Clinical Coding - an insight into healthcare data

EDUCATION

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ABSTRACT

Summary

Clinical coding is an important function within healthcare informatics. Coding datasets have various statistical and clinical uses: a high level of accuracy, completeness and specificity is paramount. Preventable errors can accumulate along the coding pathway and may have significant implications for health care management worldwide.

Relevance

Amongst other functions, clinical coding datasets are used for policy creation, clinical audit and finance. Both clinical staff and coding professionals play an equally important role in ensuring accurate reporting of hospital activity, but the nature and importance of the clinician's role is often misunderstood and underappreciated. The coding pathway is highly susceptible to human error with clinician-based errors ranging from incorrectly defining a clinical entity to underreporting comorbidities. Clinical staff should be aware of the importance of clinical coding, its uses and the role they play in ensuring accuracy: a hospital is measured by its output data. High-quality data leads to well-informed service provision, resource allocation and business planning which cumulates into enhanced patient outcomes.

Take Home Messages

Errors occurring along the coding pathway can have significant financial and statistical ramifications. Clinicians and coding professionals must work collaboratively to improve the quality of healthcare data flows. Regular engagement between all influential parties along the coding pathway is vital, with frequent reviews of clinical documentation and coding reports a firm foundation for continual improvement. Accurate and reliable healthcare data supports the optimisation of patient care.

Introduction

Effective healthcare management requires versatile and pre-emptive strategic planning. For this to be possible, hospitals depend on an effective mechanism for data collection, collation and analysis: clinical coding. Clinical coding is the translation of clinical statements into alphanumeric codes, typically four characters in length. (1) Its purpose is to standardise the recording of clinical information to enable datasets to be analogous. (2) There are numerous ways to describe the same clinical entity, so without a standardised system these cases could be coded differently, creating a barrier to comparable analyses. In the United Kingdom (UK), two classifications are currently used for clinical coding: the 10th International Statistical Classification of Diseases and Related Health Problems (ICD-10) and the Office of Population Censuses and Surveys Classification of Interventions and Procedures version four (OPCS-4). (3)

The quality of coding depends on a collaborative approach being championed by coders and clinical staff alike. (4) The value and accuracy of clinical coding is particularly important in England as coding underpins the National Tariff Payment System (NTPS) (formally known as Payment by Results (PbR)). (3) Under this system, provider income flows are directly related to clinical activity. As clinical coding is the nationally adopted method to document such activity, it is essential that coding datasets are complete, accurate and hold the highest possible level of specificity to circumnavigate potential financial pitfalls.

Despite its importance, awareness of clinical coding is low amongst junior doctors. (5) It is essential that all clinical staff understand the importance of the role they have to play in refining healthcare data flows, as ultimately they determine the usefulness of such data for all secondary purposes.

Uses of clinical coding

Clinical coding allows for reliable collation, aggregation and comparison of healthcare data on local, national and international platforms.

Local uses

Coding data is useful for clinical audit, tracking patient outcomes and measuring treatment effectiveness. It is a means for easily identifying specific patient cohorts, tracking complication rates and linking outcomes to a defined criteria, such as the surgeon performing a procedure or procedural technique adopted.

Management in a provider setting use coding data for monitoring and planning. Casemix analyses facilitate appropriate resource distribution, policy derivation and growth prediction. Reliable data aids clinical governance and encourages good practice. (6)

Under the NTPS, coding datasets are used as a means to reimburse providers for the care that they provide. Inaccuracies can lead to signficant financial losses with any one error having the potential of being valued in the thousands of pounds. (4) Coding datasets are therefore a key component in cost analyses and business planning. (7)

National uses

Monitoring patterns in activity and trends over time allows for tailored, region-specific resource planning and allocation. Coding data is widely used by governmental and healthcare bodies to monitor, develop and evaluate healthcare policies across the UK. (8) National indicators of clinical quality and best practice are tracked and reimbursed using specific coding derivatives. (9)

National benchmarking and comparison highlights areas where improvement is needed and provides a resource for patients to make greater-informed choices about where and how they access care. (10, 11) Discrepancies in coding data help ascertain 'dead zones' for particular types of care and provide a means for assessing fair access to healthcare.

