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IMPLEMENTATION GUIDE

US Guidance on Printing Text Associated with Red Cell Antigens

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1 Introduction

1.1 Purpose

The purpose of this document is to provide guidance for the printing of text and the coding of Red Blood Cell antigen test results on the affixed blood label.

1.2 Scope

This document provides a recommended hierarchy for the order in which Red Cell antigen test results appear on the label. Recommendations are also made for the specific font styles to use in order to differentiate between upper case and lower case letters when the difference between the two is based only on size.

This guidance document applies to US facilities but this does not preclude its use in other countries.

1.3 Intended Audience

The intended audience of this document is blood transfusion facility staff (management, information technology, quality, validation, and laboratory), and software developers, and label/software vendors.

1.4 Normative Reference

ISBT 128 Standard Technical Specification (ST-001)
ISBT 128 Standard Labeling of Blood Components (ST-005)

1.5 Other Reference

Use of Red Cell Antigens with Test History Data Structure [030] (IG-027)
Use of Data Matrix Symbols with ISBT 128 (IG-014)

1.6 Background

The Americas Technical Advisory Group (ATAG) recognized three issues that needed to be resolved:

1. The order in which RBC antigens appeared on a label was not standardized requiring hospital end users to search for test results in different formats.
2. If only one antigen was printed, it was difficult to differentiate antigens where the only difference was relative size. Specifically, it was difficult to differentiate C and c, S and s, and K and k.
3. In some situations, red cell antigen test results were being printed in a font too small to read easily.

A subcommittee was formed to address these issues. It was soon discovered that a MAK users group had already addressed the first of these issues by creating a hierarchy

defining the order of the antigen results on the label. Their solution, based on a 5-category hierarchy, was adopted by ATAG and is described in Chapter 2 of this document.

The second issue, differentiating between antigens that are similar in appearance, was resolved with the assistance of vendors with expertise in label printing. Their recommendation is found in section 3.4.

For the third issue, the group recommended a font size be 7 or greater.

The group addressed a few other issues (e.g., which results to print and the use of separators), but did not recommend standardization in these areas. The final recommendation of the group was to use electronically readable results.

2 Order of Antigens

The order in which Red Cell antigen test results are printed may follow the recommendations of this document. The hierarchy of test results is based on high-incidence negatives, then common antigens, followed by common low incidence antigens, then miscellaneous antigens, and lastly the rest of low incidence antigens.

When multiple antigens within the same priority are printed, they should be printed in the order in which they are listed within the tables below.

The International Society of Blood Transfusion has assigned a code to each of the antigens it recognizes. The codes are maintained by their Working Party on Red Cell Immunogenetics and Blood Group Terminology. The reference tables are available at:

<http://www.isbtweb.org/working-parties/red-cell-immunogenetics-and-blood-group-terminology/blood-group-terminology/>

2.1 High Incidence Negatives

High incidence antigens with negative results should receive a first priority position on the label and are listed in Table 1 below.

Table 1 List of High Incidence Antigens

| ISBT Code | Antigen Name | Also Known As |
|-----------|--------------|---------------------------------------|
| 002005 | U | MNS5 |
| 002028 | MNS28 | En ^a |
| 002029 | MNS29 | En ^a KT |
| 002030 | MNS30 | 'N', GPB ^N |
| 002039 | MNS39 | ENEP |
| 002040 | MNS40 | ENEH |
| 002042 | MNS42 | ENAV, Avis |
| 002044 | MNS44 | ENDA |
| 002045 | MNS45 | ENEV |
| 003003 | Pk | P1PK1, P ^k |
| 004017 | RH17 | Hr ₀ |
| 004018 | RH18 | Hr, Hr ^s , Shabalala |
| 004019 | RH19 | hr ^s , Shabalala |
| 004029 | RH29 | Total Rh |
| 004031 | RH31 | Bastiaan, hr ^B |
| 004034 | RH34 | Hr ^B , Bas, Baas, Bastiaan |
| 004039 | RH39 | C-like |
| 004044 | RH44 | Nou |
| 004046 | RH46 | Sec |

| ISBT Code | Antigen Name | Also Known As |
|-----------|--------------|--|
| 004047 | RH47 | Dav |
| 004051 | RH51 | MAR |
| 004057 | RH57 | CEST |
| 004058 | RH58 | CELO |
| 004059 | RH59 | CEAG |
| 004061 | RH61 | CEVF |
| 005002 | Lub | Lu ^b , LU2 |
| 005003 | LU3 | Lu ^{ab} , Lu ^a Lu ^b |
| 005004 | LU4 | Barnes |
| 005005 | LU5 | Beal, Fox |
| 005006 | LU6 | Jan, Jankowski |
| 005007 | LU7 | Gary |
| 005008 | LU8 | Taylor, MT |
| 005011 | LU11 | Reynolds |
| 005012 | LU12 | Muchowski, Much |
| 005013 | LU13 | Hughes |
| 005016 | LU16 | |
| 005017 | LU17 | Delcol |
| 005020 | LU20 | |
| 005021 | LU21 | |
| 005023 | LU23 | LUIT |
| 006002 | k | k, Cellano, KEL2 |
| 006004 | Kpb | Kp ^b , Rautenberg, KEL4 |
| 006005 | Ku | Ku, KEL5, Peltz, K ₀ |
| 006007 | Jsb | Js ^b , Matthews |
| 006011 | K11 | Cote |
| 006012 | K12 | Boc, Bockman, Spears |
| 006013 | K13 | SGRO |
| 006014 | K14 | San, Santini, Dp |
| 006016 | K16 | Weak k, k-like |
| 006018 | K18 | V.M., Marshall |
| 006019 | K19 | Sub, Sublett |
| 006020 | K20 | Km |
| 006022 | K22 | N.I., Ikar |
| 006026 | K26 | TOU |
| 006027 | K27 | RAZ |
| 006029 | K29 | KALT |
| 006030 | K30 | KTIM |
| 006032 | K32 | KUCI |
| 006033 | K33 | KANT |
| 006034 | K34 | KASH |
| 006036 | K36 | KETI |
| 006037 | K37 | KHUL |

