

# XML schema files version 2.4

| Timeline | Proposal ready:<br>31 Aug 2021                                                                                                                                              | XSD Approval<br>22 Feb 2022 | XSD public review<br>04 Mar 2022 - 04 May 2022 | Implementation / testing<br>2024 Q3, Q4-Dec | Release Date<br>2025 Q1-Mar | Planned Retire Date<br>TBD |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------------------------------------|---------------------------------------------|-----------------------------|----------------------------|
| Status   | <ol style="list-style-type: none"><li>1. Preparation</li><li>2. Draft</li><li>3. Discussion</li><li>4. Public review</li><li>5. Implementation</li><li>6. Release</li></ol> |                             |                                                |                                             |                             |                            |

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## Introduction

XSD 2.4 includes quite a lot of changes for RFCs as below:

[RFC-007: more fields to distinguish IDM-tests \(HBV, HCV, HEV, West Nile Virus and Chagas\)](#)

[RFC-008: Introduction of Adult Adult Donor Cryopreserved Unit \(ADCU\)](#)

[RFC-009 R2sh-CBU fields request](#)

[RFC-010 CBU Viability for Multiple Cell Types](#)

[RFC-012 Change of Collection Volume Field from Integer to Real Number](#)

**Another important update which effect the XML structure is the flat to nested structure change. This change will change and improve fields of post-collection, post-processing and new fields for post-thaw.**

Any question or comments are welcome. You can ask question regarding XSD 2.4 here : <https://share.wmda.info/questions/topics/403341316/xsdv24> or send email to [support@wmda.info](mailto:support@wmda.info).

For members who have account in share and are interested to check the details of the discussion of the changes, you can check the internal meeting notes for XSD 2.4 in the link: <https://share.wmda.info/x/agztFQ>.



**Please notice that XSD 2.3 change of GRID/ID must be implemented as well if upgrade to XSD 2.4 directly from XSD 2.2**

# Download XSD schema version 2.4

Below are the example XML files and the .xsd files.

| File                                   | Modified                   |
|----------------------------------------|----------------------------|
| File Inventories.xsd Version 2.4 final | Sep 27, 2022 by Zhihong He |
| File basicTypes.xsd Version 2.4 final  | Sep 27, 2022 by Zhihong He |
| XML File ION-1234-A-XSD24.xml          | Sep 27, 2022 by Zhihong He |
| XML File ION-1234-C-XSD24.xml          | Sep 27, 2022 by Zhihong He |
| XML File ION-1234-D-XSD24.xml          | Sep 27, 2022 by Zhihong He |

[Download All](#)

## Changes between version 2.4 and 2.3

**Inventories.xsd**

Updated version number to 2.4

**Version 2.4**

```
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified" attributeFormDefault="unqualified" version="2.4">
```

**Version 2.3**

```
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified" attributeFormDefault="unqualified" version="2.3">
```

**RFC 007 IDM changes**

XSD schema doc changes

Add new fields ANTI\_HEV, HEV\_NAT, CHAGAS\_NAT  
Rename fields WMV to WNV\_NAT, CHAGAS to ANTI\_CHAGAS  
Update order of fields HCV\_NAT and HBV\_NAT

**v2.4**

```
                <xs:element name="ANTI_HBS" type="idmValueType" minOccurs="0">
                    <xs:annotation>
                        <xs:documentation xml:lang="en">Hepatitis B status (antibody to
hepatitis B surface antigen)</xs:documentation>
                    </xs:annotation>
                </xs:element>
                <xs:element name="HBV_NAT" type="idmValueType" minOccurs="0">
                    <xs:annotation>
                        <xs:documentation xml:lang="en">HBV NAT status</xs:documentation>
                    </xs:annotation>
                </xs:element>
                <xs:element name="ANTI_HCV" type="idmValueType" minOccurs="0">
                    <xs:annotation>
                        <xs:documentation xml:lang="en">Hepatitis C status (antibody to
```

```

hepatitis C virus)/>xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="HCV_NAT" type="idmValueType" minOccurs="0">
    <xs:annotation>
      <xs:documentation xml:lang="en">HCV NAT status</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="ANTI_HEV" type="idmValueType" minOccurs="0">
    <xs:annotation>
      <xs:documentation xml:lang="en">Hepatitis E status (antibody to
hepatitis E virus)/>xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="HEV_NAT" type="idmValueType" minOccurs="0">
    <xs:annotation>
      <xs:documentation xml:lang="en">HEV NAT status</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="ANTI_HIV_12" type="idmValueType" minOccurs="0">
    <xs:annotation>
      <xs:documentation xml:lang="en">Anti-HIV 1/2 status</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="HIV_1_NAT" type="idmValueType" minOccurs="0">
    <xs:annotation>
      <xs:documentation xml:lang="en">HIV-1 NAT status</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="HIV_P24" type="idmValueType" minOccurs="0">
    <xs:annotation>
      <xs:documentation xml:lang="en">HIV p24 status</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="ANTI_HTLV" type="idmValueType" minOccurs="0">
    <xs:annotation>
      <xs:documentation xml:lang="en">Antibody to HTLV I/II</xs:
documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="SYPHILIS" type="idmValueType" minOccurs="0">
    <xs:annotation>
      <xs:documentation xml:lang="en">Syphilis status</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="WNV_NAT" type="idmValueType" minOccurs="0">
    <xs:annotation>
      <xs:documentation xml:lang="en">WNV NAT status</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="ANTI_CHAGAS" type="idmValueType" minOccurs="0">
    <xs:annotation>
      <xs:documentation xml:lang="en">Chagas antibody status</xs:
documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="CHAGAS_NAT" type="idmValueType" minOccurs="0">
    <xs:annotation>
      <xs:documentation xml:lang="en">Chagas NAT status</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="EBV" type="idmValueExtType" minOccurs="0">
    <xs:annotation>
      <xs:documentation xml:lang="en">EBV status</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="TOXO" type="idmValueExtType" minOccurs="0">
    <xs:annotation>
      <xs:documentation xml:lang="en">Toxoplasmosis status</xs:
documentation>
    </xs:annotation>
  </xs:element>