International uses

All World Health Organisation (WHO) members use the ICD. (12) This permits monitoring of the aetiology, incidence and prevalence of diseases globally and helps identify at risk populations, on the basis of diagnostic, demographic or environmental factors. (13) International learning models can be derived from shared data pools, permitting global collaboration on policy creation and resource forecasting.

The clinical coding pathway

From admission to secondary user

Figure 1 outlines the inpatient coding pathway from admission to secondary user. This pathway is specific to secondary and tertiary care in England.

The pathway begins when a patient is admitted to a hospital and undergoes treatment or investigation (step 1). Clinical staff detail all of the patient events that occurred throughout the hospital spell in the medical record.

Following discharge, clinical coders translate the clinical information into codes using ICD-10 and OPCS-4 (step 2). Providers work towards having all activity coded by an initial deadline known as 'flex,' which gives providers and commissioners the opportunity to assess the data and make corrections where appropriate. (14)

Quality assurance analyses are performed to ensure coding accuracy and abidance by national standards (step 3). The information governance toolkit is a framework for clinical coding audit. Providers must ensure that they have carried out internal audits on whichever is smaller of 200 or 2% of total finished

consultant episodes (FCEs). (15) Continual assurance activity helps safeguard a precise position for contract monitoring and performance regulation (step 4a).

In line with a final deadline known as 'freeze,' (14) providers submit their coding data to the Secondary Uses Services (SUS+) via commissioning datasets (step 4b). (10) SUS+ is a UK information warehouse that stores healthcare data in adherence to national policies. (10) There are different commissioning datasets depending on the type of care provided (admitted patient care (APC), outpatients (OP), accident & emergency (A&E) etc.).

Before the data can be accepted by SUS+, it is validated against business rules and if this is successful, the data is then passed through a grouper software (step 5). (16) The grouper uses a sophisticated algorithm, created by the National Casemix Office, to group clinically meaningful clusters of activity. (3) These groups are known as Healthcare Resource Groups (HRGs). (3) HRGs are the currency for remuneration in England and carry a defined tariff representative of the care provided with consideration of demographic and provider information. (17)

If processing has been efficacious, the data is made available to approved SUS+ users. There are two data marts: defined layers of the data warehouse aligned with user requirements (step 5). The Standard Extract Mart (SEM) view shows completed hospital episodes without any additional payment-related additions. (16) SEM is used to derive Hospital Episode Statistics (HES) (step 6a). HES is an anonymised database containing information of all admissions, outpatient appointments and A & E attendances in England. (8) The PbR view shows spell based activity with additional payment related derivations (step 6b). (16) It is used for derivation of NTPS policy, monitoring and reimbursement.

Key Roles

The number of 'influencers' along the pathway varies with the size of a setting and local practice. Some influential roles are outlined below.

Clinical Coders

Clinical coders perform the act of coding, working in accordance with local, national and international guidance to ensure uniformity. (13, 18) Clinical coders have a responsibility to stay up to date with changes to these standards as well as local recording protocols. They are encouraged to work towards professional registration (19) to prove a standard of accuracy.

Clinical Coding Auditors

Coding auditors assure the quality of clinical coding against national standards and reporting requirements. (13, 15) This may be done internally within a trust or on behalf of external

commissioning providers.

Clinical Staff

All clinical staff have a legal requirement to ensure documentation is complete and accurate. (20) Junior doctors are typically tasked with completing discharge summaries, which are a primary source of information for coding purposes.

Data Analysts

Data analysts utilise coding datasets for strategic planning, contract monitoring and identification of areas for change.

Health Informatics Managers

Informatics managers are tasked with aggregating and submitting all commissioning data sets to SUS+. They work extensively with commissioners and other third parties to ensure the correct processes, outlined within the NHS standard contract are adhered to. (21)

Sources of coding errors

Estimates on coding accuracy vary drastically, with systematic reviews suggesting a median accuracy of around 80%. (22)

Coder errors

Errors by clinical coders are well reported in the literature and are often multifactorial. (17, 22, 23) The experience of a coder directly influences the quality of coding. (23) A coder's knowledge about the diseases and procedures that they are coding can make the difference between separating a symptom of a condition from a new finding. (24) A coder could 'under-code' by being unable to differentiate between separate clinical entities. Time restraints, the level of coder-clinician communication and departmental leadership styles can all affect coding practice. (25) Failure to clarify queries or request missing subsidiary information, such as external causes or infection aetiology, can all lead to paucity in coding datasets. (17, 26)