| ISBT Code | Antigen Name | Also Known As |
|-----------|--------------|--|
| 006038 | K38 | KYOR |
| 008003 | FY3 | Fy ^{ab} , Fy ^a Fy ^b |
| 008005 | FY5 | |
| 008006 | FY6 | |
| 009003 | JK3 | Jk ^{ab} , Jk ^a Jk ^b |
| 010002 | Dib | Di ^b , Luebano |
| 010004 | Wrb | Wr ^b , Fritz, DI4 |
| 011001 | Yta | Yt ^a , YT1 |
| 012002 | XG2 | CD99, MIC2, E2 |
| 013001 | SC1 | Sc1, Sm |
| 013003 | SC3 | |
| 013005 | SC5 | STAR |
| 013006 | SC6 | SCER |
| 013007 | SC7 | SCAN |
| 014003 | Gya | Gy ^a , Gregory, DO3 |
| 014004 | Hy | Hy, Holley, DO4 |
| 014005 | Joa | Jo ^a , Joseph, DO5 |
| 014006 | DO6 | DOYA |
| 014008 | DO8 | DOLG |
| 015001 | Coa | Co ^a , CO1 |
| 015003 | CO3 | Co ^{ab} |
| 016005 | LWa | Lw ^a , LW5, LW |
| 016006 | LWab | Lw ^{ab} , LW6, Bigelow |
| 017001 | Ch | Ch ^a , Chido, CH/RG1 |
| 017002 | CH2 | Ch2, CH/RG2 |
| 017003 | CH3 | Ch3, CH/RG3 |
| 017004 | CH4 | Ch4, CH/RG4 |
| 017005 | CH5 | Ch5, CH/RG5 |
| 017006 | CH6 | Ch6, CH/RG6 |
| 017011 | Rg | Rg1, Rodgers, Rg ^a , CH/RG11 |
| 017012 | CH12 | Rg2, CH/RG12 |
| 018001 | H | H1 |
| 019001 | Kx | Kx, XK1 |
| 020002 | GE2 | |
| 020003 | GE3 | |
| 020004 | GE4 | |
| 021001 | Cra | Cr ^a , Go ^b , CROM1 |
| 021002 | Tca | Tc ^a , CROM2 |
| 021005 | Dra | CROM5, Dr ^a |
| 021006 | Esa | CROM6, Es ^a |
| 021007 | IFC | CROM7, IFC |
| 021009 | WESb | CROM9, WES ^b |

| ISBT Code | Antigen Name | Also Known As |
|------------------|---------------------|---|
| 021010 | UMC | CROM10, UMC |
| 021011 | GUTI | CROM11 GUTI |
| 021012 | SERF | CROM12 |
| 021013 | ZENA | CROM13 |
| 021014 | CROV | CROM14 |
| 021015 | CRAM | CROM15 |
| 021017 | CRUE | CROM17 |
| 021018 | CRAG | CROM18 |
| 022001 | Kna | Kn ^a , KN1, COST4 |
| 022003 | McCa | McC ^a , KN3, COST6 |
| 022004 | Sla | Sl ^a , COST7, McC ^c , KN4 |
| 022005 | Yka | Yk ^a , KN5, COST3 |
| 022008 | KN8 | S13 |
| 022009 | KN9 | KCAM |
| 023002 | Inb | In ^b , IN2 |
| 023003 | IN3 | INFI |
| 023004 | IN4 | INJA |
| 024001 | Oka | OK ^a , OK1 |
| 025001 | MER2 | RAPH, Raf |
| 026001 | JMH | John Milton Hagen |
| 027001 | I | I1 |
| 028001 | GLOB1 | P |
| 028002 | GLOB2 | PX2 |
| 029001 | GIL1 | GIL |
| 030001 | Duclos | RHAG1 |
| 032001 | Jra | Jr ^a , Junior |
| 033001 | Lan | Lan, Langereis |
| 034001 | Vel | Vel, Ve ^a |
| 205001 | Csa | Cs ^a , COST1 |
| 207002 | i | I, I2 |
| 208001 | Era | Er ^a , ER1 |
| 209003 | LKE | Luke |
| 901003 | Ata | At ^a , August |
| 901008 | EMM | |
| 901009 | AnWj | Wj, Anton |
| 901012 | Sda | Sd ^a , Sid |
| 901014 | PEL | Pelletier |
| 901015 | ABTI | ABTI |
| 901016 | MAM | |

2.2 Common Antigens

Common antigens should receive a second priority position on the label and are listed in Table 2 below.