```

</xs:element>

**v2.3**

```

        <xs:element name="ANTI_HBS" type="idmValueType" minOccurs="0">
            <xs:annotation>
                <xs:documentation xml:lang="en">Hepatitis B status (antibody to
hepatitis B surface antigen)</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="ANTI_HCV" type="idmValueType" minOccurs="0">
            <xs:annotation>
                <xs:documentation xml:lang="en">Hepatitis C status (antibody to
hepatitis C virus)</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="ANTI_HIV_12" type="idmValueType" minOccurs="0">
            <xs:annotation>
                <xs:documentation xml:lang="en">Anti-HIV 1/2 status</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="HIV_1_NAT" type="idmValueType" minOccurs="0">
            <xs:annotation>
                <xs:documentation xml:lang="en">HIV-1 NAT status</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="HIV_P24" type="idmValueType" minOccurs="0">
            <xs:annotation>
                <xs:documentation xml:lang="en">HIV p24 status</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="HCV_NAT" type="idmValueType" minOccurs="0">
            <xs:annotation>
                <xs:documentation xml:lang="en">HCV NAT status</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="ANTI_HTLV" type="idmValueType" minOccurs="0">
            <xs:annotation>
                <xs:documentation xml:lang="en">Antibody to HTLV I/II</xs:
documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="SYPHILIS" type="idmValueType" minOccurs="0">
            <xs:annotation>
                <xs:documentation xml:lang="en">Syphilis status</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="WNV" type="idmValueType" minOccurs="0">
            <xs:annotation>
                <xs:documentation xml:lang="en">WNV status</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="CHAGAS" type="idmValueType" minOccurs="0">
            <xs:annotation>
                <xs:documentation xml:lang="en">Chagas status</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="EBV" type="idmValueExtType" minOccurs="0">
            <xs:annotation>
                <xs:documentation xml:lang="en">EBV status</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="TOXO" type="idmValueExtType" minOccurs="0">
            <xs:annotation>
                <xs:documentation xml:lang="en">Toxoplasmosis status</xs:
documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="HBV_NAT" type="idmValueType" minOccurs="0">
            <xs:annotation>
                <xs:documentation xml:lang="en">HBV NAT status</xs:documentation>
            </xs:annotation>
        </xs:element>

```

## Example of IDM XML

```
<IDM>
  <ANTI_CMV>P</ANTI_CMV>
  <ANTI_CMV_DATE>2010-07-04</ANTI_CMV_DATE>
  <CMV_NAT>N</CMV_NAT>
  <CMV_NAT_DATE>2010-07-04</CMV_NAT_DATE>
  <HBS_AG>N</HBS_AG>
  <ANTI_HBC>N</ANTI_HBC>
  <ANTI_HBS>N</ANTI_HBS>
  <HBV_NAT>N</HBV_NAT>
  <ANTI_HCV>N</ANTI_HCV>
  <HCV_NAT>N</HCV_NAT>
  <ANTI_HEV>N</HEV_NAT>
  <HEV_NAT>N</HEV_NAT>
  <ANTI_HIV_12>N</ANTI_HIV_12>
  <HIV_1_NAT>N</HIV_1_NAT>
  <HIV_P24>N</HIV_P24>
  <ANTI_HTLV>N</ANTI_HTLV>
  <SYPHILIS>N</SYPHILIS>
  <WNV_NAT>N</WNV_NAT>
  <ANTI_CHAGAS>N</ANTI_CHAGAS>
  <CHAGAS_NAT>N</CHAGAS_NAT>
  <EBV>N</EBV>
  <TOXO>N</TOXO>
  <PB19_NAT>N</PB19_NAT>
  <ALT>1</ALT>
</IDM>
```

## RFC 008 Add whole ADCU structure

### XSD schema changes

#### Change the documentation

Add "ADCU" related description for the fields that used in ADCU product.

