CURRENT TOPIC

The new BPA classification

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The principle diagnostic classification in use throughout the world is the International Statistical Classification of Diseases and Health Related Problems (ICD), produced by the World Health Organisation (WHO). Recognising that earlier revisions of the ICD did not meet the requirements of paediatricians, the British Paediatric Association (BPA) produced a supplement to ICD. This combined more detailed subdivision of diagnostic categories of interest to paediatricians with the elimination of diagnoses not commonly encountered in children. It was first available in 1962, known initially as the 'Cardiff classification'. The most recent extensive revision was published in 1979.

In 1990, with a new revision of ICD in production (ICD-10), the International Paediatric Association requested that the BPA produce a paediatric adaptation of this. A project was, therefore, established to produce a new paediatric diagnostic classification for the 1990s and beyond.

Why a diagnostic classification is increasingly important

The advantages of a diagnostic classification have long been recognised. The Registrar General of England and Wales, Sir William Farr, said in 1856: *'statistics is eminently a science of classification and it is evident ... that any classification that brings together in groups, diseases that have considerable affinity ... is likely to facilitate the deduction of general principles'*.[1] He may be credited with considerable foresight in also writing: *'Several classifications may ... be used with advantage; and the physician, the pathologist, or the jurist, each from his own point of view, may legitimately classify the diseases and the causes of death in the way that he thinks best adapted to facilitate his inquiries'*. If we add to Farr's list of professionals the hospital contracts manager, public health specialist, and Office of Population Censuses and Surveys (OPCS) statistician, we can see why it is advantageous to maintain various systems for classifying in medicine.[2]

Diagnostic data collected today has diverse uses (table 1). The widespread use of information systems to collect epidemiological and statistical data relating to health provides the mechanisms for national and international surveillance of conditions, for the identification of trends in the prevalence of diseases, and for investigation into the causes of diseases.[3] Morbidity data are increasingly used in the formulation of health policies and programmes, in their monitoring and evaluation, and in the identification of at risk populations. The majority of uses of diagnostic information are in local, person based clinical information systems rather than remote national systems. Indeed data collected using BPA codes cannot presently be used for central returns of hospital activity. Currently, this information is collected by the OPCS and the final (fifth) digit is removed from BPA coded data so that all codes are in pure ICD format. Much paediatric specificity is lost in this way and it is hoped that this practice may change, especially as there is to be a new organisation responsible for this data collection and analysis.

A classification system is now essential in all health organisations. A BPA working party on services for children with learning disability specifically recommended 'that the BPA should continue to facilitate work on the development of suitable coding systems'.[4] Only by accurately recording our activity as clinicians can we have the necessary tools for clinical audit. In addition, an accurate and timely record of clinical activity is crucial to support management in the contracting process between healthcare providers and purchasers. It is said that coding now leads to income and that if the coding is inadequate, providers lose money.[5] Unfortunately, WHO admits that the ICD is not wholly suitable for 'billing or resource allocation'.[2] It is hoped that the new BPA classification will be better suited to this task.

Producing the new BPA classification

The production was overseen by a BPA project steering group. Funding was obtained from the Department of Health. Earlier classifications were reviewed (table 2). None of these met the requirements for a new paediatric classification but all provided many useful concepts for consideration.

Table 1 Potential uses and users of data derived from diagnostic information

Data users	*Data uses*
Central returns – for example OPCS, British Paediatric Surveillance Unit, Department of Health	Epidemiology, planning surveillance
Local – for example NHS trust, clinical directorate	Special needs registers, care plans, casemix/ HRGs*, audit, research
Individual – doctor or clinical team	Decision support/expert knowledge systems

*Healthcare resource groups.

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Table 2 Source materials for the new BPA classification

- Old BPA classification
- ICD-9
- Read clinical classification version 2
- Eurocat (for congenital anomalies)
- McKusick catalogue (for genetic conditions)
- ICD-10
- Individual specialty classifications devised or revised for this project with the paediatric specialty groups allied to the BPA

Links were established with nominated experts from each specialty group affiliated to the BPA and other groups involved in the classification and collection of data such as OPCS, WHO, and groups in Europe and North America. The diagnostic concepts from these sources were combined and refined to produce a classification for each specialty that was acceptable to each specialty group.

The classification is available in two versions: (i) in electronic format on floppy disk and (ii) on paper. Electronic 'books' have several advantages, they can be more rapidly and economically published and distributed and more easily updated and reissued. Searching for terms electronically is usually much quicker than leafing through a paper book.