Table 2 List of Common Antigens

| ISBT Code | Antigen Name | Also Known As |
|-----------|--------------|-----------------------|
| 001004 | A1 | |
| 002001 | M | MNS1 |
| 002002 | N | MNS2 |
| 002003 | S | MNS3 |
| 002004 | s | MNS4 |
| 003001 | P1 | |
| 004002 | C | RH2 |
| 004003 | E | RH3 |
| 004004 | c | RH4 |
| 004005 | e | RH5 |
| 006001 | K | Kell, KEL1, Kelleher |
| 007001 | Lea | Le ^a , LE1 |
| 007002 | Leb | Le ^b , LE2 |
| 008001 | Fya | Fy ^a , FY1 |
| 008002 | Fyb | Fy ^b , FY2 |
| 009001 | Jka | Jk ^a , JK1 |
| 009002 | Jkb | Jk ^b , JK2 |

2.3 Common Low Incidence Antigens

Common low incidence antigens should receive a third priority position on the label and are listed in Table 3 below.

Table 3 List of Common Low Incidence Antigens

| ISBT Code | Antigen Name | Also Known As |
|-----------|--------------|---|
| 002006 | He | He, Henshaw, MNS6 |
| 002007 | Mia | Mi ^a , Miltenberger, MNS7 |
| 002009 | Vw | Verweyst, Mi.I, MNS9 |
| 004008 | Cw | C ^w , RH8 |
| 004010 | V | ce ^s , hr ^v , RH10 |
| 004020 | VS | e ^s , RH20 |
| 004030 | Goa | Go ^a , Gonzales, D ^{Cor} , RH30 |
| 005001 | Lua | Lu ^a , LU1 |
| 006003 | Kpa | Kp ^a , Penney, KEL3 |
| 006006 | Jsa | Js ^a , Sutter |
| 010003 | Wra | Wr ^a , Wright, DI3 |
| 011002 | Ytb | Yt ^b , YT2 |
| 013002 | SC2 | Sc2, Bu ^a |
| 015002 | Cob | Co ^b , CO2 |

2.4 Miscellaneous Antigens

Miscellaneous antigens should receive a fourth priority position on the label and are listed in Table 4 below.

Table 4 List of Miscellaneous Antigens

| ISBT Code | Antigen Name | Also Known As |
|-----------|--------------|-----------------------------------|
| 002008 | Mc | M ^c , MNS8 |
| 002013 | Me | M ^e , MNS13 |
| 004006 | f | f, ce, hr, RH6 |
| 004007 | RH7 | Ce, rh _i |
| 004012 | G | rh ^G , RH12 |
| 004021 | RH21 | C ^G |
| 004026 | RH26 | c-LIKE, Deal |
| 004027 | RH27 | Ce |
| 004041 | RH41 | Ce-like |
| 005018 | Aua | LU18; Au ^a ; Auberger; |

| ISBT Code | Antigen Name | Also Known As |
|-----------|--------------|---|
| 005019 | Aub | LU19; Au ^b |
| 007003 | Leab | Le ^x , Le ^{abx} , LE3 |
| 007004 | LebH | Le ^{Bh} , LE4 |
| 007005 | Aleb | A ₁ Le ^b , LE5 |
| 007006 | Bleb | Ble ^b , LE6 |
| 012001 | Xga | Xg ^a , XG1 |
| 014001 | Doa | Do ^a , DO1 |
| 014002 | Dob | Do ^b , DO2 |
| 017007 | CH7 | WH, CH/RG7 |
| 022007 | McCd | McCd, KN7, SI2 |
| 205002 | Csb | Cs ^b , COST2 |

2.5 Low Incidence Antigens

The rest of the low incidence antigens should receive a fifth priority position on the label and are listed in Table 5 below.

Table 5 List of Low Incidence Antigens

| ISBT Code | Antigen Name | Also Known As |
|-----------|--------------|-------------------------|
| 002010 | Mur | Mur, Murrell, Mu, MNS10 |
| 002011 | Mg | Mg, Gilfeather, MNS11 |
| 002012 | Vr | Vr, Verdegaal, MNS12 |
| 002014 | Mta | Mta, Martin, MNS14 |
| 002015 | MNS15 | Sta, Stones |
| 002016 | MNS16 | Ria, Ridley |
| 002017 | MNS17 | Cla, Caldwell |
| 002018 | MNS18 | Nya, Nyberg |
| 002019 | MNS19 | Hut, Mi.II |
| 002020 | MNS20 | Hil, Hill |
| 002021 | MNS21 | Mv, Armstrong |
| 002022 | MNS22 | Far, Kam, Kamhuber |
| 002023 | MNS23 | Sd, Dreyer |
| 002024 | MNS24 | Mit, Mitchell |
| 002025 | DANTU | Dantu; MNS25 |
| 002026 | MNS26 | Hop |
| 002027 | MNS27 | Nob |
| 002031 | MNS31 | Ora, Orriss |
| 002032 | MNS32 | Dane |
| 002033 | MNS33 | TSEN |
| 002034 | MNS34 | MINY |
| 002035 | MNS35 | MUT |