#### Version 2.4

```
      <xs:element name="BIRTH_DATE" type="bareDateType">
        <xs:annotation>
          <xs:documentation xml:lang="en">Date of birth of the donor/donor of
ADCU/child of CBU</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="SEX" type="sexType" minOccurs="0">
        <xs:annotation>
          <xs:documentation xml:lang="en">Biological gender of the donor/ADCU
/CBU. Mandatory for donors, optional for CBUs.</xs:documentation>
        </xs:annotation>
      </xs:element>
```

### Version 2.3

```
<xs:element name="BIRTH_DATE" type="bareDateType">
  <xs:annotation>
    <xs:documentation xml:lang="en">Date of birth of the donor/CBU</xs:
documentation>
  </xs:annotation>
</xs:element>
<xs:element name="SEX" type="sexType" minOccurs="0">
  <xs:annotation>
    <xs:documentation xml:lang="en">Biological gender of the donor/CBU.
Mandatory for donors, optional for CBUs.</xs:documentation>
  </xs:annotation>
</xs:element>
```

### Add new item type unitItemBaseType

This item will extend the itemBaseType and include the shared fields of ADCU and CBU.

### Version 2.4

```
<xs:complexType name="unitItemBaseType">
  <xs:annotation>
    <xs:documentation>Abstract base type for banked unit items (ADCU, CBU)</xs:
documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="itemBaseType">
      <xs:sequence>
        <xs:element name="ID">
          <xs:annotation>
            <xs:documentation xml:lang="en">Unique identifier of
the unit: For CBUs: The value comprises the EMDIS hub code + donor identification allocated by the associated
donor registry, where the sending organisation is an EMDIS member, otherwise the two digit ISO country code
of the associated donor registry + donor identification allocated by the associated donor registry. For
example: AU600196166, DE00E-35487, US087013165, SB45. For ADCUs: ISBT 128 DIN without flag and check
characters. for example: A999914123456</xs:documentation>
          </xs:annotation>
          <xs:simpleType>
```

### Version 2.4

```
<xs:complexType name="cbuItemType">
  <xs:annotation>
    <xs:documentation xml:lang="en">A CBU (cord blood unit) is a banked, frozen blood
product extracted from a newborn baby's umbilical cord.</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="unitItemBaseType">
      <xs:sequence>
        <xs:element name="COLL_DATE" type="bareDateType" minOccurs="0">
          <xs:annotation>
            <xs:documentation xml:lang="en">Date that the unit
was collected</xs:documentation>
          </xs:annotation>
        </xs:element>
```

## Version 2.3

```
<xs:complexType name="cbuItemType">
  <xs:annotation>
    <xs:documentation xml:lang="en">A cord blood unit (CBU) is a banked, frozen blood
product extracted from a newborn baby's umbilical cord.</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="itemBaseType">
      <xs:sequence>
        <xs:element name="ID" minOccurs="1">
          <xs:annotation>
            <xs:documentation xml:lang="en">Unique identifier of
the CBU: The value comprises the EMDIS hub code + donor identification allocated by the associated donor
registry, where the sending organisation is an EMDIS member, otherwise the two digit ISO country code of the
associated donor registry + donor identification allocated by the associated donor registry. For example:
AU600196166, DEGOE-35487, US087013165, SB45.</xs:documentation>
          </xs:annotation>
          <xs:simpleType>
            <xs:restriction base="xs:string">
              <xs:maxLength value="25"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:element>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
```

