

# A profile of coding staff in Sydney metropolitan public hospitals

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## Abstract

This survey assessed the profiles of ICD-10-AM coding staff employed in 13 major, acute care public hospitals in Sydney, Australia, during a two-week period in 1999. Approximately 90% (56/61) of respondents gave their job title as Clinical Coder or Coding Clerk; of these, 20 (36%) were qualified Health Information Managers, of whom 10 coded for  $\geq 90\%$  of their work-time and three for  $< 75\%$  of the time. One quarter of all Clinical Coders/Coding Clerks spent  $> 25\%$  of their work time performing duties other than coding. Five Health Information Management (HIM) Clinical Coders/Coding Clerks were paid under the Clerical, rather than the HIM, Award.

**Keywords:** *coder workforce; ICD-10-AM; clinical coding; health information management*

## Introduction

The first survey of Australian coders was conducted in 1991 and it examined the ICD-9-CM coder workforce in New South Wales and the Australian Capital Territory (Watson & Gough 1991; Kemp 1994). Subsequently, coders were surveyed Australia-wide during 1994–1995 (Health Information Management Association of Australia [HIMAA] 1995), in NSW in 1997 (NSW Clinical Coder Workforce Working Party [NSW CCWWP] 1998), and again Australia-wide in 2002 (Eames et al 2003; McKenzie et al 2003). Variations across the coder workforce have been demonstrated regarding occupational background, coding education, coding experience, work time devoted to coding duties, salary, and awards (Watson & Gough 1991; HIMAA 1995). However, coder characteristics have not been examined by hospital status factors such as hospital bed capacity, separation rate, teaching status, or casemix complexity, all of which could influence coding requirements and thus the coder profile.

The present study assessed the profiles of ICD-10-AM coding staff working in major, acute care public hospitals located in metropolitan Sydney during 1999. The coder profiles were examined in teaching and non-teaching hospitals. The target population for the study comprised staff members who gave Clinical Coder or Coding Clerk as their job title. Other staff members who performed coding are also briefly described.

## Method

### Study population and data collection

The hospitals targeted for data collection were the 19 public hospitals with  $\geq 150$  beds situated within the Sydney metropolitan area. Data on hospital bed capacity were obtained from the *NSW Public Hospital Comparison Data Book 1997/1998* (NSW Department of Health 1999).

The Health Information Manager in charge of the Medical Records Department in each of the 19 hospitals was mailed an explanatory letter, requesting participation in the study of staff members who performed coding in their department. The chief Health Information Manager in 13 (68%) of the hospitals agreed for their staff to participate. The NSW Department of Health classifies all public hospitals into peer groups, for which similar performance is anticipated in terms of cost per standard unit of output

(NSW Health Department Casemix Policy Unit Structural & Funding Policy Branch 1998, p 1). The 13 participating hospitals fell into three peer group classifications: principal referral (PR) (six of a total of eight in Sydney), major metropolitan (MM) (six of a total of nine), and paediatric specialist (PS) (one of two). PR hospitals equate to teaching hospitals and MM to non-teaching hospitals.

The coding staff members were interviewed by postal questionnaire. The study period was a two-week interval in July 1999, and was approximately one year after the changeover from ICD-9-CM to ICD-10-AM. The response rate among staff members who performed coding during the study period was 83.7% (36/43) in the PR hospitals, and 77% (20/26) in the MM hospitals; all five coders responded in the PS hospital. The overall response rate was 82.4%.

Data provided by the study subjects for use in this survey included information on their job title; how they had learnt to code; method(s) by which they had received instruction in the use of ICD-10-AM; amount of work time spent coding (assigning codes); tasks performed in addition to assigning codes; age; number of months of total coding experience (as measured by the total length of time spent in coding positions [Watson & Gough 1991]); and name of the award under which they were paid.

In order to provide background information on the study hospitals, and thus on coding requirements, data were obtained for each hospital regarding bed capacity, number of annual separations, and hospital casemix complexity.