| ISBT Code | Antigen Name | Also Known As |
|------------------|---------------------|--------------------------|
| 002036 | MNS36 | SAT |
| 002037 | MNS37 | ERIK |
| 002038 | MNS38 | Osa |
| 002041 | MNS41 | HAG |
| 002043 | MNS43 | MARS |
| 002046 | MNS46 | MNTD |
| 002047 | SARA | MNS47 |
| 002048 | MNS48 | KIPP |
| 003004 | NOR | P1PK4 |
| 004009 | Cx | Cx, rhx, RH9 |
| 004011 | Ew | Ew, Rhw2, RH11 |
| 004022 | RH22 | CE, Jarvis |
| 004023 | RH23 | Dw, Weil |
| 004028 | RH28 | hrH |
| 004032 | RH32 | RN |
| 004033 | RH33 | Har, R0HAR, Dhar |
| 004035 | RH35 | |
| 004036 | RH36 | Berrens, Bea |
| 004037 | RH37 | Evans |
| 004040 | RH40 | Tar, Targett |
| 004042 | RH42 | CeS, CceS, rhS, Thornton |
| 004043 | RH43 | Crawford |
| 004045 | RH45 | Riv |
| 004048 | RH48 | JAL, S. Allen, J. Allen |
| 004049 | RH49 | STEM |
| 004050 | RH50 | FPTT, Mol |
| 004052 | RH52 | BARC |
| 004053 | RH53 | JAHK |
| 004054 | RH54 | DAK |
| 004055 | RH55 | LOCR |
| 004056 | RH56 | CENR |
| 004060 | RH60 | PARG |
| 005009 | LU9 | Mull |
| 005014 | LU14 | Hofanesian |
| 006010 | K10 | Ula, Karhula |
| 006017 | K17 | Wka, Weeks |
| 006021 | K21 | Kpc, Levay |
| 006023 | K23 | Centauro |
| 006024 | K24 | CL, Callais, Cls |
| 006025 | K25 | VLAN |
| 006028 | K28 | VONG |
| 006031 | K31 | KYO |

| ISBT Code | Antigen Name | Also Known As |
|------------------|---------------------|----------------------------------|
| 010001 | Dia | Dia, Diego |
| 010005 | Wda | Wda, Waldner, DI5 |
| 010006 | Rba | Rba, Redelberger DI6 |
| 010007 | WARR | WARR, Warrior, DI7 |
| 010008 | ELO | ELO, DI8 |
| 010009 | Wu | Wu, Wulfsburg, DI9 |
| 010010 | Bpa | Bpa, Bishop, DI10 |
| 010011 | Moa | Moa, Moen, DI11 |
| 010012 | Hga | Hga, Hughes, Tarplee, Tarp, DI12 |
| 010013 | Vga | Vga, VanVugt, DI13 |
| 010014 | Swa | Swa, Swann, DI14 |
| 010015 | BOW | BOW, Bowyer, DI15 |
| 010016 | NFLD | NFLD , DI16 |
| 010017 | Jna | Jna, Nunhart, JN, DI17 |
| 010018 | KREP | KREP, IK, DI18 |
| 010019 | Tra | Tra, Traversu, Lanthois, DI19 |
| 010020 | Fra | Fra, Froese, DI20 |
| 010021 | SW1 | SW1, DI21 |
| 013004 | SC4 | Rd, Rda, Radin |
| 016007 | LWb | LW7, Nea |
| 020005 | Wb | Webb, GE5 |
| 020006 | GE6 | Lsa |
| 020007 | GE7 | Ana, Ahonen |
| 020008 | GE8 | Dha, Duch |
| 020009 | GE9 | GEIS |
| 021003 | Tcb | Tcb, CROM3 |
| 021004 | Tcc | CROM4, Tcc |
| 021008 | WESa | CROM8, WESa |
| 022002 | Knb | Knb, COST5, KN2 |
| 022006 | McCb | McCb, KN6 |
| 023001 | Ina | Ina, IN1 |
| 030002 | Ola | RHAG 2, Ola |
| 030004 | RHAG4 | |
| 208002 | Erb | Erb, ER2 |
| 700002 | By | Batty |
| 700003 | Chra | Chra |
| 700005 | Bi | Biles |
| 700006 | Bxa | Bxa, Box |
| 700017 | Toa | Toa |
| 700018 | Pta | Pta |
| 700019 | Rea | Rea |

| ISBT Code | Antigen Name | Also Known As |
|-----------|--------------|---------------|
| 700021 | Jea | Jea |
| 700028 | Lia | Lia |
| 700039 | MILNE | |
| 700040 | RASM | |
| 700044 | JFV | |
| 700045 | Kg | Kg |
| 700047 | JONES | |
| 700049 | HJK | |
| 700050 | HOFM | |
| 700054 | REIT | |

2.6 High Incidence Positives

Facilities may choose to print high incidence antigens with positive results. If these positive results will be printed, they should be printed in the same order in the list as the antithetical antigen.

3 Antigen Text

The ISBT 128 Standard specifications have left the specific appearance of text on the label to be nationally defined. Therefore the recommendations made in this document for the appearance of Red Cell antigen test results are not requirements of the Standard itself.

It is recommended that the names appearing in the Antigen Name column of the above tables be used for identifying the antigen on the label.

3.1 Font Size

A minimum font size of 7 should be used. Larger font sizes may be used if space permits.

3.1.1 Use of Superscripts

The use of superscripts will be left to the discretion of each facility. A font size large enough to read the superscripted characters shall be used.

3.2 Test Results to Print

The selection of which test results to print on the label will be left to the discretion of each facility. For example, the laboratory may choose to print only the negative results that were requested, all negative results, or the full phenotype (negative and positive antigens). Facilities will need to take into consideration the amount of space available in the lower right quadrant of the label.

Each facility is responsible for adhering to regulatory requirements that may restrict the printing of test results under certain circumstances. For example, regulations may restrict the printing of historical test results, require that tests be performed on the current donation, or disallow the printing of test results if the tests were performed using unlicensed antisera.

3.3 Use of Separators

The use of commas, spaces, semicolons, etc. as separators between antigens will be left to the discretion of each facility. Facilities may choose not to use any separators depending on the amount of space available on the label.