The NHS Information Management Group has agreed to fund a project to produce an alphabetical index and this should be available in 1996. In electronic format, the classification may be used without an index using a text or number string searching capability.

Advantages of the new BPA classification

The new BPA classification has several advantages over other classifications:

(1) It allows, where desired, for the more specific coding of diagnoses by providing a further level of subdivision below that found in ICD-10. This enables many more diagnostic terms to be given a unique identifying code. This facilitates the later retrieval of more specific information from coded data. For example, ICD-10 often groups together many varied conditions under one code. If a paediatrician wants to be able to separately identify such conditions in his information system, a separate code is needed for each condition. ICD-10 has a heading of *Other specified metabolic disorders* (E88.8). The new BPA classification has 27 subdivisions of this heading for various metabolic conditions. Data on none of these conditions would be separately retrievable using ICD-10 as a system of classification.

Similarly, in ICD-10 all the syndromes in group A below are assigned to Q87.0: *Congenital malformation syndromes predominantly affecting facial appearance.*

Group A
- Acrocephalopolysyndactyly
- Acrocephalosyndactyly
- Cryptophthalmos syndrome
- Cyclopia
- Goldenhar
- Moebius
- Orofacial-digital
- Robin
- Treacher-Collins
- Whistling face

However, the syndromes in group B, below, are assigned to Q87.1: *Congenital malformation syndromes predominantly associated with short stature.*

Group B
- Aarskog
- Cockayne
- De Lange
- Dubowitz
- Noonan
- Prader-Willi
- Robinow-Silverman-Smith
- Russell-Silver
- Seckel
- Smith-Lemli-Opitz

Many children with diagnoses in group A will have short stature and many in group B will have abnormal facial appearance. Such groupings are fairly meaningless and it will often be more helpful to identify the specific syndrome than the very non-specific ICD-10 grouping. The new BPA classification incorporates most of these syndromes with a specific fifth character extension.

(2) Sometimes ICD-10 places conditions in categories that would be considered inappropriate with today's understanding of the underlying pathophysiology. For example, ICD-10 classifies Zellweger's syndrome to: Q87.8: *Other specified congenital malformation syndromes, not elsewhere classified.* We now know that Zellweger's syndrome is the prototypal peroxisomal disorder and would be better allocated to the section on metabolic abnormalities in a different chapter at E88.8. In the new BPA classification a pointer to the place where the item is found (Q87.83) has been placed at the point where the user might expect to find it (E88.8). A note also appears at the place where it has been placed (Q87.83) to state that related disorders can be found in another section (E88.8). It is likely that WHO will take note of the changes in the new BPA classification and introduce some of them into ICD-11.

(3) For some topics the definitions or words used in ICD-10 are not those preferred by paediatricians. An example is found in the ICD classification of malnutrition that is divided into the following categories:

E40	Kwashiorkor
E41	Nutritional marasmus
E42	Marasmic kwashiorkor
E43	Unspecified severe protein energy malnutrition
E44	Protein energy malnutrition of moderate and mild degree
E44.0	Moderate protein energy malnutrition
E44.1	Mild protein energy malnutrition
E45	Retarded development following protein energy malnutrition
E46	Unspecified protein energy malnutrition

The BPA Standing Committee on Nutrition recommends describing malnutrition purely in terms of its effect on height and weight using the following terms:

E43.X0	Severe nutritional wasting: <70% weight for height
E44.00	Moderate nutritional wasting: 70–80% weight for height

E44.10 Mild nutritional wasting: 80–90% weight for height
E45.X0 Severe nutritional stunting: <85% height for age
E45.X1 Moderate nutritional stunting: 85–89% height for age
E45.X2 Mild nutritional stunting: 90–95% height for age

The ICD terms are excluded from the new BPA classification and the preferred terms have been accommodated by creating subdivisions of the original ICD-10 codes.

(4) In some controversial areas the new BPA classification differs substantially from ICD-10, for example perinatal asphyxia. The words used to describe such events can have long lasting medicolegal consequences. When an asphyxiated infant is born, it is often unclear when the asphyxiation occurred. ICD-10 provides code P20 and its subdivisions for intrauterine hypoxia or asphyxia first noted before or during labour and code P21 and its subdivisions for birth asphyxia. There is no provision for labelling the infant born unexpectedly in poor condition where the onset of the problem is unknown. In the new BPA classification two codes have been added to describe the *infant in poor or very poor condition at birth, without known asphyxia.*

Thus, terms have been provided that do not imply causation where the cause is not known with absolute certainty. If these new terms are used, it will not be possible to infer from the diagnostic label the mechanism by which an infant may have suffered damage and thus lay blame for the outcome on any one involved in the process of parturition.