## Add adcuItemType

## Version 2.4

```
<xs:complexType name="adcuItemType">
  <xs:annotation>
    <xs:documentation xml:lang="en">An ADCU (adult donor cryopreserved unit) is a banked,
frozen blood product collected from an adult donor.</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="unitItemBaseType">
      <xs:sequence>
        <xs:element name="COLL_DATE" type="bareDateType">
          <xs:annotation>
            <xs:documentation xml:lang="en">Date that the unit
was collected</xs:documentation>
          </xs:annotation>
        </xs:element>
        <xs:element name="COLL_TYPE" type="collTypeType">
          <xs:annotation>
            <xs:documentation xml:lang="en">Collection type, i.e.
the collection method used</xs:documentation>
          </xs:annotation>
        </xs:element>
        <xs:element name="POST_COLL" type="postCollAdcuType" minOccurs="0">
          <xs:annotation>
            <xs:documentation xml:lang="en">Post collection
(prior processing) data</xs:documentation>
          </xs:annotation>
        </xs:element>
        <xs:element name="POST_PROC" type="postProcAdcuType" minOccurs="0">
          <xs:annotation>
            <xs:documentation>Post-processing (prior
cryopreservation) data</xs:documentation>
          </xs:annotation>
        </xs:element>
        <xs:element name="POST_THAW" type="postThawAdcuType" minOccurs="0">
          <xs:annotation>
            <xs:documentation>Post-thaw data</xs:documentation>
          </xs:annotation>
        </xs:element>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
<xs:group ref="nmbrFieldsGroup"/>
```

```

        <xs:element name="QA_DATE" type="bareDateType" minOccurs="0">
            <xs:annotation>
                <xs:documentation xml:lang="en">Date of laboratory
quality assessment</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="GRID">
            <xs:annotation>
                <xs:documentation xml:lang="en">GRID of the donor of
the ADCU.</xs:documentation>
            </xs:annotation>
            <xs:simpleType>
                <xs:restriction base="xs:string">
                    <xs:length value="19"/>
                </xs:restriction>
            </xs:simpleType>
        </xs:element>
    </xs:sequence>
</xs:extension>
</xs:complexType>
<xs:complexType name="inventoryType">
    <xs:annotation>
        <xs:documentation xml:lang="en">Type representing an inventory of donors, ADCUs
(adult donor unit) and/or CBUs (cord blood units)</xs:documentation>
    </xs:annotation>
    <xs:sequence>
        <xs:element name="DONOR" type="donItemType" minOccurs="0" maxOccurs="unbounded">
            <xs:annotation>
                <xs:documentation xml:lang="en">A donor is an adult person who has
consented to donate haematopoietic progenitor cells, that is, HPC(M) or HPC(A) and similar products to an
unrelated patient.</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="ADCU" type="adcuItemType" minOccurs="0" maxOccurs="unbounded">
            <xs:annotation>
                <xs:documentation xml:lang="en">An ADCU (adult donor cryopreserved
unit) is a banked, cryopreserved blood product collected from an adult donor.</xs:documentation>
            </xs:annotation>
        </xs:element>
    </xs:sequence>

```

### Version 2.3

```

    <xs:complexType name="inventoryType">
        <xs:annotation>
            <xs:documentation xml:lang="en">Type representing an inventory of donors and/or cord
blood units (CBUs)</xs:documentation>
        </xs:annotation>
        <xs:sequence>
            <xs:element name="DONOR" type="donItemType" minOccurs="0" maxOccurs="unbounded">
                <xs:annotation>
                    <xs:documentation xml:lang="en">A donor is an adult person who has
consented to donate haematopoietic progenitor cells, that is, HPC(M) or HPC(A) and similar products to an
unrelated patient.</xs:documentation>
                </xs:annotation>
            </xs:element>
            <xs:element name="CBU" type="cbuItemType" minOccurs="0" maxOccurs="unbounded">
                <xs:annotation>
                    <xs:documentation xml:lang="en">A cord blood unit (CBU) is a banked,
frozen blood product extracted from a newborn baby's umbilical cord.</xs:documentation>
                </xs:annotation>
            </xs:element>
        </xs:sequence>

```

(Impact XML format) Improve some flat structure to nested structure

1. Improved to use nested structure of POST\_COLL (post collection), introduced item type postCollCbuType, postCollAdcuType, postCollBaseType
2. Improved to use nested structure of POST\_PROC (post processing/pre-cryopreservation), introduced item type postProcCbuType, postProcAdcuType, postProcBaseType
3. Added POST\_THAW object. See details in the part for RFC 009 below

#### Version 2.4 Inventories.xsd

```

<xs:element name="POST_COLL" type="postCollCbuType" minOccurs="0">
  <xs:annotation>
    <xs:documentation xml:lang="en">Post collection
(prior processing) data</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="POST_PROC" type="postProcCbuType" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Data of post-processing (prior
cryopreservation)</xs:documentation>
  </xs:annotation>
</xs:element>

```

#### Version 2.4 Inventories.xsd

```

<xs:element name="POST_COLL" type="postCollAdcuType" minOccurs="0">
  <xs:annotation>
    <xs:documentation xml:lang="en">Post collection
(prior processing) data</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="POST_PROC" type="postProcAdcuType" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Post-processing (prior
cryopreservation) data</xs:documentation>
  </xs:annotation>
</xs:element>