3.4 Use of Reverse Printing

It can be difficult to distinguish an upper case letter from a lower case letter especially if only one character is printed. Specifically, C and c, S and s, and K and k are difficult to differentiate where the only difference is their relative size. It is therefore recommended that a special printing technique be used to differentiate these antigens.

When test results for c, s, and k (lower case) are printed, they should be printed using reverse printing (i.e., white on black) similar to the manner in which RhD Negative status is printed in the upper right quadrant of the label).

4 Label Text Examples

This section provides various examples of Red Cell antigen test results based on recommendations made from the previous sections.

Figure 1 Example Order of Antigens

Jsb- C- E- Kpa- Doa- Lia-
Yta- Fya- Mia- Dob- Mur-

Figure 2 Separator Options or No Separators

Js(b-); S-; C-, E-; K-; Fy(a-); Jk(a-)
Js(b-), S-, C-, E-, K-, Fy(a-), Jk(a-)
Js(b-) S- C- E- K- Fy(a-) Jk(a-)
Jsb- S- C- E- K- Fya- Jka-

Figure 3 Reverse Printing Examples with Multiple Antigens

k- C+ E- **c-** e+ K+
k- M- S- E- **c-** Le(a-) Fy(b-) Jk(a-) Cw-

Figure 4 Reverse Printing with a Single Antigen

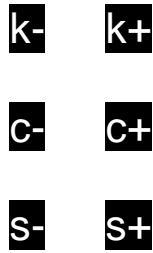
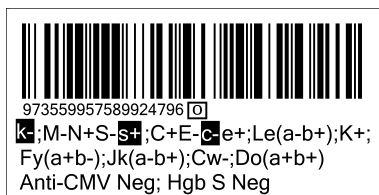
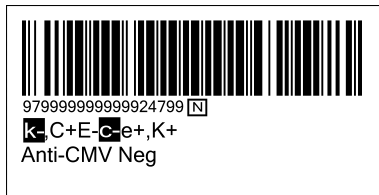


Figure 5 Use of Superscripts

k⁻, M⁻, S⁻, E⁻, c⁻, C^w-

Figure 6 Bar Code Text Examples



5 Electronically-Readable Red Cell Antigen Test Results

There is no requirement that Red Cell antigen test results be bar coded, but it is highly recommended that such test results are machine readable. The data structures that allow for encoding Red Cell antigen test results include Data Structures 002, 012, 013, or 030.

5.1 Blood Groups [ABO and RhD] [Data Structure 002]

Data Structure 002 has a very limited capability of encoding phenotypes in its “r” value. It is limited to encoding results for C, c, E, e, and Kell phenotypes, or just a Miltenberger phenotype.

In the US, this data structure is not used for the purposes of encoding these antigen test results.

5.2 Special Testing: Red Blood Cell Antigens – General [Data Structure 012]

Only some antigens can be encoded using Data Structure 012 and are listed in the ISBT 128 reference table RT009 found in the *ISBT 128 Standard Technical Specification* (ST-001). They are also listed in Table 6. For details on encoding Data Structure 012, refer to ST-001.

If it is encoded into a linear bar code, the placement of the linear bar code shall appear in the lower right quadrant below the expiration date/time.

5.3 Special Testing: Red Blood Cell Antigens – Finnish [Data Structure 013]

Data Structure 013 should not be used in the US. For details regarding Data Structure 013, refer to the *ISBT 128 Standard Technical Specification* (ST-001).

5.4 Red Cell Antigens with Test History [Data Structure 030]

For details regarding Data Structure 030, refer to:

- *ISBT 128 Standard Technical Specification* (ST-001)
- *Use of Red Cell Antigens with Test History Data Structure [030]* (IG-027)

The ISBT Codes listed in the antigen tables above are used as coding values for Data Structure 030.

The Data Matrix symbology shall be used when bar coding Data Structure 030. The standardized placement of the 2D bar code will be established in the near future and it will be specified in the *ISBT 128 Standard Technical Specification* (ST-001).

Table 6 Comparison Table

| Characteristic | Data Structure 002 | Data Structure 012 | Data Structure 030 |
|--|---|--|--|
| Recommended for use in the US? | No | Yes | Yes |
| Bar codes that may be used | Linear (Code 128) or 2D (Data Matrix) | Linear (Code 128) or 2D (Data Matrix) | 2D (Data Matrix) only |
| Antigens that can be encoded | K, C, c, E, and e OR Miltenberger | C, c, E, e, K, k, C ^w , Mi ^a , M, N, S, s, U, P1, Lu ^a , Kp ^a , Le ^a , Le ^b , Fy ^a , Fy ^b , Jk ^a , Jk ^b , Do ^a , Do ^b , In ^a , Co ^b , Di ^a , V/Vs, Js ^a plus one additional high or low incidence antigen selected from a list of 88 antigens | All antigens for which there is an ISBT numerical code |
| Differentiates test method? (serological vs. predicted phenotype based on genotyping) | No | No | Yes (use is optional) |
| Encodes the number of tests performed for a donor? (e.g., tested once on this donation, tested once on prior donation, tested twice on different donations, etc.) | No | No | Yes (use is optional) |

6 Appendix A

The table below lists the antigens in alphabetical order based on the Antigen Name column. The antigen priorities in this table adhere to the following color scheme.

