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Reliability of secondary central coding of medical problems in primary care by non medical coders, using the International Classification of Primary Care (ICPC).

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Abstract

Introduction*: There are several ways to codify medical problems in primary care. ICPC was developed as an epidemiological tool for use by primary care provider during the consultation as a primary decentralized coding system. In practice however this is difficult to se up, so we apply ICPC in a secondary centralized coding system by a limited number of non medical coders.*

Objectives: *To assess the reliability of secondary central coding of medical problems by trained medical students and nurses using ICPC.*

Material and Methods: *All medical problems in our adult population recorded by primary care physicians in a electronic medical record system as narrative text are centralized coded by trained medical students and nurses. Use of the electronic medical record by physicians is not compulsive but is strongly encouraged. A random sample of 300 medical problems were selected for intra-coder reliability by asking coders to blindly re-code the free text and comparing it with the previous coding, and for inter-coder reliability by comparison with a group of expert physicians. Percentage of agreement and Kappa statistic was calculated at chapter and rubric levels. The coding centre was treated as a single observer, as the objective was to assess the system reliability and not observers themselves.*

Results: *In the last two years 164,745 medical problems were codified in 45,365 adult patients (mean 3.63 problems DS: 2.69). Intra-coder agreement at chapter level was: 97,7 % (Kappa: 0,97; p<0.0001) and at rubric level was 86,3 % (Kappa: 0,86; p<0.0001). Chapters with lower percents of agreement at rubric level for intra-coder reliability were female genital, social and ear problems.*

Inter-coder agreement at chapter level was: 95 % (Kappa: 0,94; p<0,0001) and at rubric level was 82,3 % (Kappa: 0,82; p<0,0001). Chapters with lower percents of agreement at rubric level for inter-coder reliability were female genital, neurological, general and social problems.

Conclusion: *Centralized secondary coding with the ICPC by non medical coders is reliable, and can be used for coding medical problems.*

Keywords:

International Classification of Primary Care; Reliability; Coding Systems; Problem Oriented Medical Record.

Introduction

There are several coding systems to codify medical problems in primary care [1]. Within them International Classification of Primary Care (ICPC) [2] has been used as a valuable epidemiological tool in several coutnries around the world, as Norway [3], Canada [4], Australia [5-6], Netherlands [7-8], United States [9], Finland [10] and Spain [11] within others. We where unable to find references about it's use in Latin American countries.

ICPC is based on a simple bi-axial structure: 17 chapters based on body systems on one axis, each with an alpha code, an seven identical components with rubrics bearing a two digit numeric code as the second axis. This structure is specially useful for coding problems recorded on a problem oriented medical record (POMR). This epidemiological tool was designed for use by the primary care provider during the consultation. Ideally clinical data should be coded by the practitioner at the time of the consultation so they can utilize their knowledge of the patient presentation while being aware of the limitations set down by the selected classification system. This is known as primary coding. However there are several practical dificulties in seting primary coding. It is time consuming for the practitioner, and requieres mayor efforts in their training, to assure that the same code would be choosen in the same situation by the different physicians. One answer to this problem is secondary central coding, where a reduced number of trainned persons codify the narrative text recorded by the physicians taking care of the patients. As ICPC was not designed for secondary coding the reliability of this system should be assessed.

Objetives:

To assess the reliability of secondary central coding of medical problems in adults in primary care by trained medical students and nurses in a University Hospital in Buenos Aires, Argentina.

Materials and Methods:

Since June 1998 an electronic medical record (EMR) was set up for primary care practitioners in the Hospital Italiano de Buenos Aires HMO. This is a high tecnology University Hospital. It´s HMO takes care of around 80000 patients, with 200 primary care physicians. Medical encounters with patients are recorded in the EMR. Although it's utilization is not compulsive it is strongly encouraged. The EMR is a problem oriented medical record. A medical problem is defined as anything that makes a patient take contact with the health care system, or makes the physician take a medical intervention during the process of care. In our electronic POMR it is necessary to assign a problem to each medical intervention as: recording progress notes, drugs prescriptions, and specialists referrals. Since October 1998 primary care physicians are recording medical problems in the EMR as narrative text, and a group of five trained final year medical students and three trained professional nurses are secondary coding this medical problems using ICPC.

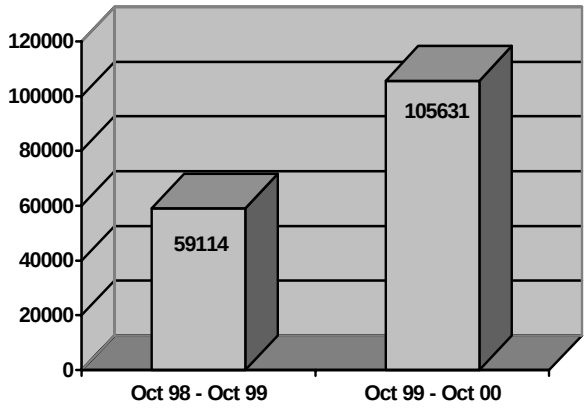
In order to maximize the level of agreement among each coder from the team, periodic meetings are organized to reach consensus about doubts that arouse during diary coding. There we define inclusion and exclusion criteria for the used codes because definitions are not included in the ICPC book, although this was solved in the second version of the ICPC, named ICPC-2 [12]. Another objective of these meetings was to incorporate controlled synonymous to the ICPC alphabetic list. If necessary, coders have telephonic access to attending physicians to get additional information about the narrative text in order to help them select the correct code.