What the new classification cannot do

Despite its advantages over other classifications, there are some things that this new paediatric classification cannot do.

Definitions are not provided. Some terms are precise in their meaning, for example, *Infant of birth weight 500–749 g* (P07.01). However, *Reactive thrombocytosis* (D75.81) is a useful term to describe a common clinical occurrence but is not defined. Attempts to define every term in this classification would require huge resources. When every definition was agreed (if that were ever possible) the classification would be out of date.

Secondly, although this classification is designed for use internationally, it has been developed by clinicians in the UK. There are some sections, therefore, which have been developed more than others. Tropical medicine experts, for example, may like to see more subdivision of the chapter on infectious diseases. It is planned that there will be regular updates to the classification to consider such developments.

Finally, the new BPA classification does not provide for the coding of procedures or operations.

Relationship of the new BPA classification to 'Read codes'

It is important to realise the complementary nature of ICD based specialty classifications such as this and the Read clinical classification. Developers of information systems and those responsible for implementing them in the healthcare environment do not have to choose between one and the other. The two coding systems perform different functions and can both be used within the same information management system. The NHS Executive has confirmed that both Read and ICD-10 are essential within the national information management and technology strategy.

ICD-10 and related classifications are primarily useful for statistical and epidemiological purposes. Within the hospital system, diagnostic data in this format are required for the contract minimum dataset and for hospital episode summaries. The Read clinical classification can perform this latter function through its mapping to ICD-10. However, the Read terms are also being developed to the stage where they will form a complete thesaurus of clinical terms and will enable the construction of the electronic patient record. A further diagnostic coding system is used for healthcare resource groups (HRGs). The three coding systems can be seen as a continuum with Read being used for 'terming', ICD or the BPA classification being used for 'encoding', and HRGs for 'grouping'. It is possible that BPA codes will be used by the National Casemix Office for their grouping purposes to create HRGs.

Similar terms to those in the new BPA classification will appear in the Read codes. The new BPA classification has formed a major component of the paediatric input to the 'clinical terms project'.[6] This was a national project to develop the latest version of the Read terms (version 3.1). The National Health Service Centre for Coding and Classification (the branch of the NHS Executive Information Management Group responsible for developing the Read codes), is committed to including all concepts from the new BPA classification into the Read codes and to include cross references from Read to BPA codes.

Did we really need a new classification and would ICD-10 have been good enough without adaptation?

Two exercises were carried out using diagnostic terms used by clinicians. These terms were related to the closest match in each of three classifications: (i) the old BPA classification, based on ICD-9 (in use in England and Wales until April 1995), (ii) ICD-10 (in use since April 1995), and (iii) the new BPA classification. The ease with which clinical terms could be identified in the three classifications was assessed. The aim was to test the functionality of the new classification for a subspecialty within child health and for general paediatrics.

FIRST COMPARISON

The first set of terms were the diagnoses recorded on a ward based database for all new referrals to a specialist regional paediatric

Table 3 Difficult matches

Original clinical term	Best matches in ... Old BPA	ICD-10 without morphology code	New BPA
Wilms' tumour	Malignant neoplasm of kidney parenchyma	Malignant neoplasm of the kidney, except renal pelvis*	Wilms' tumour (nephroblastoma)
Renal cell carcinoma			Renal cell carcinoma
Beckwith-Wiedemann syndrome	Congenital malformation syndrome with metabolic disturbance	Congenital malformation syndromes involving early overgrowth	Beckwith-Wiedemann syndrome
Accidental overdose – Calpol	Poisoning by aromatic analgesics	Poisoning by 4-aminophenol derivatives	Paracetamol poisoning
Premature 35 weeks	Other preterm infants	Other preterm infants	An infant of 32 to 37 weeks
Niemann-Pick disease type C	Lipidoses	Other sphingolipidosis	Other Niemann-Pick's disease (type C, type D)

*It should be noted that if a separate morphology code is also used the two types of renal neoplasm can be separately distinguished in ICD-10.

oncology centre during 1994 (Southampton General Hospital). There were 64 children with 31 different diagnostic terms used. Only one diagnosis was recorded for each child. The diagnoses had previously been gleaned from data collection sheets completed by senior paediatric medical staff. The terms had not been chosen with the process of clinical coding in mind.

Some terms from both the oncology and general paediatric group were particularly difficult to match and examples of these are shown in table 3.