1. High incidence antigens: highlighted in **green** indicating first priority
2. Common antigens: highlighted in **red** indicating second priority
3. Common low incidence antigens: highlighted in **blue** indicating third priority
4. Miscellaneous antigens: highlighted in **yellow** indicating fourth priority
5. Rest of low incidence antigens: highlighted in **orange** indicating fifth priority

| ISBT Code | Antigen Name | Also Known As |
|-----------|--------------|---|
| 001004 | A1 | |
| 901015 | ABTI | ABTI |
| 007005 | Aleb | A ₁ Le ^b , LE5 |
| 901009 | AnWj | Wj, Anton |
| 901003 | Ata | At ^a , August |
| 005018 | Aua | LU18; Au ^a ; Auberger; |
| 005019 | Aub | LU19; Au ^b |
| 700005 | Bi | Biles |
| 007006 | Bleb | Ble ^b , LE6 |
| 010015 | BOW | BOW, Bowyer, DI15 |
| 010010 | Bpa | Bpa, Bishop, DI10 |
| 700006 | Bxa | Bxa, Box |
| 700002 | By | Batty |
| 004002 | C | RH2 |
| 004004 | c | RH4 |
| 017001 | Ch | Ch ^a , Chido, CH/RG1 |
| 017002 | CH2 | Ch2, CH/RG2 |
| 017003 | CH3 | Ch3, CH/RG3 |
| 017004 | CH4 | Ch4, CH/RG4 |
| 017005 | CH5 | Ch5, CH/RG5 |
| 017006 | CH6 | Ch6, CH/RG6 |
| 017007 | CH7 | WH, CH/RG7 |
| 017012 | CH12 | Rg2, CH/RG12 |
| 700003 | Chra | Chra |
| 015003 | CO3 | Co ^{ab} |
| 015001 | Coa | Co ^a , CO1 |
| 015002 | Cob | Co ^b , CO2 |
| 021001 | Cra | Cr ^a , Go ^b , CROM1 |
| 021018 | CRAG | CROM18 |
| 021015 | CRAM | CROM15 |
| 021014 | CROV | CROM14 |

| ISBT Code | Antigen Name | Also Known As |
|-----------|--------------|---|
| 021017 | CRUE | CROM17 |
| 205001 | Csa | Cs ^a , COST1 |
| 205002 | Csb | Cs ^b , COST2 |
| 004008 | Cw | C ^w , RH8 |
| 004009 | Cx | Cx, rhx, RH9 |
| 002025 | DANTU | Dantu; MNS25 |
| 010001 | Dia | Dia, Diego |
| 010002 | Dib | Di ^b , Luebano |
| 014006 | DO6 | DOYA |
| 014008 | DO8 | DOLG |
| 014001 | Doa | Do ^a , DO1 |
| 014002 | Dob | Do ^b , DO2 |
| 021005 | Dra | CROM5, Dr ^a |
| 030001 | Duclos | RHAG1 |
| 004003 | E | RH3 |
| 004005 | e | RH5 |
| 010008 | ELO | ELO, DI8 |
| 901008 | EMM | |
| 208001 | Era | Er ^a , ER1 |
| 208002 | Erb | Erb, ER2 |
| 021006 | Esa | CROM6, Es ^a |
| 004011 | Ew | Ew, Rhw2, RH11 |
| 004006 | f | f, ce, hr, RH6 |
| 010020 | Fra | Fra, Froese, DI20 |
| 008003 | FY3 | Fy ^{ab} , Fy ^a Fy ^b |
| 008005 | FY5 | |
| 008006 | FY6 | |
| 008001 | Fya | Fy ^a , FY1 |
| 008002 | Fyb | Fy ^b , FY2 |
| 004012 | G | rh ^G , RH12 |
| 020002 | GE2 | |
| 020003 | GE3 | |
| 020004 | GE4 | |
| 020006 | GE6 | Lsa |
| 020007 | GE7 | Ana, Ahonen |
| 020008 | GE8 | Dha, Duch |
| 020009 | GE9 | GEIS |
| 029001 | GIL1 | GIL |
| 028001 | GLOB1 | P |
| 028002 | GLOB2 | PX2 |
| 004030 | Goa | Go ^a , Gonzales, D ^{Cor} , RH30 |
| 021011 | GUTI | CROM11 GUTI |

| ISBT Code | Antigen Name | Also Known As |
|-----------|--------------|--|
| 014003 | Gya | Gy ^a , Gregory, DO3 |
| 018001 | H | H1 |
| 002006 | He | He, Henshaw, MNS6 |
| 010012 | Hga | Hga, Hughes, Tarplee, Tarp, DI12 |
| 700049 | HJK | |
| 700050 | HOFM | |
| 014004 | Hy | Hy, Holley, DO4 |
| 027001 | I | I1 |
| 207002 | i | i, I2 |
| 021007 | IFC | CROM7,IFC |
| 023003 | IN3 | INFI |
| 023004 | IN4 | INJA |
| 023001 | Ina | Ina, IN1 |
| 023002 | Inb | In ^b , IN2 |
| 700021 | Jea | Jea |
| 700044 | JFV | |
| 009003 | JK3 | Jk ^{ab} , Jk ^a Jk ^b |
| 009001 | Jka | Jk ^a , JK1 |
| 009002 | Jkb | Jk ^b , JK2 |
| 026001 | JMH | John Milton Hagen |
| 010017 | Jna | Jna, Nunhart, JN, DI17 |
| 014005 | Joa | Jo ^a , Joseph, DO5 |
| 700047 | JONES | |
| 032001 | Jra | Jr ^a , Junior |
| 006006 | Jsa | Js ^a , Sutter |
| 006007 | Jsb | Js ^b , Matthews |
| 006002 | k | k, Cellano, KEL2 |
| 006001 | K | Kell, KEL1, Kelleher |
| 006010 | K10 | Ula, Karhula |
| 006011 | K11 | Cote |
| 006012 | K12 | Boc, Bockman, Spears |
| 006013 | K13 | SGRO |
| 006014 | K14 | San, Santini, Dp |
| 006016 | K16 | Weak k, k-like |
| 006017 | K17 | Wka, Weeks |
| 006018 | K18 | V.M., Marshall |
| 006019 | K19 | Sub, Sublett |
| 006020 | K20 | Km |
| 006021 | K21 | Kpc, Levay |
| 006022 | K22 | N.I., Ikar |
| 006023 | K23 | Centaurio |
| 006024 | K24 | CL, Callais, Cls |

