient diagnosis X and those with outpatient diagnosis X in different DCGs may therefore be better – in terms of predictive accuracy of the RE-model – than classifying them in the same DCG.

Several RE-models used in other countries already include risk classifications based on both inpatient and outpatient diagnoses. Examples are the CMS/HCC-model [9] and the CDPS-model [10] used in the United States, and the DCG-HCC model used in Germany [11]. These RE-models, however, do not explicitly distinguish between inpatient and outpatient diagnoses. This paper indicates the potential effects of making such an explicit distinction.

Our starting point (or benchmark) is the Dutch RE-model of 2012 in which DCGs are mainly based on inpatient care. Next to DCGs, this model includes the following risk adjusters: age/gender, region, source of income, pharmacy-based cost groups (PCGs), socioeconomic status and risk classes for people with high costs in multiple prior years. The two research objectives will be addressed by performing an empirical analysis using hospital information for defining different DCG-modalities, administrative data for estimating the RE-model supplemented with these modalities and health survey information from a previous year for analyzing the outcomes for several subgroups of people in poor health.

2. Methods

2.1. Diagnoses-based cost groups in the Netherlands

The configuration of the original DCG-classification consists of roughly five phases:

1. To gather all information on hospital care and to deduce all primary diagnoses. In this phase no distinction is made between inpatient and outpatient information.
2. To select the diagnoses referring to a chronic condition. This means, for instance, that the diagnosis “prostate cancer” will proceed to phase 3, contrary to the diagnosis “broken leg”. Phase 2 involves a detailed medical judgment by a team of experts.
3. To select the diagnoses that have been determined in an inpatient setting. This step consists of a simple administrative check (i.e. the Dutch coding system for hospital care distinguishes between inpatient and outpatient settings). An exemption to this “inpatient rule” holds for a set of severe treatments that may be provided in either an inpatient or an outpatient setting (e.g. radiotherapy, chemotherapy and hemodialysis).
4. To cluster the resulting diagnoses into so-called dxgroups. This step involves detailed medical judgment by a team of experts. Comparable diagnoses are classified in the same dxgroup. In the Dutch RE-model of 2012 the DCG-classification includes 140 dxgroups.
5. To cluster dxgroups (including diagnoses from year $t-x-1$) into 13 DCGs based on their follow-up cost (i.e. average costs in year $t-x$ corrected for age, gender and PCGs) using Ward’s hierarchical clustering method [7]. Reference year $t-x$ is periodically updated (once in about 3–5 years) to correct for changes in follow-up costs.

The resulting DCGs are used as risk adjusters in the RE-model of year t in which enrollees are classified based on diagnostic information from year $t-1$. If enrollees have multiple diagnoses, they are classified in only one DCG, i.e. the one with the highest average follow-up costs.

Based on recent research, the Dutch DCG-classification will be extended with three new dxgroups [12]. These new dxgroups increase the number of DCGs to 15 (because the new dxgroups have high follow-up costs that do not appropriately fit into the 13 existing DCGs). The extended classification will function as the benchmark in our empirical analyses.

The two research objectives will be addressed by examining the following three classifications: (1) DCGs (mainly) based on inpatient diagnoses (i.e. the benchmark model), (2) DCGs based on inpatient and outpatient diagnoses with outpatient diagnoses clustered into the *same* dxgroups as the corresponding inpatient diagnoses and (3) DCGs based on inpatient and outpatient diagnoses with outpatient diagnoses clustered into *different* dxgroups as the corresponding inpatient diagnoses. Table 1 presents the number of dxgroups, the number of DCGs and the percentage of the population classified in a DCG per modality. The results show that the extension of DCGs with outpatient diagnoses substantially increases the percentage of the population classified in a DCG, i.e. from 2.7% (benchmark) to 9.9% (modalities 2 and 3). For the specific diagnoses included in the Dutch DCG-classification, modalities 2 and 3 will closely approach “all-encounter” models, i.e. models that use diagnostic information from all available sources. The reason is that – because of relatively high severity levels – these specific diagnoses are typically treated (at least partly) in a hospital setting (either inpatient or outpatient). In modality 2 the number of dxgroups is exactly the same as in the benchmark since all outpatient diagnoses are “simply” added to the dxgroup of the corresponding inpatient diagnoses. In modality 3 the two settings are clustered into different dxgroups resulting in an increase of the number of dxgroups from 143 to 280. The reason that the number of dxgroups does not equal 286 (i.e. $2*143$) is that six dxgroups in the benchmark classification do already include outpatient diagnoses (i.e. the exemptions to the “inpatient rule” mentioned above).