

## Residual coding in ICHPPC: the size of the problem and its impact on research

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**SUMMARY.** In initial field trials of the International Classification of Health Problems in Primary Care (ICHPPC), the number of problems coded in residual ('other') categories was <5 per cent. Since then, there have been no published analyses of the residual category. Problems have been coded and computerized for over eight years at the Medical University of South Carolina Department of Family Medicine model practice. An analysis of that experience demonstrates that 14.3 per cent of the 85,000 problems were coded as residuals. Many classes or subclasses had >40 per cent coded as residuals. A residual as large as this is a major deterrent for research or practice analysis in a residency setting in anything more than a general category or descriptive manner. If many residuals also occur in other settings, this aspect of the code as well as the coding itself will need further study and improvement.

### Introduction

**T**HE history and reasons for the development of the International Classification of Health Problems in Primary Care (ICHPPC) have been well described (Froom, 1974, 1976, 1977). One aspect of this system often mentioned as important is the small size of the residual codes (the 'other' categories), especially when the code is used in primary care settings. Ten per cent is usually considered the maximum acceptable size for the residual (Clark, 1974). Early international testing of ICHPPC measured the residual categories at <5 per cent (Froom, 1976, 1977). Since that time, there have been a multitude of morbidity analyses using ICHPPC,

but there have been no published reports which included the size or an analysis of the residual categories. An initial review of data from the Department of Family Medicine at the Medical University of South Carolina demonstrated our 'other' categories to consist of >10 per cent of coded problems. Detailed analysis of this aspect of ICHPPC therefore seemed necessary.

### Methods

In the Department of Family Medicine, problems for each patient contact have been coded and computerized for eight years. Coding is done directly from problem lists in the records as they are updated by dictation, and not from encounter forms. Some coding is performed by the resident or faculty member at the time of patient contact. The remainder is performed by the computer by means of a synonym dictionary or by one staff member who is experienced in coding. After these three steps, a list of any problems still uncoded or difficult to code is returned to the doctor (faculty member or resident) for final classification. Since July 1976, we have used the ICHPPC system. Prior to that, the Royal College of General Practitioners (RCGP) code had been used, but all problems were converted to ICHPPC according to the standard conversion system (Schneeweiss *et al.*, 1977).

During the first few years of operation the Family Medicine Unit was growing, with a steadily climbing complement of residents, faculty and patients. For the past five years there have been an average of 45 residents (15 in each of the three training years) and four to six practising faculty members actively seeing patients one to three half days per week.

During that same five years the practice population has remained at approximately 10,000 active patients and 3,300 families. (See Table 1 for the age distribution

**Table 1.** Family Medicine Unit, Medical University of South Carolina. Active patient population at 31 December, 1977.

Age group	Total
0-4	897
5-14	2,073
15-44	5,266
45-64	1,101
65+	459
Unknown	255
Total	10,051
Families	3,329

of the population at a representative moment during the study, 31 December 1977.)

At that time 47 per cent of the population was male, 67 per cent was white and 30 per cent black. Throughout the eight-year period new families were added appropriately so as to give the residents within each year practice populations with reasonably similar demographic characteristics. In addition, each resident's profile of families is expanded yearly as he or she progresses through the residency.

For this study, a summary printout of all coded problems stored in the computer was obtained and categorized by ICHPPC class and subclass. Those classes containing a particularly large number of problems coded as 'other' were analysed in greater detail.

## Results

Of 85,277 problems coded and computerized, 16 per cent were classified in 'other' ICHPPC categories. The percentages for the residual category by class and subclass are listed in Table 2. Certain subclasses contain no residual category and in other cases the residual category itself is a subclass within a class.

Very high residuals (>40 per cent) were found in many classes and subclasses: 'Breast Diseases', 'Nervous System Diseases', 'Blood Diseases', 'Nonarticular Rheumatism', 'Other Musculoskeletal Connective Disease' and 'Dislocations/Subluxations, Other Sites, Not Elsewhere Classified'. A more detailed analysis was made of these subclasses. Both 'Breast Diseases' (62 per cent) and 'Nonarticular Rheumatism' (83 per cent) have large residuals because the major rubrics within the subclasses are 'other' rubrics. Seventy-five per cent of the residual category in the class 'Heart Diseases' was found in the 'Heart Murmurs NEC/NYD/Functional' rubric, most of which consisted of functional murmurs.