Clinician errors

The eventual value of clinical coding is limited by the quality of clinical documentation; electronic discharge summaries have been shown to often be suboptimal for coding purposes. (17) Junior doctors receive minimal education on clinical coding, (27) and are typically first introduced to the topic at local hospital inductions. In general, this is ineffective and, despite a willingness to engage with the field, clinicians often fail to adequately meet all coding requirements when recording clinical events. (5) A lack of a robust educational programme has meant that misconceptions on the uses and importance of clinical coding are rife, and many clinical staff members are uncertain as to what is required from them. (5, 26)

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Lack of engagement, between clinical staff and coding professionals, has been correlated with significant financial repercussions and omission of noteworthy information. (4, 26) A lack of specificity frequently causes difficulties with different codes available as subcategories of the same disease or morbid entity. An example of this is the coding of obesity. In ICD-10, obesity (with no further modifiers) is coded as E66.9 – Obesity, unspecified whereas morbid obesity and drug-induced obesity are coded with E66.8 – Other obesity and E66.1 – Drug-induced obesity respectively. (12) In some cases, the clinical management of the conditions defined by ICD-10 subcategories does not change, so from a medical perspective the 'unspecified' description of a condition may be deemed sufficient to ensure continuity of care. (28) Idiosyncratic use of abbreviations, inconsistencies between the ways clinicians document patient events and failure to record information in a predictable structure, all create interpretational dilemmas for the coder. (4)

Under the current version of the NTPS, inpatient tariffs can be affected by a patient's summed 'comorbidity score'; correct financial reimbursement is reliant on all relevant secondary diagnoses and comorbidities being coded. (3) Failure to record that conditions have been fully treated or resolved can inhibit the correct 'history of' codes being assigned and requires the coder to dedicate significant resources towards determining whether a condition is current. Coders cannot infer test results and require a definitive interpretation of radiological, biochemical, histological and microbiological results. (13) This interpretation must be made by the clinician and documented in the medical record, especially in cases where the patient is treated on the basis of these investigations. The nature of acute injuries should be recorded to ascertain the circumstances in which the injury arose, to permit injury surveillance. (29)

Methods for reducing clinical coding errors

The first step in reducing the likelihood of coding errors occurring is raising awareness of regularly reported problems. With increased awareness, it is possible to introduce subtle changes in local practice to best serve both clinical and administrative functions. Table 1 outlines a framework for mitigating the effects of common pitfalls.

The future of clinical coding

The field of clinical coding is rapidly evolving and there is plenty of debate about future directions. (2) The implementation of Systematized Nomenclature of Medicine–Clinical Terms (SNOMED CT), which is a structured terminology within an Electronic Patient Record (EPR), (31) will permit ICD-10 and OPCS 4.8 to be cross mapped directly to clinical documentation rather than coded by a coding professional. As such, the roles of the clinician and coder will continue to transform over time.

Conclusion

It is essential that all influential parties, along the coding pathway, work coherently to ensure healthcare data is complete, accurate and reliable. Sources of error are plentiful but ill effects can be diminished or lessened with diligence and planning. Education is the key to improvement and more must be done to raise awareness if we are to continue to use clinical coding for essential secondary functions.

References

1. Eve-Jones S. Coding for clinicians. The Bulletin of the Royal College of Surgeons of England. 2014;96:286-287.

https://doi.org/10.1308/147363514X14042954768673

2. Tatham A. The increasing importance of clinical coding. British Journal of Hospital Medicine. 2008:69;372-373.

https://doi.org/10.12968/hmed.2008.69.7.30409

3. National Casemix Office. Casemix companion. Health and Social Care Information Centre:2018 [accessed 26 Feb 2018]. Available from:https://digital.nhs.uk/media/37396/HRG4-201718-Reference-Costs-Grouper-Casemix-Companion-v1-0/pdf/HRG4__201718_Reference_Costs_Grouper_Casemix_Companionv1-0.