```

#### Version 2.4 basicTypes.xsd

```
<xs:complexType name="postCollBaseType">
  <xs:annotation>
    <xs:documentation>Post-collection (prior processing) base data</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="VOL" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">Collected volume (without additives)
in ml</xs:documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:float">
          <xs:minInclusive value="1.0"/>
          <xs:maxInclusive value="9999.9"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
    <xs:element name="TNC" type="xs:float" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">Total number of nucleated cells</xs:
documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="CD34PC" type="xs:float" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">Total number of CD34+ cells</xs:
documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="postCollCbuType">
  <xs:annotation>
    <xs:documentation>Post-collection (prior processing) data for CBUs</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="postCollBaseType"/>
  </xs:complexContent>
</xs:complexType>
<xs:complexType name="postCollAdcuType">
  <xs:annotation>
    <xs:documentation>Post-collection (prior processing) data for ADCUs</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="postCollBaseType">
      <xs:sequence>
        <xs:element name="CD3PC" type="xs:float" minOccurs="0">
          <xs:annotation>
            <xs:documentation xml:lang="en">Total number of CD3+
cells </xs:documentation>
          </xs:annotation>
        </xs:element>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
```

#### Version 2.4 basicTypes.xsd

```
<xs:complexType name="postProcBaseType">
  <xs:annotation>
    <xs:documentation>Post-processing (prior cryopreservation) base data</xs:
documentation>
  </xs:annotation>
```

```

<xs:sequence>
  <xs:element name="VOL" minOccurs="0">
    <xs:annotation>
      <xs:documentation xml:lang="en">Total volume in ml</xs:documentation>
    </xs:annotation>
    <xs:simpleType>
      <xs:restriction base="xs:float">
        <xs:minInclusive value="1.0"/>
        <xs:maxInclusive value="9999.9"/>
      </xs:restriction>
    </xs:simpleType>
  </xs:element>
  <xs:element name="CFU" type="xs:float" minOccurs="0">
    <xs:annotation>
      <xs:documentation xml:lang="en">Total count of colony forming units<
/xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="MNC" type="xs:float" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">Total Number of mononucleated cells<
/xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="TNC" type="xs:float" minOccurs="0">
        <xs:annotation>
          <xs:documentation xml:lang="en">Total number of nucleated cells</xs:
documentation>
          </xs:annotation>
        </xs:element>
        <xs:element name="VIABILITY_TNC" type="viabilityType" minOccurs="0">
          <xs:annotation>
            <xs:documentation xml:lang="en">Viability information regarding TNC<
/xs:documentation>
            </xs:annotation>
          </xs:element>
          <xs:element name="CD34PC" type="xs:float" minOccurs="0">
            <xs:annotation>
              <xs:documentation xml:lang="en">Total number of CD34+ cells </xs:
documentation>
              </xs:annotation>
            </xs:element>
            <xs:element name="VIABILITY_CD34PC" type="viabilityType" minOccurs="0">
              <xs:annotation>
                <xs:documentation xml:lang="en">Viability information regarding CD43+
cells</xs:documentation>
                </xs:annotation>
              </xs:element>
              <xs:element name="VIABILITY_CD45PC" type="viabilityType" minOccurs="0">
                <xs:annotation>
                  <xs:documentation xml:lang="en">Viability information regarding CD45+
cells</xs:documentation>
                  </xs:annotation>
                </xs:element>
              </xs:sequence>
            </xs:complexType>
            <xs:complexType name="postProcCbuType">
              <xs:annotation>
                <xs:documentation>Post-processing (prior cryopreservation) data for CBUs</xs:
documentation>
                </xs:annotation>
              <xs:complexContent>
                <xs:extension base="postProcBaseType">
                  <xs:sequence>
                    <xs:element name="NRBC" minOccurs="0">
                      <xs:annotation>
                        <xs:documentation xml:lang="en">Total number of
nucleated red blood cells </xs:documentation>
                      </xs:annotation>
                    </xs:simpleType>
                    <xs:restriction base="xs:float">

```

```

                                <xs:minInclusive value="0.0E0"/>
                                <xs:maxInclusive value="999.9E7"/>
                            </xs:restriction>
                        </xs:simpleType>
                    </xs:element>
                </xs:sequence>
            </xs:extension>
        </xs:complexContent>
    </xs:complexType>
    <xs:complexType name="postProcAdcuType">
        <xs:annotation>
            <xs:documentation>Post-processing (prior cryopreservation) data for ADCUs</xs:
documentation>
        </xs:annotation>
        <xs:complexContent>
            <xs:extension base="postProcBaseType">
                <xs:sequence>
                    <xs:element name="RBC" minOccurs="0">
                        <xs:annotation>
                            <xs:documentation xml:lang="en">Total number of red
blood cells </xs:documentation>
                        </xs:annotation>
                        <xs:simpleType>
                            <xs:restriction base="xs:float">
                                <xs:minInclusive value="0.0E0"/>
                                <xs:maxInclusive value="99.9E9"/>
                            </xs:restriction>
                        </xs:simpleType>
                    </xs:element>
                    <xs:element name="CD3PC" type="xs:float" minOccurs="0">
                        <xs:annotation>
                            <xs:documentation xml:lang="en">Total number of CD3+
cells </xs:documentation>
                        </xs:annotation>
                    </xs:element>
                </xs:sequence>
            </xs:extension>
        </xs:complexContent>
    </xs:complexType>

```

In XSD 2.3 and before, collection and post-processing fields use flat structure and use "\_FRZN" to distinguish them.