| ISBT Code | Antigen Name | Also Known As |
|-----------|--------------|--|
| 006025 | K25 | VLAN |
| 006026 | K26 | TOU |
| 006027 | K27 | RAZ |
| 006028 | K28 | VONG |
| 006029 | K29 | KALT |
| 006030 | K30 | KTIM |
| 006031 | K31 | KYO |
| 006032 | K32 | KUCI |
| 006033 | K33 | KANT |
| 006034 | K34 | KASH |
| 006036 | K36 | KETI |
| 006037 | K37 | KHUL |
| 006038 | K38 | KYOR |
| 700045 | Kg | Kg |
| 022008 | KN8 | S13 |
| 022009 | KN9 | KCAM |
| 022001 | Kna | Kn ^a , KN1, COST4 |
| 022002 | Knb | Knb, COST5, KN2 |
| 006003 | Kpa | Kp ^a , Penney, KEL3 |
| 006004 | Kpb | Kp ^b , Rautenberg, KEL4 |
| 010018 | KREP | KREP, IK, DI18 |
| 006005 | Ku | Ku, KEL5, Peltz, K ₀ |
| 019001 | Kx | Kx, XK1 |
| 033001 | Lan | Lan, Langereis |
| 007001 | Lea | Le ^a , LE1 |
| 007003 | Leab | Le ^x , Le ^{abx} , LE3 |
| 007002 | Leb | Le ^b , LE2 |
| 007004 | LebH | Le ^{bH} , LE4 |
| 700028 | Lia | Lia |
| 209003 | LKE | Luke |
| 005003 | LU3 | Lu ^{ab} , Lu ^a Lu ^b |
| 005004 | LU4 | Barnes |
| 005005 | LU5 | Beal, Fox |
| 005006 | LU6 | Jan, Jankowski |
| 005007 | LU7 | Gary |
| 005008 | LU8 | Taylor, MT |
| 005009 | LU9 | Mull |
| 005011 | LU11 | Reynolds |
| 005012 | LU12 | Muchowski, Much |
| 005013 | LU13 | Hughes |
| 005014 | LU14 | Hofanesian |
| 005016 | LU16 | |
| 005017 | LU17 | Delcol |

| ISBT Code | Antigen Name | Also Known As |
|-----------|--------------|--------------------------------------|
| 005020 | LU20 | |
| 005021 | LU21 | |
| 005023 | LU23 | LUIT |
| 005001 | Lua | Lu ^a , LU1 |
| 005002 | Lub | Lu ^b , LU2 |
| 016005 | Lwa | Lw ^a , LW5, LW |
| 016006 | Lwab | Lw ^{ab} , LW6, Bigelow |
| 016007 | LWb | LW7, Nea |
| 002001 | M | MNS1 |
| 901016 | MAM | |
| 002008 | Mc | M ^c , MNS8 |
| 022003 | McCa | McC ^a , KN3, COST6 |
| 022006 | McCb | McCb, KN6 |
| 022007 | McCd | McCd, KN7, SI2 |
| 002013 | Me | M ^e , MNS13 |
| 025001 | MER2 | RAPH, Raf |
| 002011 | Mg | Mg, Gilfeather, MNS11 |
| 002007 | Mia | Mi ^a , Miltenberger, MNS7 |
| 700039 | MILNE | |
| 002015 | MNS15 | Sta, Stones |
| 002016 | MNS16 | Ria, Ridley |
| 002017 | MNS17 | Cla, Caldwell |
| 002018 | MNS18 | Nya, Nyberg |
| 002019 | MNS19 | Hut, Mi.II |
| 002020 | MNS20 | Hil, Hill |
| 002021 | MNS21 | Mv, Armstrong |
| 002022 | MNS22 | Far, Kam, Kamhuber |
| 002023 | MNS23 | Sd, Dreyer |
| 002024 | MNS24 | Mit, Mitchell |
| 002026 | MNS26 | Hop |
| 002027 | MNS27 | Nob |
| 002028 | MNS28 | En ^a |
| 002029 | MNS29 | En ^a KT |
| 002030 | MNS30 | 'N', GPB ^N |
| 002031 | MNS31 | Ora, Orriss |
| 002032 | MNS32 | Dane |
| 002033 | MNS33 | TSEN |
| 002034 | MNS34 | MINY |
| 002035 | MNS35 | MUT |
| 002036 | MNS36 | SAT |
| 002037 | MNS37 | ERIK |
| 002038 | MNS38 | Osa |