Table 4 shows the degree to which clinical terms in the oncology database could be matched with available terms in the different classifications. Using the old BPA classification for 11 (35%) terms there was specific mention in the index but once the terms were coded specificity was lost and it would be impossible to retrieve the original terms from coded data.

Using the index to ICD-10, it was possible to specifically identify a further 12 terms. However, these terms could again not be retrieved from coded data unless both the principal ICD-10 code and the ICD for Oncology (ICD-O) morphology code were recorded.

Using the new BPA classification there were six terms (19%) for which there was a reasonably close match but for which ICD-10 could potentially provide better specificity if ICD-O morphology codes were also recorded separately.

Overall both ICD-10 and the new BPA classification represent considerable improvements over the old BPA classification (and, therefore, ICD-9). The two new classifications have different advantages. If a system is used that can accommodate both the code for the ICD-10 principal term and a separate morphology code for each diagnosis then ICD-10 can usefully provide a match for 27 of the 31 terms (87%) used for this test. The new BPA classification does not allow for separate morphology coding (although they are often given within the classification), and only gave a close *and* specific match for 22 of the 31 terms (71%). However, if a system is being used that can only accommodate one code for each diagnostic term (which is commonly the case), ICD-10 could only provide a match for 15 (58%) of the terms, whereas the new BPA classification could match 22 (71%). For other paediatric specialties where ICD-10 does not provide an alternative morphology code, it is likely that the advantages of the BPA classification over ICD-10 would be even greater.

Table 4 Type of match for each term from the oncology database using each classification

Degree of match	Old BPA	ICD-10	New BPA
Easily found, excellent match	7	9	22
Easily found, close match	4	6	0
Indexed to non-specific term	11	2	0
No close match even in index	8	1	2
Indexed with specific morphology code but not in tabular list of terms	0	12	0
Close match but not as specific as ICD-10 using morphology codes	0		6
Imprecise clinical term	1	1	1
Total	31	31	31

Table 5 Type of match for each term from the general paediatric discharge forms using each classification

Degree of match	Old BPA	ICD-10	New BPA
Easily found, excellent match	28	34	49
Easily found, close match	15	19	14
Indexed to non-specific term	5	7	0
No close match even in index	6	0	0
Poor match	11	5	2
Total	65	65	65

SECOND COMPARISON

For the second comparison, diagnostic data from the paediatric department of a district general hospital (Borders General Hospital, Melrose) were used. The diagnoses (often more than one for each child) were recorded by the junior medical staff at the time of discharge. Although it was known that the terms would be used for clinical coding, the terms were not chosen from any diagnostic classification. These diagnoses were checked by a consultant paediatrician before the forms were sent to the clinical coding department. These forms were retrieved and an attempt was made to match the terms in the same manner as for the oncology terms.

Table 5 shows the degree to which the terms on the discharge form could be matched with available terms in the classifications being studied.

For five (8%) diagnoses in the old BPA classification an appropriate term could be found in the index but the reference was to a non-specific term and, therefore, coded data again could not be used to specifically identify the condition. The same applied to seven (11%) terms using ICD-10.

Again both ICD-10 and the new BPA classification were significantly better than the

old ICD-9 based BPA classification. For this group of patients it was also much more likely that a given diagnosis would be matchable to a specific term in the new classification than in ICD-10. The new BPA classification often gave more synonyms or abbreviations than was available in ICD-10.

Conclusions

The new BPA classification is a significant improvement over previous classifications for child health. By generating better diagnostic information, its use should enable an improved delivery of care for children. It is strongly recommended that paediatricians ensure that the information systems' procurer for their employer is aware of the importance of the new BPA classification to clinicians and managers. They can then ensure that systems are implemented that can make use of the new BPA classification.

In due course it is hoped that any system that makes use of the latest version of the Read codes will also have access to all the new paediatric terms found in the new BPA classification. However, such systems are not yet available and not all provider units, especially internationally, will use Read codes. Even if they do, clinicians may still find it helpful to browse through a purely paediatric classification whether on paper or on disk.

If paediatricians are to make best use of coded diagnostic data it is essential that we now address the next step in the process of generating this. So far we have produced good new diagnostic classifications for *terming* and for *coding*. We now need to examine the process by which we collect diagnostic data using these tools. Many models have been developed or suggested for this, all of which require closer involvement of the clinician. We do not wish to end up with systems that allow much more specific but equally inaccurate data. Only when we have addressed this difficult area will we be able to have sufficient faith in diagnostic data to use them in a scientific manner to improve the welfare of children.

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The new BPA classification.

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*Arch Dis Child*1995 73: 563-567
doi: 10.1136/adc.73.6.563

Notes