## Version 2.3

```
<xs:element name="VOL" minOccurs="0">
  <xs:annotation>
    <xs:documentation xml:lang="en">Collected volume
before processing (without additives) in ml</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:short">
      <xs:minInclusive value="1"/>
      <xs:maxInclusive value="9999"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
<xs:element name="VOL_FRZN" minOccurs="0">
  <xs:annotation>
    <xs:documentation xml:lang="en">Total volume frozen
(post processing, prior to cryopreservation) in ml</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:short">
      <xs:minInclusive value="1"/>
      <xs:maxInclusive value="9999"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
<xs:element name="TNC" type="xs:float" minOccurs="0">
  <xs:annotation>
    <xs:documentation xml:lang="en">Total number of
nucleated cells (before processing)</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="TNC_FRZN" type="xs:float" minOccurs="0">
  <xs:annotation>
    <xs:documentation xml:lang="en">Total number of
nucleated cells (post processing, prior to cryopreservation)</xs:documentation>
  </xs:annotation>
</xs:element>
```

## Example of ADCU XML

```
<?xml version="1.0" encoding="UTF-8"?>
<INVENTORIES CREATION_TIME="2022-01-05T21:00:04Z">
  <INVENTORY LISTING_ORGANIZATION="1234" POOL="1234" CONTENT_TYPE="A" UPDATE_MODE="FULL" SNAPSHOT_TIME="
2022-02-23T13:00:08Z" SCHEMA_VERSION="2.4">
    <ADCU>
      <BIRTH_DATE>2009-09-02</BIRTH_DATE>
      <SEX>M</SEX>
      <ABO>A</ABO>
      <RHESUS>P</RHESUS>
      <ETHN>AF</ETHN>
      <CCR5>DD</CCR5>
      <HLA>
        <A>
          <SER>
            <FIELD1>1</FIELD1>
            <FIELD2>3</FIELD2>
          </SER>
          <DNA>
            <FIELD1>01:XX</FIELD1>
            <FIELD2>03:XX</FIELD2>
          </DNA>
        </A>
        <B>
          <SER>
            <FIELD1>7</FIELD1>
            <FIELD2>55</FIELD2>
          </SER>
        </B>
      </HLA>
    </ADCU>
  </INVENTORY>
</INVENTORIES>
```

```

        <DNA>
            <FIELD1>07:XX</FIELD1>
            <FIELD2>55:XX</FIELD2>
        </DNA>
    </B>
    <C>
        <SER>
            <FIELD1>3</FIELD1>
            <FIELD2>7</FIELD2>
        </SER>
        <DNA>
            <FIELD1>03:03</FIELD1>
            <FIELD2>07:XX</FIELD2>
        </DNA>
    </C>
    <E>
        <DNA>
            <FIELD1>04:01</FIELD1>
            <FIELD2>07:02</FIELD2>
        </DNA>
    </E>
    <DRB1>
        <SER>
            <FIELD1>1</FIELD1>
            <FIELD2>15</FIELD2>
        </SER>
        <DNA>
            <FIELD1>01:01</FIELD1>
            <FIELD2>15:XX</FIELD2>
        </DNA>
    </DRB1>
    <DRB3/>
    <DRB4/>
    <DRB5>
        <DNA>
            <FIELD1>01:01</FIELD1>
            <FIELD2/>
        </DNA>
    </DRB5>
    <DQA1/>
    <DQB1>
        <DNA>
            <FIELD1>05:01</FIELD1>
            <FIELD2>06:02</FIELD2>
        </DNA>
    </DQB1>
    <DPA1/>
    <DPB1>
        <DNA>
            <FIELD1>04:02</FIELD1>
            <FIELD2>11:01</FIELD2>
        </DNA>
    </DPB1>
    <MICA>
        <GLS>008:01:01/008:01:02/008:03/008:04+018:01/018:02</GLS>
    </MICA>
    <MICB>
        <GLS>003/005:02:01/005:02:02/005:02:03/005:02:04/005:08/006/010+003
/005:02:01/005:02:02/005:02:03/005:02:04/005:08/006/010</GLS>
    </MICB>
</HLA>
<KIR>
    <KIR2DL1>NEG</KIR2DL1>
    <KIR2DL2>NEG</KIR2DL2>
    <KIR2DL3>NEG</KIR2DL3>
    <KIR2DL4>POS</KIR2DL4>
    <KIR2DL5A>NEG</KIR2DL5A>
    <KIR2DL5B>NEG</KIR2DL5B>
    <KIR2DS1>POS</KIR2DS1>
    <KIR2DS2>NEG</KIR2DS2>
    <KIR2DS3>NEG</KIR2DS3>

