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PROPERTIES AND UNITS FOR TRANSFUSION MEDICINE AND IMMUNOHAEMATOLOGY (Technical report) (IFCC-IUPAC 2003)

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Synopsis

This document is part of an ongoing effort to standardize transmission of laboratory data across cultural and linguistic domains, without attempting to standardize the routine language used by clinicians and laboratory practitioners.

It comprises a general introduction, and an alphabetic list of properties. The list is based on the syntax for properties recommended by the International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) and the International Union of Pure and Applied Chemistry (IUPAC) [1]. The nomenclature is primarily from the Working Party on Terminology of the International Society of Blood Transfusion (ISBT) [2-5].

General introduction

The purpose of this document is to create a systematic terminology, that can be used as the basis for encoding laboratory messages in the domain of transfusion medicine and immunohaematology. The systematic terms and unique codes for properties recommended for scientific communication and in requests and reports are primarily for the purpose of unambiguous data exchange. Their use by clinicians or laboratory practitioners is optional but encouraged.

Syntax and definitions

syntax : System(specification)—Component(specification); kind-of-property(specification) = (x).(x) [1].

EXAMPLES: NPU21943 Neutrophilocytes(Blood)—Immunoglobulin A; arbitrary entitic number(procedure) = ? arbitrary unit

NPU01945 Erythrocytes(Blood)—Erythrocyte antigen; taxon(AB0; RhD; procedure) = ?

system: demarcated arrangement of a set of elements and a set of relationships between these elements [6]

EXAMPLE: a portion of blood, a portion of plasma, a portion of erythrocytes.

component: definable part of a system [6]

EXAMPLE: Erythrocyte A antibody as part of a plasma sample.

kind of property: attribute of phenomena, bodies or substances that may be distinguished qualitatively[6]

NOTE 1 - In ENV 1614 the term property (in a general sense) is used as synonym for kind-of-property[6].

NOTE 2 - A kind of property may be qualified by each user to nominal scale, ordinal scale, difference scale or ratio scale. The last three types of kind-of-property are also called kind-of-quantity.

compatibility : mutual tolerance

NOTE 1 - There is presently no officially approved definition. The definition for this kind-of-property is for use in this document only.

EXAMPLE: NPU21410 Plasma B-lymphocyte antibody; compatibility(donationID; absent present) = ?

nominal scale: scale with a set of possible values for a given kind-of-property that are each a word or symbol without any relation to magnitude [1]

EXAMPLE: taxon of erythrocyte antigen in a sample of blood identified as BARC; Cra.

NOTE - The values may be listed in any order according to practical considerations and convention.

ordinal scale: scale with an ordered set of possible values for a given kind-of-quantity that are each a word or symbol used for ranking according to magnitude, but where differences or ratios between values have no arithmetic meaning [1]

EXAMPLE: arbitrary number of Immunoglobulin M molecules(median) per erythrocyte in a sample of blood found as “0” or “1”; or “absent” or “present”; or “negative” or “positive”.

ratio scale: scale of measurement with an ordered set of values for a given kind of measurable quantity that are each a product of numerical value and unit of measurement such that a given ratio between values corresponds to the ratio between magnitudes of the measurable quantities along the scale [1]

EXAMPLE: entitic number of immunoglobulin A molecules(median) per thrombocyte in a sample of thrombocytes.

list of related properties: some requests elicit a series of related properties that may be grouped under a common heading in a report. The heading is for requesting and the list of properties presented is for selection by the individual laboratory

EXAMPLE: NPU21970 P—HNA antibody(IgM); arb.c.(list; 0 1)

NPU21971 P—HNA-1a antibody(IgM); arb.c. = 0

NPU21972 P—HNA-1b antibody(IgM); arb.c. = 0

NPU21973 P—HNA-1c antibody(IgM); arb.c. = 0

NPU21974 P—HNA-2a antibody(IgM); arb.c. = 1

NPU21975 P—HNA-3a antibody(IgM); arb.c. = 0

NPU21976 P—HNA-4a antibody(IgM); arb.c. = 0

NPU21977 P—HNA-5a antibody(IgM); arb.c. = 0

Alternatively the request and report in these cases may be reduced to a single entry using the kind-of-property taxon and nominal results if the actual list of properties looked for in the procedure is part of the general information from the laboratory.

EXAMPLE: NPU21924 P—HNA antibody(IgM); taxon = HNA-2a

designation of property: set of data elements comprising information on system, component and kind-of-property and their adherent specifications.

NOTE 1 - There is presently no officially approved definition. This definition is for use in this document only.

NOTE 2 - Information about identification of system, time and result is not considered in the entries of this document.

EXAMPLE: Lymphocytes(Blood)—B-lymphocytes(immature); number fraction.

