

# The shift from ICD9-CM to ICD-10 in coding health conditions in Italy: preliminary data on morbidity statistics effects

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**Abstract** Data are presented in order to evaluate the impact of the introduction in Italy of ICD-10 on morbidity statistics, by transcoding ICD9-CM codes in administrative Hospital Discharged Form database to ICD-10 2013 Italian version codes, by a specifically developed web tool named TransIT, under the "IT-DRG Project".

## Introduction

In Italy, ICD9-CM is currently used for coding health conditions at hospital discharge. In order to introduce ICD-10 in morbidity coding and revise the overall case mix classification system, since 2010 a national project has been founded led by the Italian Ministry of Health and Emilia Romagna Region ("IT-DRG Project"). It involves the Friuli Venezia Giulia Region (as Italian WHO-FIC CC) to update ICD-10 and the Lombardia Region to update the interventions and procedures classification. In order to evaluate the impact of ICD-10 introduction in Italy, the Italian WHO-FIC CC has been active on the translation of ICD updates, the update of ClaML files [1] and development of web tools and services. The ICD-10 2013 Italian version was used as the reference version to transcode administrative hospital discharge data by a specifically developed web tool named TransIT. This was developed to make the transition easier for coders that already know ICD9-CM.

## Methods & Materials

A subset of the Hospital Discharge Form (SDO) database was provided by the Italian Ministry of Health, including data from 3 Regions (Emilia Romagna, Veneto, Friuli Venezia Giulia) for 2011 and 2012. TransIT was used to transcode SDO ICD9-CM codes from the available database. TransIT transcoding rules were obtained initially by processing the original American ICD9-CM to ICD10-CM transcoding rules ([http://www.cdc.gov/nchs/data/icd/DiagnosisGEMs\\_2007.zip](http://www.cdc.gov/nchs/data/icd/DiagnosisGEMs_2007.zip)), complemented by rules identified by classification experts to take into account the differences between ICD9-CM and ICD-10 (in particular, the dagger/asterisk convention). The outputs of TransIT can be a single exact ICD-10 code, a single approximate code, a set of codes

**Table 1 – Sample of the Italian Hospital Discharge Forms considered for transcoding**

Region	Year	Total records (N)	Main conditions (N)	Other conditions (N)
Friuli Venezia Giulia	2011	197,664	197,663	235,566
	2012	198,225	198,224	240,074
Veneto	2011	729,748	728,210	596,233
	2012	697,020	696,991	587,969
Emilia-Romagna	2011	787,152	787,142	1,023,630
	2012	764,514	764,511	1,006,775
<b>Total</b>		<b>3,374,323</b>	<b>3,372,741</b>	<b>3,690,247</b>

Database source: Ministry of Health 2014

("composite"), or even a number of codes or composites, among which to choose. The developed software can be used either online, through a web browser, or embedded in SDO compilation software as a transcoding table or as a web service.



**Figure 2 – TransIT user interface**

The remaining 12.86% of SDO ICD9-CM codes needed manual intervention, since transcoding provided more than one option. 401 codes could not be transcribed (0.006%). When examining the 100 most used ICD9-CM codes, which covered 42% of SDOs, 44 were coded exactly, 46 approximately, and 10 with multiple choices. When analyzing details of codes that could not be transcribed, a number of coding mistakes were found (mostly: intermediate level categories and groups that cannot be used for SDOs coding conditions according to coding rules).

## Results

A total of 3,374,323 SDOs were analysed, of which 3,372,741 contained a main condition, with a total of 3,690,247 secondary conditions. The number of different ICD9-CM codes used was 10987 (88.4% on a total of 12,435). Looking at both main and secondary conditions, a large number of SDOs ICD9-CM codes (86.36%) was transcribed automatically, that is, transcoding provided just one option, either exact (35.86%), approximate (50.18%) or composite (0.32%).

**Table 2 – Transcoding ICD9-CM to ICD-10 by TransIT in a sample of the Italian Hospital Discharge Forms by Region and Year**

Region	Year	Single exact ICD-10 code (N)	Single Approximate ICD-10 code (N)	Composite ICD-10 codes (N)	Multiple ICD-10 codes choice (N)	Not trans-coded (N)
Friuli Venezia Giulia	2011	161,524	212,018	1,951	54,308	0
	2012	163,131	215,795	1,971	53,911	0
Veneto	2011	473,204	659,351	4,613	177,388	199
	2012	457,646	642,714	4,977	170,545	201
Emilia-Romagna	2011	644,378	919,009	4,468	228,357	1
	2012	632,884	895,487	4,812	223,810	0
<b>Total (N)</b>		<b>2,532,767</b>	<b>3,544,374</b>	<b>22,792</b>	<b>908,319</b>	<b>401</b>
%		<b>35,86%</b>	<b>50,18%</b>	<b>0,32%</b>	<b>12,86%</b>	<b>0,006%</b>

Database source: Ministry of Health 2014

**Table 3 – The most used ICD9-CM/ICD-10 categories in the SDO sample**

ICD9-CM	Mapping type	ICD-10	Count (N)	Frequency (%)	Cumulative (%)
427.31	exact	I48.0	160,051	2	2
401.1	approximate	I10	154,454	2	4
V30.00	approximate	Z38.0	119,093	2	6
250.00	approximate	E11	99,086	1	8
401.9	exact	I10	72,246	1	9
V58.11	approximate	Z51.1	67,694	1	10

I48.0 Paroxysmal atrial fibrillation  
 I10 Essential (primary) hypertension  
 Z38.0 Singleton, born in hospital  
 E11 Non-insulin-dependent diabetes mellitus  
 Z51.1 Chemotherapy session for neoplasm

## Conclusions

The transition from ICD9-CM to ICD-10, based on these preliminary data analysis, could be less difficult than supposed, because a large number of ICD9-CM codes can be easily transcribed to one single ICD-10 code, leaving a manageable 10% of codes to be chosen by coders among a small set of options. However, training is needed for coders to understand the differences between the two ICD versions, in particular when involving the dagger/asterisk mechanism, which is not present in ICD9-CM. The lack of the E codes in current SDO coding rules is another issue to address in ICD-10 V-W-X-Y codes implementation in Italy.

## References

- Frattura L., Grippo F., Frova L. The collaborative effort to implement updated classifications: the lesson learned in developing and using web tools and services to translate, update, browse, and publish ICD-10. WHO-FIC Network Annual Meeting, Barcelona 2014, submitted

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