### Casemix complexity

An average cost weight for top volume Diagnosis Related Groups (DRGs) was developed for each hospital and this was used as an absolute indicator of the hospital's casemix complexity. Data for each hospital were obtained from the NSW 1996–1997 Inpatient Statistic Collection, using AN-DRG v.3.1. For each hospital, only DRGs with at least 100 cases were kept, with the exception of four DRGs: day stay renal dialysis; chemotherapy; planned same-day rehabilitation; and non-acute outpatient rehabilitation. The reasons for their exclusion are given in a previous study of the same coder population (Dimitropoulos et al 2001). The hospitals were ranked according to their indicated casemix complexity. The study hospitals with the

**1: Number of beds, annual separations (rounded to 1000's), and rank order for casemix complexity, in the Principal Referral and Major Metropolitan/Paediatric Specialist hospitals**

<u>Hospital Group</u>	<u>Bed capacity</u>	<u>Range in hospital bed capacity</u>	<u>Annual Separations</u>	<u>Range in hospital annual separations (in 1,000's)</u>	<u>Rank of hospitals according to casemix complexity</u>
Principal Referral (n = 6)	3619	333–865	292 000	28–60	1–6
Major Metropolitan/Paediatric Specialist (n = 7)	1751	164–404	176 000	16–38	7–13

highest and lowest casemix complexity were given the ranks of one and 13, respectively.

**Coding**

Coding is defined as the translation of narrative descriptions of diseases, injuries, and procedures into alphanumeric codes according to a predefined health classification system (NSW CCWWP 1998). Staff members who spent less than 10% of their work time coding were not included in the study.

**Clinical Coder and Coding Clerk**

A Clinical Coder is a health care worker whose primary responsibility is to carry out coding as defined above (NSW CCWWP 1998). Among subjects in this study, the duties of a Clinical Coder and a Coding Clerk are interchangeable.

**Data statistics**

This survey was descriptive in design, and the results are shown by frequencies (number of observations) with percentages. No formal statistical tests were used. The descriptive method of presenting results as used in this study is consistent with the method used in all the other Australian coder workforce survey reports (Watson & Gough 1991; HIMAA 1995; NSW CCWWP 1998; Eames et al. 2003; McKenzie et al. 2003).

**Results**

**Hospital groups**

Box 1 shows the status features of the hospital peer groups in terms of bed capacity, number of annual separations (totals for, and range within, each group), and rank order of the hospitals as regards casemix complexity (range of ranks in each group). The PS hospital was included in the MM group for study because it was ranked 11 for casemix complexity — that is, within the range for the MM hospitals.

**Job title**

Box 2 shows that among coding staff who responded to the survey, those who gave Clinical Coder or Coding Clerk as their job title constituted 92% of the coding

workforce in each of the PR and MM/PS hospital groups.

No Clinical Coder or Coding Clerk worked in more than one hospital. Among the PR hospital Clinical Coders/Coding Clerks, four were at each of two hospitals, five at each of two hospitals, seven at one, and eight at one. Among the MM/PS hospital Clinical Coders/Coding Clerks two were at one hospital, three at each of three hospitals, and four at each of three.

**2: Job titles of coding staff, by hospital group.**

<u>Job title</u>	<u>Hospital group</u>			
	Principal Referral (n = 36)		Major Metropolitan/Paediatric Specialist (n = 25)	
Coding Manager	0	(0.0%)	1	(4.0%)
Assistant Coding Manager	2	(5.6%)	0	(0.0%)
Clinical Coder	28	(77.8%)	20	(80.0%)
Coding Clerk	5	(13.9%)	3	(12.0%)
Trainee Clinical Coder	1	(2.8%)	1	(4.0%)

**How coding knowledge was gained**

**Clinical Coders/Coding Clerks**

Among the 56 Clinical Coders/Coding Clerks, 23 (41.1%) had completed or were undertaking a Health Information Management (HIM) or Medical Record Administration (MRA) degree or diploma course, with similar proportions in the PR and MM/PS hospitals (39.3% and 43.5%, respectively) (Box 3). The ratio of those who had received, or who were receiving, coding education through an HIM course to those whose coding education was from other sources was therefore approximately 2:3 in both the PR and MM/PS hospitals.