4. Mahbubani K, Georgiades F, Goh E, Chidambaram S, Sivukamaran P, Rawson T et al. Clinician-directed improvement in the accuracy of hospital clinical coding. Future Healthcare Journal. 2018:5;47-51.

https://doi.org/10.7861/futurehosp.5-1-47

5. Sehjal R, Harries V. Awareness of clinical coding: a survey of junior hospital doctors. Sehjal, R and Harries, V. British Journal of Health Care Management. 2016;22:310-314.

https://doi.org/10.12968/bjhc.2016.22.6.310

6. Veenstra G, Ahaus K, Welker G, Heineman E, Van Der Laan M, Mutinghe F. Rethinking clinical governance: healthcare professionals' views: a Delphi study. BMJ Open. 2017;7.

https://doi.org/10.1136/bmjopen-2016-012591

7. Hof S, Fügener A, Schoenfelder J, Brunner J. Case mix planning in hospitals: a review and future agenda. Health Care Management Science. 2017;20:207-220.

https://doi.org 10.1007/s10729-015-9342-2

8. Waller P, Shaw M, Ho D, Shakir S, Ebrahim S. Hospital admissions for 'drug-induced' disorders in England: a study using the Hospital Episodes Statistics (HES) database. British Journal of Clinical Pharmacology. 2005;59:213-219.

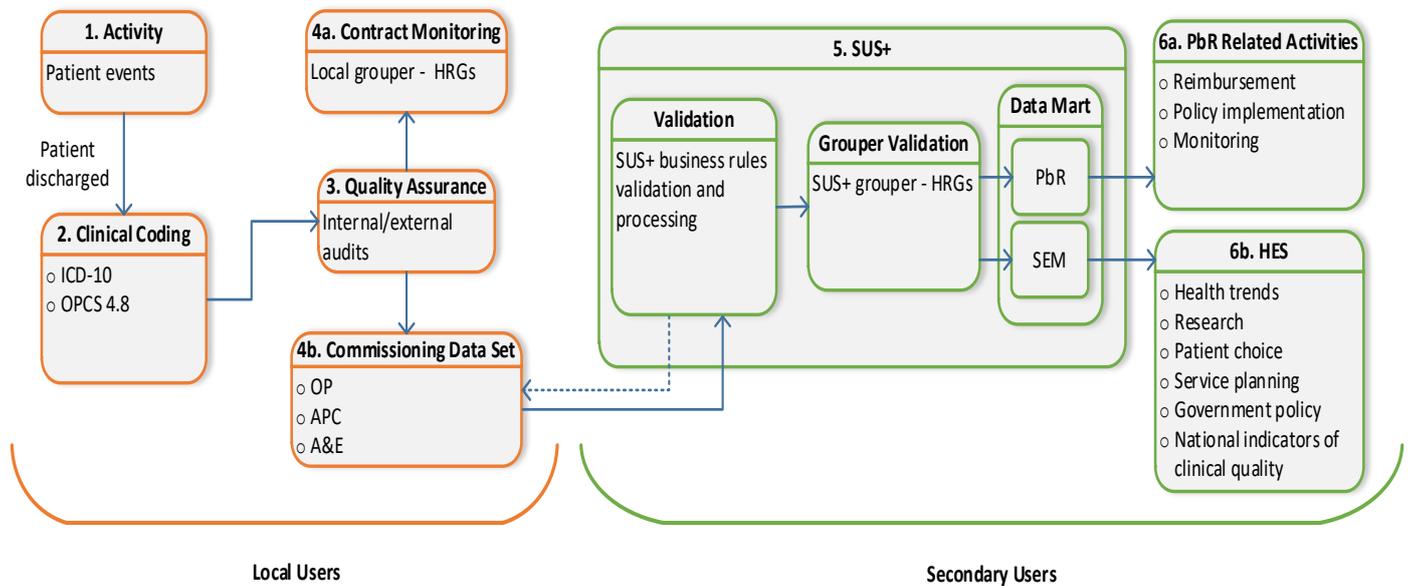https://doi.org/10.1111/j.1365-2125.2004.02236.x

9. Health and Social Care Information Centre. Hospital accident and emergency activity: support information, 2016-17. 2017 [accessed 26 Feb 2018]. Available from: https://digital.nhs.uk/media/33256/Hospital-Accident-and-Emergency-Activity-2016-17-Supporting-Information/default/acci-emer-atte-eng-2016-17-supp.

