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International-Refined (IR-DRG) versus 3M All Patients Refined DRG (APR-DRG) to describe and predict costs of ambulatory patients in 42 Belgium hospitals.

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Abstract Belgium currently uses APR-DRGs as part of its inpatient funding system and is considering expanding this system to fund pharmaceutical consumption based on APR DRGs. This would also include outpatient hospital care or the so called 'one-day clinic'. As most existing DRG systems, APR-DRGs have been intended initially only for use in the inpatient setting. For this reason we would like to evaluate the outpatient part of another grouper (3M-HIS International Refined – IR-DRGs) that is designed to handle outpatient visits, including emergency room and procedures.

Introduction

This research is based on an ongoing project called 'Matrix'. The 'Matrix' project collects administrative, case-mix and charge data from more than 40 Belgian hospitals for inpatients and outpatients (one day hospital). Text shouldn't be smaller than 24 pt., this will keep your poster legible from normal viewing distance.
Before adding an entire new set of IR-DRG categories to the present Belgian APR-DRG system, it is prudent to determine that the current system cannot reasonably group outpatient/ambulatory encounters. The purpose of this project is to group such outpatient data into both the IR outpatient categories and into APR inpatient categories and then to compare the results.

Methods and materials

METHODS: The analysis is based on outpatient data from 42 Belgian hospitals for calendar year 2002. Two data sets were linked and used for the analysis:

•The first contained charge information for 976,002 patients, of which 382,786 were outpatients.

•The second contained diagnosis and procedure data coded in ICD-9-CM for 1,094,969 patients, of which 439,527 were outpatients.

Excluding newborns, non-linked visits and records with zero costs left 376,509 records with charge information on a detailed level. The data were grouped into IR outpatient and APR inpatient categories As a first step in the analysis we performed three mappings:
ICD-9-CM procedure codes were mapped into both IR DRGs and APR DRGS
Outpatients in a particular outpatient IR category were mapped to the corresponding APR DRG and severity level combination and vice versa.

As a second step we calculated the R^2 as a summary measure which is often used to compare performance of classification systems. For the prediction of costs, only the cases in cells with more than ten cases in both APR/SOI groups and IRDRG were retained and outliers have been trimmed based on Q75+ three times the interquartile distance (Q75-Q25).

Based on the mapping of the procedures codes into IR and APR DRGs the twenty most common procedure codes were listed along with the IR and APR categories that they fall into. Those top 20 procedures accounted for 52,8% of all procedures in the dataset

	R^2		
	Base APR DRG	IR DRG	% Diff
Phar+Med Charg+Hosp Charg	47,26%	49,11%	3,9%
Pharmacy charges	31,84%	32,18%	1,0%
Medical charges	69,66%	74,76%	7,3%
Hospital charges	50,64%	57,43%	13,4%

To summarize, this research compared the ability of the IR-DRG outpatient grouper to the APR-DRG inpatient grouper to group outpatient data. While that statistical performance of the groupers is not dissimilar, the APR-based results, especially for procedures that do not influence classification in an inpatient system, are not logical.

Results

RESULTS: As a summary measure, 307 IR-DRGs were needed to group these procedure codes, while APR required about 50% more, 457 DRGs, for these procedure codes. Excluding the severity adjustment for APR reduces the number of additional categories for APR to about 20%.
Mapping APR DRGs into IR DRGs and vice versa shows that the APR-based results, especially for procedures that do not influence classification in an inpatient system, are not logical (spinal tap, for example).
These visits are outpatient procedures for IR and inpatient medical under APR.

Calculated R^2 values which indicate reduction of variance of costs and are the standard evaluation test for the predictive value of a DRG system are shown in table 2. The R^2 values are fairly good especially for the medical charges and the hospital charges. Overall there is no significant difference between the two compared grouping systems, even if there are much more APRDRG cells (433 groups) than IRDRG cells (277 groups), which is positive for IRDRGs, which should statistically have advantaged the APR-DRG system result. Results are 74.6% for IRDRG for medical costs (7.3% better than APRDRG) and 57% for hospital costs (vs 50% for APRDRG). For all costs inclding drugs, it is 49.1% for IRDRGs (vs 47% for APRDRG)

The R^2 on pharmacy charges are fairly low for both systems (IR and APRDRGs) at approx. 30% for both systems. This could be caused by practice differences, pharmacy charging practices or other factors who need further investigation.