### 3: Coding education of Clinical Coders and Coding Clerks, by hospital group.

Education method	Hospital group			
	Principal Referral (n = 33)		Major Metropolitan/ Paediatric Specialist (n = 23)	
Australian HIM/MRA degree or diploma				
Completed	11	(33.3%)	8	(34.8%)
Currently completing	1	(3.0%)	2	(8.7%)
Overseas HIM/MRA degree or diploma	1	(3.0%)	0	(0.0%)
HIMAA Distance Education Program	13	(39.4%)	3	(13.0%)
Open Training & Education Network	8	(24.2%)	8	(34.8%)
On-the-job instruction	1	(3.0%)	6	(26.1%)
No type of coding education documented	1	(3.0%)	2	(8.7%)

Cell frequencies add up to more than total numbers of subjects, and percentages add up to >100, because some subjects reported undertaking more than one method of education.

HIM= Health Information Management. MRA = Medical Record Administration.  
HIMAA= Health Information Management Association of Australia.

### 4: Methods of instruction in the use of ICD-10-AM among Clinical Coders and Coding Clerks, by hospital group.

Instruction method	Hospital group			
	Principal Referral (n = 33)		Major Metropolitan/Paediatric Specialist (n = 23)	
Coding workbooks: "Mastering 10"; "A Taste of 10"*	5	(15.2%)	4	(17.4%)
ICD-10-AM Education Workshop*	22	(68.4%)	13	(56.5%)
ICD-10-AM Post-implementation Workshop*	14	(42.4%)	14	(60.9%)
Introduction to ICD-10-AM†	1	(15.2%)	2	(21.7%)
ICD-10-AM Intermediate Course‡	3	(9.1%)	3	(13.0%)
Other‡	5	(15.2%)	5	(21.7%)

Cell frequencies add up to more than total numbers of subjects, and percentages add up to >100, because some subjects undertook more than one instruction method.

\* Originates from National Centre for Classification in Health.

† Originates from the Health Information Management Association of Australia.

‡ Clinical Classification (undergraduate; graduate diploma); Clinical Coder update; on-the-job training; coding conference; coding meetings within the department.

Seventeen (35%) of the 48 Clinical Coders were qualified Health Information Managers (10 worked in PR hospitals and seven in MM/PS hospitals) and two (4.2%) were student Health Information Managers (one in a PR and one in an MM/PS hospital). Three of the eight Coding Clerks were qualified Health Information Managers (two in PR and one in MM/PS hospitals) and one a student Health Information Manager (MM hospital). Two of the three student Health Information Managers had completed the HIMAA Distance Education Program (DEP) in Clinical Coding (NSW CCWWP 1998), and the overseas-trained Health Information Manager was undertaking the DEP.

Among the 33 non-HIM Clinical Coders/Coding Clerks, 16 had undertaken the HIMAA DEP and 16 had completed the Open Training and Education Network (OTEN) course for Medical Record Clerks. The OTEN course is offered by distance education and is delivered through the NSW Department of Technical and

Further Education. The course incorporates medical terminology and clinical classification and, although not specifically designed for clinical coders, provides a basic introduction to clinical coding (NSW CCWWP 1998). One non-HIM respondent had completed both the HIMAA DEP and the OTEN course. Among non-Health Information Managers, undertaking the HIMAA DEP was 7.8 times more common in PR than in MM/PS hospitals, and undertaking the OTEN course was 1.4 times more common in the MM/PS hospitals. Seven Clinical Coders/Coding Clerks had received on-the-job instruction in coding, two of whom (in MM hospitals) did not record having undertaken any other type of coding education.

Three non-HIM Clinical Coders/Coding Clerks were overseas-trained medical practitioners and another recorded having an enrolled nurse background. As recognised in legislation in NSW, enrolled nurses are second level nurses who work under the direction of

**5: Number of ICD-10-AM instruction methods undertaken by Clinical Coders and Coding Clerks, by hospital group.**

Number of methods	Principal Referral (n = 33)		Major Metropolitan/ Paediatric Specialist (n = 23)	
	0	7	(21.2%)	1
1	10	(30.3%)	6	(26.1%)
2	9	(27.3%)	14	(60.9%)
3	5	(15.2%)	1	(4.4%)
4	2	(6.1%)	1	(4.4%)

**6: Proportion of total work-time spent by Clinical Coders and Coding Clerks in allocating codes, by hospital group.**

Proportion of worktime spent allocating codes	Principal Referral (n = 33)		Major Metropolitan/ Paediatric Specialist (n = 23)	
	≥ 90%	17	(51.5%)	5
75% - <90%	9	(27.3%)	11	(47.8%)
50% - <75%	5	(15.2%)	6	(26.1%)
<50%	2	(6.1%)	1	(4.4%)

registered nurses (Nurses Registration Board of New South Wales 2003). One of the three medical practitioners had completed the HIMAA DEP, and the enrolled nurse had completed the OTEN course. Two of the three non-HIM Clinical Coders/Coding Clerks who did not record how they had learnt to code (Box 3) were medical practitioners.