```

/KIR\_GLS\_URI>

```
<KIR2DS4>NEG</KIR2DS4>
<KIR2DS5>NEG</KIR2DS5>
<KIR2DP1>NEG</KIR2DP1>
<KIR3DL1>NEG</KIR3DL1>
<KIR3DL2>NEG</KIR3DL2>
<KIR3DL3>NEG</KIR3DL3>
<KIR3DS1>NEG</KIR3DS1>
<KIR3DP1>NEG</KIR3DP1>
<KIR_GLS_URI>https://gl.nmdp.org/nonstrict/multilocus-unphased-genotype/4p<

</KIR>
<IDM>
  <ANTI_CMV>N</ANTI_CMV>
  <ANTI_CMV_DATE>2009-09-04</ANTI_CMV_DATE>
  <CMV_NAT>N</CMV_NAT>
  <CMV_NAT_DATE>2009-09-04</CMV_NAT_DATE>
  <HBS_AG>N</HBS_AG>
  <ANTI_HBC>N</ANTI_HBC>
  <ANTI_HBS>N</ANTI_HBS>
  <HBV_NAT>N</HBV_NAT>
  <ANTI_HCV>N</ANTI_HCV>
  <HCV_NAT>N</HCV_NAT>
  <ANTI_HEV>N</ANTI_HEV>
  <HEV_NAT>N</HEV_NAT>
  <ANTI_HIV_12>N</ANTI_HIV_12>
  <HIV_1_NAT>N</HIV_1_NAT>
  <HIV_P24>N</HIV_P24>
  <ANTI_HTLV>N</ANTI_HTLV>
  <SYPHILIS>N</SYPHILIS>
  <WNV_NAT>N</WNV_NAT>
  <ANTI_CHAGAS>N</ANTI_CHAGAS>
  <CHAGAS_NAT>N</CHAGAS_NAT>
  <EBV>H</EBV>
  <TOXO>N</TOXO>
  <PB19_NAT>N</PB19_NAT>
  <ALT>1</ALT>
</IDM>
<STATUS>AV</STATUS>
<ID>A999922000001</ID>
<LOCAL_ID>REG000001</LOCAL_ID>
<BAG_ID>BAG00BMDW001</BAG_ID>
<BANK_MANUF_ID WMDA="6789" EMDIS="EN-38"/>
<BANK_DISTRIB_ID WMDA="6789" EMDIS="EN-38"/>
<PROC_DATE>2009-09-02</PROC_DATE>
<PROC_METH>HES</PROC_METH>
<PROC_METH_TYPE>SPX</PROC_METH_TYPE>
<FREEZE_DATE>2009-09-02</FREEZE_DATE>
<FREEZE_METH>C</FREEZE_METH>
<PROD_MOD>PRR</PROD_MOD>
<BAG_TYPE>80/20</BAG_TYPE>
<BAGS>1</BAGS>
<BACT_CULT>N</BACT_CULT>
<FUNG_CULT>N</FUNG_CULT>
<HEMO_STATUS>DN</HEMO_STATUS>
<ATT_SEG>2</ATT_SEG>
<DNA_SMPL>true</DNA_SMPL>
<OTH_SMPL>true</OTH_SMPL>
<CT_COMPLETE_DATE>2016-09-22</CT_COMPLETE_DATE>
<CT_SMPL_TYPE>ED</CT_SMPL_TYPE>
<AL_RED_BC>3</AL_RED_BC>
<AL_SER>4</AL_SER>
<SER_QUANT>10.0</SER_QUANT>
<AL_PLA>2</AL_PLA>
<PLA_QUANT>10.0</PLA_QUANT>
<RELEASE_READY>true</RELEASE_READY>
<COLL_DATE>2009-09-02</COLL_DATE>
<COLL_TYPE>P</COLL_TYPE>
<POST_COLL>
  <VOL>100</VOL>
  <TNC>1.20E9</TNC>
  <CD34PC>1.50E6</CD34PC>
```

```

        <CD3PC>30.5E6</CD3PC>
    </POST_COLL>
    <POST_PROC>
        <VOL>25</VOL>
        <CFU>1.23E6</CFU>
        <MNC>552999973</MNC>
        <TNC>9.90E8</TNC>
        <VIABILITY_TNC>
            <VALUE>95</VALUE>
            <METHOD>7A</METHOD>
            <DATE>2009-09-02</DATE>
        </VIABILITY_TNC>
        <CD34PC>1.10E6</CD34PC>
        <VIABILITY_CD34PC>
            <VALUE>92</VALUE>
            <METHOD>7A</METHOD>
            <DATE>2009-09-02</DATE>
        </VIABILITY_CD34PC>
        <RED_BC>9.00E7</RED_BC>
        <CD3PC>15.5E6</CD3PC>
    </POST_PROC>
    <POST_THAW>
        <CFU>2.1E5</CFU>
        <CFU_GROWTH>true</CFU_GROWTH>
        <CFU_METHOD>GM</CFU_METHOD>
        <TNC>250E7</TNC>
        <CD34PC>2.1E6</CD34PC>
        <VIABILITY_CD34PC>
            <VALUE>91</VALUE>
            <METHOD>7A</METHOD>
            <DATE>2009-09-02</DATE>
        </VIABILITY_CD34PC>
        <LAST_TEST_DATE>2009-09-02</LAST_TEST_DATE>
    </POST_THAW>
    <NMBR_TRANS>1</NMBR_TRANS>
    <NMBR_PREG>1</NMBR_PREG>
    <NMBR_MARR>0</NMBR_MARR>
    <NMBR_PBSC>0</NMBR_PBSC>
    <QA_DATE>2009-09-02</QA_DATE>
    <GRID>99991234567ABCDEF35</GRID>
</ADCU>
</INVENTORY>
</INVENTORIES>