International Coding Scheme Identifier, ICSI: identifier assigned to uniquely identify a registered coding scheme for use in information interchange [7]

EXAMPLE: “NPU” for codes allocated by the C-NPU of the IFCC-IUPAC.

code value : result of applying a coding scheme to an element in a coded set [7]

EXAMPLE of number and term: 21406 for Blood—Crossmatch(electronic); expiry(date and hour; procedure)".

Systematic Request and Report of Clinical Laboratory Results

The parts comprised in the concept of 'term of property' and in the concept of 'term of a result' are presented in table 1.

By convention, properties and results of examinations are connected through an operator.

- Parts 1 and 2 are Essential for a request; that is information on patient identification, time or time interval for sampling, and information on the property requested.
- The laboratory report on a particular property comprises the three parts 1, 2 and 3.
- To each element in part 2 may be added a specification as a parenthetic suffix for clarification and to avoid ambiguity.
- Note(s) (part 4) relating to, for example, diagnosis, medication, haemolysis or hardware breakdown are not included, except when needed for the interpretation of results such as pretreatment of patient or subject.
- Thus the elements of a term for a type of property comprise: System(specification)—Component(specification); kind-of-property(specification in the form of procedural details).
- This is as recommended by IFCC and IUPAC [1] and by the European standard ENV 1614:1995 [6].
- EXAMPLE: Erythrocytes(Blood)— Erythrocyte antigen; taxon(AB0; RhD; procedure).
- The elements of a result comprise: an operator (= < ? > ? etc.), a numerical value and any unit or name, usually in symbolic form. This is as recommended by the European standard ENV 12435:1996 [8].
- Nominal and ordinal scale values carry no unit. In difference and ratio scales the unit must never be omitted in reporting results, except for the unit 1.
- It is further recommended that the result includes or refers to a value for a measure of uncertainty [8].
- The names of components are primarily from the Working Party of the International Society of Blood Transfusion [2, 3, 4, 5].
- In addition to the systematic term of the property, an example is given in abbreviated format..

For details, see IUPAC–IFCC (Recommendations 1995). Syntax and semantic rules [9].

Elements of an Entry

The terms recommended are given in bold, that is: the systematic term for the type of property, the unit and the code value.

1 Name of system and parenthetic specification spelled out in full, and followed by a long dash (em dash)

2 Alphanumeric chemical prefixes to component name

3 Recommended name of component and parenthetic specification Shifted to the left for alphabetical sorting and searching, and followed by a semicolon

4 Kind-of-property and parenthetic specification

5 Unit

6 Molar mass (M) for conversion from other units

7 Presently recommended calibrator

8 Previous calibrator(s)

9 Other term(s)

10 Authority: Code value for the international organisation recommending the name of the component or the combined elements of an entry

11 Note with any further information

12 [NPUXXXXX]. Code value, intended for interlaboratory transmission between databases

13 Example in abbreviated form

The term "arbitrary" in principle cannot be related to a volume. In clinical chemistry, however, a less well defined "in-house" or a regional calibrator is often referred to and is expressed in "arbitrary unit per litre" in order to enable comparison of patient data over time and regionally. In each of these instances further information should be given in the parenthesis "procedure"

In the examples given, a question mark, "?", has been used to represent the value of a result for properties including quantities.

EXAMPLE

1 Erythrocytes(Blood)—

2 none

3 Complement + Immunoglobulin;

4 arbitrary entitic number(procedure)

5 arbitrary unit

6 none

7 none

8 none

9 Other term(s): Coombs test

10 none

11 none

12 NPU20001

13. Ercs(B)—Complement + Immunoglobulin; arb.entitic num. = ? arb.unit

References

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5 The Anthony Nolan Trust. HLA Informatics Group. 19 July 2002 http://www.anthonynolan.org.uk/HIG/nomenc.html

6 CEN/TC 251,1995. European Prestandard ENV 1614. Medical informatics. Structure for nomenclature, classification and coding of properties in clinical laboratory sciences

7 International Organization for Standardization. International Standard ISO/IEC7826-1:1994 Information technology – General structure for the interchange of code values – Part 1: Identification of coding schemes

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9 Syntax and semantic rules. Prepared for publication by H Olesen. Pure Appl. Chem. 1995; 67: 1563-74; Eur. J. Clin. Chem. Clin. Biochem. 1995; 33: 627-36; Clin. Chim. Acta 1996; 245: S5-S21.

Index of Abbreviations

C-NPU Commission on Nomenclature, Properties and Units

IFCC International Federation of Clinical Chemistry and Laboratory Medicine

ISBT International Society of Blood Transfusion

IUPAC International Union of Pure and Applied Chemistry

--> Full List of Terms Here <--