**Other staff members who performed coding**

One trainee Clinical Coder was currently completing the HIMAA DEP and on-the-job instruction, while the other was undergoing on-the-job instruction only. The Coding/Assistant Coding Managers held undergraduate degrees or Associate/Graduate Diplomas in Health Information Management; they did not record having received any other coding education.

**ICD-10-AM instruction methods**

**Clinical Coders/Coding Clerks**

Box 4 shows methods of instruction in the use of the ICD-10-AM coding system. The workshops were the major means of instruction and only a few Clinical Coders/Coding Clerks undertook other methods. The workbook and workshop methods were of similar frequency in the PR and MM/PS groups. The three Clinical Coders/Coding Clerks who had not documented how they had learnt to code (see Box 3) had attended ICD-10-AM education and/or post-implementation workshops.

**Other staff members who performed coding**

The two trainee Clinical Coders had received on-the-job instruction in ICD-10-AM. All three Coding Managers had attended workshops, one had also used a workbook, and another had attended an unspecified ICD-10-AM course.

Box 5 shows the number of methods of instruction in the use of the ICD-10-AM undertaken by the Clinical Coders and Coding Clerks. Two or more methods were undertaken by 48.5% of Clinical Coders/Coding Clerks in PR hospitals and by 69.6% in MM/PS hospitals. The eight Clinical Coders/Coding Clerks who did not record having received any ICD-10-AM instruction mostly worked in PR hospitals; four of the eight were Health Information Managers.

**Work time spent coding**

**Clinical Coders/Coding Clerks**

Box 6 shows that 13% more Clinical Coders/Coding Clerks in PR hospitals than in MM/PS hospitals spent ≥75% of their work time undertaking coding (78.8% as against 69.6%), and more than twice as many in PR than in MM/PS hospitals coded for ≥90% of the time. It can be seen from Box 6 that one quarter of Clinical Coders/Coding Clerks across the hospital groups coded for <75% of their work time; of those who coded for <50% of work time, one Clinical Coder in each hospital group coded for only 30% of the time. Ten of the 20 Clinical Coders/Coding Clerks who were qualified Health Information Managers coded for

**7: Tasks performed in addition to allocating codes among Clinical Coders and Coding Clerks, by hospital group.**Activities additional to allocating codesHospital group

	Principal Referral (n = 33)		Major Metropolitan/ Paediatric Specialist (n = 23)	
Coding quality activities	11	(33.3%)	12	(52.2%)
Coding education activities	9	(27.3%)	8	(34.8%)
Indexing /data entry	7	(21.2%)	5	(21.7%)
Other additional coding activities	10	(30.3%)	5	(21.7%)
Any additional coding activities at all	18	(54.6%)	19	(82.6%)
General medical record department duties	24	(72.7%)	21	(91.3%)
Management/supervisory duties	2	(6.1%)	1	(4.4%)

\* Cell frequencies add up to more than total numbers of subjects, and percentages add up to >100 because some subjects undertook tasks in more than one category.

**8: Age and total coding experience of Clinical Coders and Coding Clerks, by hospital group.**

<u>Age (in years)</u>	Principal Referral (n = 33)		Major Metropolitan/ Paediatric Specialist (n = 23)	
	<25	0	(0.0%)	2
25-34	10	(30.3%)	8	(34.8%)
35-44	15	(45.5%)	6	(26.1%)
45-54	5	(15.2%)	6	(26.1%)
≥55	3	(9.1%)	1	(4.4%)
<u>Experience (years)</u>				
<1	2	(6.1%)	3	(13.0%)
1-<3	7	(21.2%)	2	(8.7%)
3-<6	6	(18.2%)	10	(43.5%)
≥6	15	(45.5%)	8	(34.8%)
Not specified	3	(9.1%)	0	(0.0%)

≥90% of work time, and three for <75% (one coded for only 30% of work time).