A random sample of 300 medical problems already coded were selected for intra-coder reliability by asking coders to blindly re-code the narrative text and comparing it with the correspondent previous coding, and for inter-coder reliability by comparison with a group of expert physicians. Percentage of agreement and Kappa statistic was calculated at rubric and chapter levels. The coding group was treated as a single observer, as the objective was to assess the system reliability and not the observers themselves. Results are expressed as mean and standard deviation (SD).

Results:

In the last two years 164,745 (Figure 1) medical problems were codified in 45,365 patients: mean 3.63 problems per patient (DS 2.69). During the first year (October 1998 – October 1999) 59.114 problems were coded, in 18,800 patients with a mean of 3.1 problems per patient (SD 2.2). In the second year (October 1999-October 2000) 105,631 problems were coded, in 36,276 patients with a mean of 2.9 problems per patient (SD 2.1). Only 9,711 (27%) patients with problems recorded during the second year had already problems recorded during the first year, showing that 26,565 (73%) new patients had problems added in the EMR during the second year, according to the implementation stages of the electronic medical record in our institution.

Figure 1- Number of medical problems coded per year.



The ICPC chapter distribution in the random sample used for the reliability study was similar to that observed in the original coded database (Table 1)

Although coders could use all ICPC codes, 108,661 (66%) problems were coded with component 7 (diagnosis/disease), and only 43,663 (26.5%) with component 1 (symptoms/complaints), showing a greater use of diagnosis narrative text by physicians in problems lists, unlike other reports in the literature that had found greater use of reasons for encounters [6].

Intra-coder agreement

Intra-coder agreement at chapter level was: 97,7 % (Kappa: 0,97; $p<0.0001$) and at rubric level was 86,3 % (Kappa: 0,86; $p<0.0001$). Chapters with lower percents of agreement at rubric level for intra-coder reliability were female genital, social problems and ear problems (Table 2).

Table 1 – ICPC chapter distribution

ICPC Chapter	Problems in the database (%)	Random sample (%)
A-General	13,884 (8.43)	36 (12)
B-Blood	2,812 (1.71)	3 (1)

D-Digestive	15,541 (9.43)	26 (8.7)
F-Eye	1,993 (1.21)	2 (0.7)
H-Hear	2,357 (1.43)	10 (3.3)
K-Circulatory	26,769 (16.25)	38 (12.7)
L-Musculoskeletal	22,096 (13.41)	51 (17)
N-Neurological	4,740 (2.88)	8 (2.7)
P-Psychological	16,494 (10.01)	25 (8.33)
R-Respiratory	7,719 (4.69)	23 (7.7)
S-Skin	9,984 (6.06)	36 (12)
T-Endocrine, Nutr	23,335 (14.16)	19 (6.33)
U-Urological	4,321 (2.62)	4 (1.33)
W-Pregnancy	1,335 (0.81)	0 (0)
X-Female genital	5,397 (3.28)	7 (2.33)
Y-Male Genital	3,389 (2.06)	9 (3)
Z-Social Problem	2,579 (1.57)	3 (1)
Total	**164,745 (100)**	**300 (100)**

Inter-coder agreement

Inter-coder agreement at chapter level was: 95 % (Kappa: 0,94; p<0,0001) and at rubric level was 82,3 % (Kappa: 0,82; p<0,0001). Chapters with lower percents of agreement at rubric level for inter-coder reliability were female genital, neurological problems, general problems and social problems (Table 2).

Discussion:

As ICPC was designed to be used by the primary care provider at the time of the consultation it is important to assess the reliability of a secondary central coding system. Succeeding in training a reduced group of people in coding is more feasible than training 200 primary care physicians spread around the city. This heightens the possibility that facing the same narrative text in the description of a medical problem, the same ICPC code will be assigned. Intra and Inter-coder agreement at rubric level was lower in those chapters that were less frequently used, except for inter-coder agreement in chapter A (general problems). This was due to misinterpretation by coders of the right code for specialists referrals, which was not detected in consensus meetings. The Kappa statistics values in all other chapters make very unlikely that the observed agreement could be due to chance, reinforcing the reproducibility and reliability of the secondary and centralized coding model.. The very good inter-coder agreement at chapter and rubric levels with a group of expert primary care physicians ensures that the assigned codes are the most suitable ones for each medical problem.

Conclusion:

Centralized secondary coding with the ICPC by non medical coders is reliable, and can be used for coding medical problems from an electronic problem oriented medical record.

Table 2 – Intra and Inter coder agreement and Kappa statistics at rubric level by ICPC chapter

ICPC Chapter	% Intra-coder agreement (Kappa)	% Inter-coder agreement (Kappa)
A-General	86.11 (0.81)	63.89 (0.53)
B-Blood	66.67 (0.57)	68.7 (0.58)
D-Digestive	92.3 (0.91)	96.1 (0.96)
F-Eye	100 (1)	100 (1)
H-Hear	90 (0.87)	90 (0.87)
K-Circulatory	86.84 (0.84)	73.68 (0.70)
L-Musculoskeletal	86.27 (0.85)	88.24 (0.87)
N-Neurological	87.5 (0.85)	62.5 (0.56)
P-Psychological	68 (0.62)	76 (0.72)
R-Respiratory	95.65 (0.95)	95.65 (0.95)
S-Skin	86.11 (0.85)	86.11 (0.85)
T-Endocrine, Nutr	100 (1)	100 (1)
U-Urological	100 (1)	100 (1)
W-Pregnancy	0 (0)	0 (0)
X-Female genital	57.14 (0.53)	57.14 (0.53)
Y-Male Genital	88.89 (0.84)	77.78 (0.69)
Z-Social Problem	95 (0.94)	66.67 (0.40)
Total	**86.33 (0.86)**	**82.33 (0.82)**

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