| ISBT Code | Antigen Name | Also Known As |
|-----------|--------------|---|
| 002039 | MNS39 | ENEP |
| 002040 | MNS40 | ENEH |
| 002041 | MNS41 | HAG |
| 002042 | MNS42 | ENAV, Avis |
| 002043 | MNS43 | MARS |
| 002044 | MNS44 | ENDA |
| 002045 | MNS45 | ENEV |
| 002046 | MNS46 | MNTD |
| 002048 | MNS48 | KIPP |
| 010011 | Moa | Moa, Moen, DI11 |
| 002014 | Mta | Mta, Martin, MNS14 |
| 002010 | Mur | Mur, Murrell, Mu, MNS10 |
| 002002 | N | MNS2 |
| 010016 | NFLD | NFLD, DI16 |
| 003004 | NOR | P1PK4 |
| 024001 | Oka | OK ^a , OK1 |
| 030002 | Ola | RHAG 2, Ola |
| 003001 | P1 | |
| 901014 | PEL | Pelletier |
| 003003 | Pk | P1PK1, P ^k |
| 700018 | Pta | Pta |
| 700040 | RASM | |
| 010006 | Rba | Rba, Redelberger DI6 |
| 700019 | Rea | Rea |
| 700054 | REIT | |
| 017011 | Rg | Rg1, Rodgers, Rg ^a , CH/RG11 |
| 004007 | RH7 | Ce, rh _i |
| 004017 | RH17 | Hr ₀ |
| 004018 | RH18 | Hr, Hr ^s , Shabalala |
| 004019 | RH19 | hr ^s , Shabalala |
| 004021 | RH21 | C ^G |
| 004022 | RH22 | CE, Jarvis |
| 004023 | RH23 | Dw, Weil |
| 004026 | RH26 | c-LIKE, Deal |
| 004027 | RH27 | cE |
| 004028 | RH28 | hrH |
| 004029 | RH29 | Total Rh |
| 004031 | RH31 | Bastiaan, hr ^B |
| 004032 | RH32 | RN |
| 004033 | RH33 | Har, R0HAR, Dhar |

| ISBT Code | Antigen Name | Also Known As |
|-----------|--------------|---------------------------------------|
| 004034 | RH34 | Hr ^B , Bas, Baas, Bastiaan |
| 004035 | RH35 | |
| 004036 | RH36 | Berrens, Bea |
| 004037 | RH37 | Evans |
| 004039 | RH39 | C-like |
| 004040 | RH40 | Tar, Targett |
| 004041 | RH41 | Ce-like |
| 004042 | RH42 | CeS, CceS, rhS, Thornton |
| 004043 | RH43 | Crawford |
| 004044 | RH44 | Nou |
| 004045 | RH45 | Riv |
| 004046 | RH46 | Sec |
| 004047 | RH47 | Dav |
| 004048 | RH48 | JAL, S. Allen, J. Allen |
| 004049 | RH49 | STEM |
| 004050 | RH50 | FPTT, Mol |
| 004051 | RH51 | MAR |
| 004052 | RH52 | BARC |
| 004053 | RH53 | JAHK |
| 004054 | RH54 | DAK |
| 004055 | RH55 | LOCR |
| 004056 | RH56 | CENR |
| 004057 | RH57 | CEST |
| 004058 | RH58 | CELO |
| 004059 | RH59 | CEAG |
| 004060 | RH60 | PARG |
| 004061 | RH61 | CEVF |
| 030004 | RHAG4 | |
| 002003 | S | MNS3 |
| 002004 | s | MNS4 |
| 002047 | SARA | MNS47 |
| 013001 | SC1 | Sc1, Sm |
| 013002 | SC2 | Sc2, Bu ^a |
| 013003 | SC3 | |
| 013004 | SC4 | Rd, Rda, Radin |
| 013005 | SC5 | STAR |
| 013006 | SC6 | SCER |
| 013007 | SC7 | SCAN |
| 901012 | Sda | Sd ^a , Sid |
| 021012 | SERF | CROM12 |

| ISBT Code | Antigen Name | Also Known As |
|-----------|--------------|---|
| 022004 | Sla | Sl ^a , COST7, McC ^c , KN4 |
| 010021 | SW1 | SW1, DI21 |
| 010014 | Swa | Swa, Swann, DI14 |
| 021002 | Tca | Tc ^a , CROM2 |
| 021003 | Tcb | Tcb, CROM3 |
| 021004 | Tcc | CROM4, Tcc |
| 700017 | Toa | Toa |
| 010019 | Tra | Tra, Traversu, Lanthois, DI19 |
| 002005 | U | MNS5 |
| 021010 | UMC | CROM10, UMC |
| 004010 | V | ce ^s , hr ^v , RH10 |
| 034001 | Vel | Vel, Ve ^a |
| 010013 | Vga | Vga, VanVugt, DI13 |
| 002012 | Vr | Vr, Verdegaal, MNS12 |
| 004020 | VS | e ^s , RH20 |
| 002009 | Vw | Verweyst, Mi.I, MNS9 |
| 010007 | WARR | WARR, Warrior, DI7 |
| 020005 | Wb | Webb, GE5 |
| 010005 | Wda | Wda, Waldner, DI5 |
| 021008 | WESa | CROM8, WESa |
| 021009 | WESb | CROM9, WES ^b |
| 010003 | Wra | Wr ^a , Wright, DI3 |
| 010004 | Wrb | Wr ^b , Fritz, DI4 |
| 010009 | Wu | Wu, Wulfsburg, DI9 |
| 012002 | XG2 | CD99, MIC2, E2 |
| 012001 | Xga | Xg ^a , XG1 |
| 022005 | Yka | Yk ^a , KN5, COST3 |
| 011001 | Yta | Yt ^a , YT1 |
| 011002 | Ytb | Yt ^b , YT2 |
| 021013 | ZENA | CROM13 |