10. NHS England and Health and Social Care Information Centre. NHS hospital data and datasets: a consultation. 2013 [accessed 26 Feb 2018]. Available from: https://www.england.nhs.uk/wp-content/uploads/2013/07/hosp-data-consult.pdf.

11. Dr Foster Intelligence. Essential reading for smart spending: Dr Foster hospital guide 2013. 2013 [accessed 21 Mar 2018]. Available from: http://myhospitalguide.drfosterintelligence.co.uk/downloads/report/Report.pdf.

12. World Health Organization. International Statistical Classification of Diseases and Related Health Problems. 10th Revision. 5th ed. Geneva: WHO; 2016.

13. Clinical Classifications Service. National clinical coding standards ICD-10 5th Edition: accurate data for quality information. 2018 [accessed 22 Feb 2018]. Available from: https://hscic.kahootz.com/connect.ti/t_c_home/view?objectId=298579

14. Health and Social Care Information Centre. PbR data user guide. 2013 [accessed 26 Feb 2018]. Availabke from: http://content.digital.nhs.uk/media/12502/pbr-data-user-guide-v1/pdf/PbR_data_user_guide_v1.0.pdf.

15. Health and Social Care Information Centre. Information governance toolkit v14.0. [Accessed 01 Mar 2018]. Available from: https://www.igt.hscic.gov.uk/RequirementDocuments/IGT_Requirement_505_ACUTE_v14_0.pdf.

16. NHS Digital. SUS+ PbR reference manual: implementation of National Tariff/Payment by results (PbR) in the Secondary Uses Service v4.3. 2017 [accessed 01 Mar 2018]. Available from: http://content.digital.nhs.uk/media/25684/SUS-PbR-Reference-Manual-v43/pdf/SUS__PbR_Reference_Manual_v4.3.pdf.

17. Roberts L, Timmis J, Nagrecha R, Martinez-Alier N. Capturing causative agents in clinical coding. British Journal of Healthcare Management. 2016;22:461–468.

https://doi.org/10.12968/bjhc.2016.22.9.461

18. Clinical Classifications Service. National clinical coding standards OPCS-4: accurate data for quality information. 2018 [accessed 22 Feb 2018]. Available from: https://hscic.kahootz.com/gf2.ti/f/762498/33700805.1/PDF/-/NCCSOPCS420185.pdf.

19. IHRIM – National Clinical Coding Qualification. [Accessed]. Available from: http://www.ihrim.co.uk/index.php?option=com_content&view=article&id=109&Itemid=433.

20. General Medical Council. Good medical practice. 2013 [accessed 01 Mar 2018]. Available from: https://www.gmc-uk.org/static/documents/content/Good_medical_practice_-_English_1215.pdf.

21. NHS England. NHS standard contract 2017/18 and 2018/19: service conditions. 2016 [accessed 01 Mar 2018]. Available from: https://www.england.nhs.uk/wp-content/uploads/2018/01/2-nhs-standard-contract-1718-1819-service-conditions-full-length.pdf.

22. Burns E, Rigby E, Mamidanna R, Bottle A, Aylin P, Ziprin P et al. Systematic review of discharge coding accuracy. Journal of Public Health. 2012;34:138-148.

https://doi.org/10.1093/pubmed/fdr054

23. Zafirah S, Nur A, Puteh S, Aljunid S. Potential loss of revenue due to errors in clinical coding during the implementation of the Malaysia diagnosis related group (MY-DRG®) Casemix system in a teaching hospital in Malaysia. BMC Health Services Research. 2018;18:38.

https://doi.org/10.1186/s12913-018-2843-1.

24. Price E, Robinson K. The coding masterpiece: a framework for the formal pathways and processes of health classification. Health Information Management Journal. 2011;40:14-20.

https://doi.org/10.1177/183335831104000103.

25. Reid B, Ridoutt L, O'Connor P, Murphy D. Best practice in the management of clinical coding services: insights from a project in the Republic of Ireland, Part 2. Health Information Management Journal. 2017;46:105–112.

https://doi.org/10.1177/1833358317697470.