## Discussion

Use of the ICHPPC has been encouraged on the basis of its simplicity and manageable size. The fact that the vast

majority of diagnoses made in a general practitioner's surgery can be encompassed in less than 100 diagnoses makes a brief coding system logical. Using 371 rubrics, the ICHPPC code was found in initial trials to categorize <5 per cent of problems seen in residuals.

The existence of the large residual categories which we found makes research very difficult. Up to 48 per cent of diagnoses (220 of 460) under 'Nervous System Diseases' fall under the category 'Other Nervous System Diseases/Not Elsewhere Classified'. To investigate a neurological diagnosis other than multiple sclerosis, parkinsonism, epilepsy or migraine (the only specific neurological rubrics in ICHPPC), at least 220 records must be hand searched. In order to study patients diagnosed as having a functional murmur, the records for 375 patients coded as 'Heart Murmur, Not Elsewhere Classified/Not Yet Diagnosed/Functional' must be searched by hand for those who in fact have a functional murmur. A significant number of diagnoses are made in the subclass of 'Nonarticular Rheumatism', yet two out of three rubrics are residuals. Certainly new rubrics could be developed to lower this large residual component without having the 'other' contamination.

For a particular research project a practice might use specific ICD (International Classification of Disease) codes in a hierarchical manner within an ICHPPC subclass. This approach could be especially helpful within those subclasses with large residuals. In many cases the specific data gathered can later be collapsed back into the general ICHPPC subclass and appropriately compared to the morbidity statistics of other localities. This approach requires predetermined changes in coding and data gathering, but it is difficult to do this in a residency setting involving many doctors and it cannot incorporate the past or longitudinal data which are often available. To make use of information collected on specific diseases, the standard retrospective analysis involving certain ICHPPC subclasses with residuals requires a review, by hand, of a formidable number of records.

Our study may be criticized because many doctors, most of them trainees, made the recorded diagnoses. In this study the residents and faculty, however, all acted as primary care physicians and used the ICHPPC coding book (RCGP in earlier years). Their manner of diagnosing and coding may vary from that of an experienced private practitioner, and this difference may result in a greater residual. ICHPPC, however, has been considered appropriate for residency practices. If a systematic coding difference does exist in residency programmes, it should be investigated, because it would have an impact on the external validity of any research from these locations and the resulting high residuals make specific research much more difficult in those settings. If a systematic difference in coding methods did exist over the eight years of this study, it is unclear why it necessarily would result in higher residuals. Further investigation of coding methods is indicated.

**Table 2.** Medical University of South Carolina, Department of Family Medicine. ICHPPC residuals.

	Total diagnoses	Residuals	Percentage of diagnoses under residual category
i. Infectious and Parasitic Diseases	6,103	166	3
ii. Neoplasms			
Malignant	180	31	17
Benign	535	192	36
iii. Endocrine, Nutritional, Metabolic Diseases	2,904	92	3
iv. Blood Diseases	778	332	43
v. Mental Disorders			
Psychoses	86	21	24
Neuroses	1,734	55	3
Other Mental, Psychological Disorders	1,976	134	7
vi. Nervous System, Sense Organ Diseases			
Nervous System Diseases	460	220	48
Eye Diseases	1,484	424	29
Ear Diseases	3,726	229	6
vii. Circulatory System Diseases			
Heart Diseases	1,186	642	54
Blood Pressure Problems	1,404		
Vascular System Diseases	975	127	13
viii. Respiratory System Diseases	8,689	237	3
ix. Digestive System	4,041	651	
x. Genito-urinary System Diseases			
Urinary System Diseases	1,797	274	15
Male Genital Organ Diseases	386	126	33
Breast Diseases	295	182	62
Female Genital Organ Diseases	3,161	353	11
xi. Pregnancy, Childbirth, Puerperium	366	66	18
xii. Skin, Subcutaneous Tissue Diseases	4,951	952	19
xiii. Musculoskeletal, Connective Tissue Diseases			
Arthritis and Arthrosis	544	160	29
Nonarticular Rheumatism	606	506	83
Vertebral Column Syndromes	1,268	75	6
Other Musculoskeletal, Connective Tissue Diseases	781	618	79
xiv. Congenital Anomalies	340	132	39
xv. Perinatal Morbidity and Mortality	66		
xvi. Sign, Symptom, Ill-defined Condition	13,569	3,635	27
xvii. Injuries and Adverse Effects	5,458	608	11
Supplemental Classification	15,908	1,075	7
Total	85,757	12,315	14.3