**Other staff members who performed coding**

One trainee Clinical Coder (PR hospital) coded for 69% of the time and the other (MM hospital) for 18%. The two PR Coding Managers coded for 33% and 58% of work time, respectively, and the MM/PS Coding Manager for 17%.

**Tasks additional to assigning codes**

The types of tasks performed by Clinical Coders/Coding Clerks in addition to assigning codes are shown in Box 7. It is seen that additional tasks, whether coding activities or general duties of the Medical Record Department, overall were more often performed by Clinical Coders/Coding Clerks in MM/PS than PR hospitals. Among the additional coding activities the most common were associated with quality; these included checking coding accuracy, auditing, data quality checks, and ISCOS editing. Other addi-

tional coding activities included locating records and loose sheets, cancer registry, and converting codes from ICD-9-CM to ICD-10-AM. Among the general medical record department duties the most common were attending meetings, filing, attending to telephone calls and enquiries, and research requests. General duties were undertaken at some time during the study period by the vast majority of Clinical Coders/Coding Clerks in both hospital groups.

Across the PR and MM/PS hospital groups one quarter of Clinical Coders/Coding Clerks spent >25% of their work time performing tasks other than coding, and 5.4% spent >50% of their time on such work. It is not known how the time spent away from coding was divided between additional coding activities and general duties.

**Age and coding experience****Clinical Coders/Coding Clerks**

The age spread among Clinical Coders/Coding Clerks in the two hospital groups is shown in Box 8. It is seen

**9: Awards under which Clinical Coders/Coding Clerks were paid, by hospital group**

Award	Hospital group			
	Principal Referral (n = 33)		Major Metropolitan/ Paediatric Specialist (n = 23)	
Public Hospital Medical Records Librarians (State) Award MRA Incremental Years 1-7	6	(18.2%)	7	(30.4%)
Hospital Employees' Administrative & Clerical (State) Award Clerk Grades 3 and 4	17	(51.5%)	10	(43.5%)
Clerk: Grade not specified	7	(21.2%)	6	(26.1%)
Award not specified	3	(9.1%)	0	(0.0%)

that this coder sub-population ranged from those who had only recently started out in their career to those well advanced in their working life. Box 8 also shows that across the hospital groups, 41% of Clinical Coders/Coding Clerks had six or more years' total of coding experience. The five who had coded for less than one year were either qualified (n = 4) or student (n = 1) Health Information Managers. Among Clinical Coders/Coding Clerks in the <35 and ≥ 45 years age groups, at least 63.6% and 86.7%, respectively, had three or more years total coding experience; at least 15.8% and 73.3%, respectively, had six or more years experience.

**Other staff members who performed coding**

The ages of these staff ranged from under 25 years (one Coding Manager) through the intermediate years (25 – 44) (one Trainee Clinical Coder) to 45 years and over (two Coding Managers and one Trainee Clinical Coder). The two Managers in the latter group had more than three years' coding experience, and both of the Trainee Clinical Coders had experience of less than one year.

**Awards**

Box 9 shows the awards under which the Clinical Coders/Coding Clerks were paid. At least five of the 20 with a HIM qualification were known to have been paid under the Clerical Award (three documented Clerk Grade 4, and two did not specify a grade). Three of these Health Information Managers worked in one PR hospital, one (who was overseas-trained) worked in another PR hospital, and one worked in an MM hospital.

**Discussion**

The results of this survey suggest that staff employed in medical records departments of major public, acute care hospitals in Sydney whose job title is Clinical Coder or Coding Clerk differ widely across hospitals in respect of age, total coding experience, and method of gaining coding knowledge. These factors appear to be unrelated to characteristics associated with hospital peer group, that is, hospital size (as determined by bed capacity), teaching status, and casemix complexity. While the sample size of the present survey is not large, the sample may be said to be representative in

that coding staff in a substantial majority of prominent Sydney hospitals took part. As this survey was conducted in Sydney, the issues addressed and discussed relate to NSW; thus any inferences drawn may not necessarily apply in other Australian states or in other countries.