26. Roberts L, Cheung R. The aetiology of infections: the significance for hospital management. British Journal of Healthcare Management. 2017;23:271–280.

https://doi.org/10.12968/bjhc.2017.23.6.271.

27. UCL. Medicine MBBS BSc. [Accessed 01 Mar 2018]. Available from: http://www.ucl.ac.uk/prospective-students/undergraduate/degrees/medicine-mbbs-bsc/.

28. Nouraei S, Virk, J, Hudovsky A, Wathen C, Darzi A, Parsons D. Accuracy of clinician-clinical coder information handover following acute medical admissions: implication for using administrative datasets in clinical outcomes management. Journal of Public Health. 2016;38:352-362.

https://doi.org/10.1093/pubmed/fdv041.

29. Roberts, L. Clinical coding and external causes of injury: the importance of documentation. Journal of Plastic, Reconstructive and Aesthetic Surgery. 2016;69:1560–1561.

https://doi.org/10.1016/j.bjps.2016.08.027.

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30. Clinical Classifications Service. Coding clinic. 2017 [accessed 22 Feb 2018]. Available from: https://hscic.kahootz.com/connect.ti/t_c_home/view?objectId=298579.

31. Al-Hablani, B. The use of automated SNOMED CT clinical coding in clinical decision support systems for preventive care. Perspectives in Health Information Management. 2017;14.

PMid:28566995 PMCid:PMC5430114

Figures

Figure 1: The clinical coding pathway from admission to secondary user

Error	Owner	Potential solution(s)
Lack of specificity	Clinical staff	• Be as specific as possible when documenting diagnoses (e.g. link results, use multiple descriptors) and procedures (e.g. site, laterality, method of approach). • Liaise with coders to establish the descriptions required for accurate code assignment.
Use of abbreviations	Clinical staff	• Record diagnoses and procedures using the full ICD-10/OPCS 4 descriptions. • If an abbreviation must be used provide a reference key for clarification.
Omitted comorbidities	Clinical staff	• Record all comorbidities in all primary source documentation (e.g. clinic letters, discharge summaries). • Use service specific tick sheets to identify commonly missed comorbidities. • Engage in regular coding audits. • Develop and engage with new internal IT systems to promote comorbidity capture.
Unclear primary diagnoses or reason for admission	Clinical staff	• Record a patient's primary diagnosis clearly following any local pro forma standards. • If no definitive diagnosis can be made, record all of the patient's signs, symptoms or abnormal finding. • If there are no signs and symptoms, describe the reason for encounter (e.g. follow up after surgery or screening due to a family history of a condition).
Missing procedures/ interventions	Clinical staff	• Ensure that any procedures/interventions are fully described including those that may have been completed on the ward. • Record the dates procedures/interventions took place. • Engage in regular coding audits.
Ambiguous past medical history	Clinical staff	• Make a clear distinction between a condition that has been fully treated or resolved and one which is ongoing. • Follow local pro forma protocols.
Use of suboptimal language	Clinical staff	• Refrain from using terms such as "likely," "suggestive of" and "impression" that cannot be used for clinical coding. • Instead, use phrases such as "probable," "working diagnosis" and "treated as."

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Absent linkages between results and disease status	Clinical staff	• Link all results to a condition (e.g. microbiology, histology, radiology etc.). • If results are not available at the time of discharge, document that they are pending. • Review test results and amend the discharge documentation where appropriate. • Engage in regular coding audits.
Unclear timelines	Clinical staff	• Record date and times of ward/clinician transfers. • Record dates when procedures were performed or complications arose.
Lack of engagement	Clinical staff/ Coder	• Participate in audits and assurance exercises. • Encourage wider partaking in coding events and workshops.
Inappropriate code assignment	Coder	• Attend frequent training to refresh knowledge of the national standards. (13, 18) • Clarify any ambiguous clinical information with responsible clinicians.
Not keeping up to date with new coding standards	Coder	• Read and update classifications with the latest coding standards and coding clinics. (13, 18, 30)
Lack of experience	Coder	• Undertake coding for different specialties • Attend all refresher courses and training workshops (where relevant).

Table 1: Methods for reducing coding errors

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