Certainly the practice population at risk will affect the type of problems seen and coded. The Medical University of South Carolina Family Medicine Unit is similar to most other residency practices within a medical school system. The unit has its own slate of patients (enlisted as families) who are separated completely from the standard clinic system of the medical school. The distribution displayed in Table 1 demonstrates that the population is predominantly young with an average of three persons per family. These patients are drawn from the community and the faculty and staff of the medical university system, and are representative of those groups. There appears to be no inherent reason why such a patient population would yield an excess of coding into the residuals of ICHPPC.

One also might expect the newly revised edition of ICHPPC (ICHPPC II) to affect these results, but a review of this edition demonstrates little change in residual categories, and this problem still remains.

### Conclusion

Of over 85,000 diagnoses, 14.3 per cent fell in the residual categories of the ICHPPC code, an unacceptably large percentage, with many classes having large residuals. A closer analysis demonstrated that many of the problems forced into the 'other' category by the ICHPPC system were actually well defined and highly prevalent diagnoses.

Many authors agree that development of a research



## COLLEGE ACCOMMODATION

Charges for college accommodation are reduced for fellows, members and associates. Members of overseas colleges are welcome when rooms are available, but pay the full rate. All charges for accommodation include a substantial breakfast and now include service and VAT.

Children aged 12 and over can be accommodated when accompanied by a parent. Accompanied children aged between six and 12 may be accommodated upon a trial basis and arrangements can be made for young children to share a room with their parents at a reduced rate. Children over six may use the public rooms when accompanied by their parents. Younger children cannot be accommodated, and dogs are not allowed. Residents are asked to arrive before 21.00 to take up their reservations or, if possible, earlier.

From 1 April 1982, the room charge per night will be:

	Members	Full Rate
Single room	£14	£22
Double room	£28	£44
Penthouse (self-catering with kitchen)	£60	£80

Reception rooms are available for booking by outside organizations as well as by members. All hirings are subject to approval, and the charges include VAT and service. A surcharge may be made for weekend bookings.

	Members	Full Rate
Long room	£105	£210
John Hunt Room	£70	£140
Common room and terrace	£70	£140
Dining room	£35	£70

Enquiries should be addressed to: **The Accommodation Secretary, Royal College of General Practitioners, 14 Princes Gate, Hyde Park, London SW7 1PU. Tel: 01-581 3232.**

Whenever possible, bookings should be made well in advance and in writing. Telephone bookings can be accepted only between 08.30 and 18.30 on Mondays to Fridays. Outside these hours, an Ansafone service is available.

base is mandatory for the success and progress of family medicine as a legitimate academic specialty (Renner and Bauman, 1975; Geyman 1977a, 1977b, 1977c, 1978a, 1978b; McWhinney, 1978; Wood, 1979). There have been general descriptive morbidity analyses published about many aspects of family medicine. This has been an important step in the development of the specialty, but we now must move into new areas with more detailed research. The morbidity classification system used by the specialty must allow for and support progress of this kind. Further investigation of the coding practices, and specifically the residual problems of ICHPPC in residency and private practices, is necessary. If these large residuals (especially in particular subclasses) are replicated in other settings, and if the ICHPPC coding system is to foster the new developments necessary for progress in primary care research, the residual categories of ICHPPC must be improved.

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### Hospital costs

The hospitals now account for 63 per cent of all NHS costs. Yet between 1965 and 1979 the number of available beds fell by 21 per cent and waiting lists increased by a third. Admissions rose by 19 per cent to 5.4 million in 1979.

Source: Office of Health Economics. *Compendium of Health Statistics*. 4th edition. London: OHE.