The lack of any mention of the term Clinical Coder in the 1991 NSW and ACT coding workforce survey (Watson & Gough 1991) provides evidence that Clinical Coder was not a job title in NSW at that time. In the survey conducted three to four years later (HIMAA 1995), just 5% of those in the NSW coding workforce whose job title included the term "coder" gave Clinical Coder as their job title. However, the report of the NSW CCWPP (1998) indicates that by 1998 Clinical Coder had become established as a job title in NSW. Throughout the report the position of Clinical Coder is discussed, and in Appendix G Clinical Coder was defined as a healthcare worker whose primary responsibility was coding. In Appendix F of the CCWPP report specific salaries for clerical Clinical Coders were proposed, it having been recommended earlier in the report (11) that the specialist skills and competency levels of staff who code clinical data be linked to remuneration in order to bring about a more structured career progression and better salary levels for Clinical Coders. Coding Clerk was a recognised position held, at the time of writing of the 1991 and 1995 reports (Watson & Gough 1991; HIMAA 1995), by clerical staff who performed coding; it was also a position which could be held by Health Information Managers. Coding Clerk was not mentioned in the later surveys (NSW CCWPP 1998; Eames et al 2003; McKenzie et al 2003). The coding duties for Clinical Coder and Coding Clerk are virtually the same, indicating that these terms are used interchangeably. The finding in our survey that Health Information Managers working as coders gave their job title as Clinical Coder or as Coding Clerk indicates that in NSW Clinical Coder and Coding Clerk over-ride Health Information Manager as job titles if clinical coding appears in the job description as the primary responsibility. In the present study, Health Information Managers were similarly distributed among the Clinical Coders and Coding Clerks both in the PR and the MM/PS hospital groups.

The coding process has traditionally been the professional responsibility of Health Information Managers (Watson & Gough 1991, vol 1, p 6). However, due to the long-term shortage of Health Information Manag-

ers as coding personnel, coding duties have been delegated increasingly to clerical and other non-HIM staff (Watson & Gough 1991, vol 1, pp 7, 10). This is reflected in the finding of the current study that only 41.1% of the Clinical Coders/Coding Clerks had an educational background of health information management. It can be argued that an underlying reason for exploring the occupational backgrounds of coders is to enable estimation of the ratio of Health Information Managers to non-Health Information Managers in a coder population in order to throw light on the degree to which the responsibility of coding is passing out of its traditional sphere. In the present survey the occupational backgrounds of very few non-HIM Clinical Coders/Coding Clerks were known; however, this could be regarded as a limitation, given that non-Health Information Managers were responsible for so much of the coding and the ratio of Health Information Managers to non-Health Information Managers was able to be determined.

Assessment of the amount of time that Clinical Coders/Coding Clerks spent coding reveals the extent to which they were required to do other tasks. It is seen that in both hospital groups a substantial proportion of these staff members spent a good deal of time doing other work, even though much of it may have been related to the coding process. Our finding that 51.5% of PR but only 21.7% of MM/PS Clinical Coders/Coding Clerks coded for 90% or more of their work-time may mean that either MM/PS Clinical Coders/Coding Clerks were more likely to be required to do other duties, or that the pressure to meet coding deadlines was higher in PR than in MM/PS hospitals.

A marked variation in total coding experience, as seen within each hospital group in our study, was also found across the entire coding workforces (ie, all staff who did any coding at all) of the 1991, 1994–1995 and 2002 surveys (Watson & Gough 1991; HIMAA 1995; Eames et al 2003). The present study demonstrates that among Clinical Coders/Coding Clerks, older age tends to signify more years of coding experience.

Award inconsistencies are long-standing, having been reported over several years (Watson & Gough 1991; HIMAA 1995; NSW CCWWP 1998). One inconsistency identified in this survey and reported on in the earlier surveys (Watson & Gough 1991; HIMAA 1995; NSW CCWWP 1998) is the payment of some Health Information Managers employed specifically to code under the Clerical Award and the payment of others under the HIM Award. One explanation for this is that some hospitals employ all staff for coding positions at clerical grades, while others take the HIM qualification into account (Watson & Gough 1991; HIMAA 1995).

## Conclusion

We consider the most important finding of our study was that many staff employed as Clinical Coders or Coding Clerks, both in PR or MM/PS hospitals, appeared to spend an appreciable amount of time on duties other than assigning codes. It is recognised that the Clinical Coder is required to perform other specialised coding duties, such as editing and transcribing

electronic data, and maintaining manual indexing systems (NSW CCWWP 1998). However, strict adherence to the key guideline that the Clinical Coder's primary responsibility is the assigning of codes should maximise the likelihood of meeting coding deadlines, and thus of minimising backlog.

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