```

## RFC 009 Add Ready-to-Ship structrue

### XSD schema changes

#### (Impact XML format) Add POST\_THAW items

Following items are added: postThawBaseType, postThawCbuType, postThawAdcuType

## Version 2.4 basicTypes.xsd

```
<xs:complexType name="postThawBaseType">
  <xs:annotation>
    <xs:documentation>Post-thaw base data</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="CFU" type="xs:float" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">Total count of colony forming units<
/xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="CFU_GROWTH" type="xs:boolean" minOccurs="0">
      <xs:annotation>
        <xs:documentation>CFU growth or not</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="CFU_METHOD" type="cfuMethodType" minOccurs="0">
      <xs:annotation>
        <xs:documentation>CFU count method</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="CD34PC" type="xs:float" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">Total number of CD34+ cells</xs:
documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="VIABILITY_CD34PC" type="viabilityType" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">Viability information regarding CD43+
cells</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="LAST_TEST_DATE" type="xs:date" minOccurs="0">
      <xs:annotation>
        <xs:documentation>last test date</xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>
```

#### Version 2.4 basicTypes.xsd

```
<xs:complexType name="postThawCbuType">
  <xs:annotation>
    <xs:documentation>Post-thaw data for CBUs</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="postThawBaseType">
      <xs:sequence>
        <xs:element name="VIABILITY_TNC" type="viabilityType" minOccurs="0">
          <xs:annotation>
            <xs:documentation xml:lang="en">Viability information
regarding TNC</xs:documentation>
          </xs:annotation>
        </xs:element>
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
<xs:complexType name="postThawAdcuType">
  <xs:annotation>
    <xs:documentation>Post-thaw data for ADCUs</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="postThawBaseType"/>
  </xs:complexContent>
</xs:complexType>
```

#### (Impact XML format)Add RELEASE\_READY field

#### Version 2.4 Inventories.xsd

```
<xs:element name="RELEASE_READY" type="xs:boolean" minOccurs="0">
  <xs:annotation>
    <xs:documentation>Identify whether unit is ready for
release by the stem cell bank</xs:documentation>
  </xs:annotation>
</xs:element>
```

#### (Impact XML )Add item cfuMethodType

```
<xs:simpleType name="cfuMethodType">
  <xs:annotation>
    <xs:documentation>Method used for CFU counting</xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:string">
    <xs:enumeration value="TT"/>
    <xs:enumeration value="GM"/>
    <xs:enumeration value="OT"/>
  </xs:restriction>
</xs:simpleType>
```

#### Example of CBU XML for RFC-009

Add POST\_THAW, RELEASE\_READY, POST\_COLL,POST\_PROC. The example of viability usage from RFC-010 also included to make the example more complete

```

...
<PLA_QUANT>10.0</PLA_QUANT>
  <POST_THAW>
    <CFU>2.1E5</CFU>
    <CFU_GROWTH>true</CFU_GROWTH>
    <CFU_METHOD>GM</CFU_METHOD>
    <TNC>250E7</TNC>
    <VIABILITY_TNC>
      <VALUE>95</VALUE>
      <METHOD>7A</METHOD>
      <DATE>2010-09-02</DATE>
    </VIABILITY_TNC>
    <CD34PC>2.1E6</CD34PC>
    <VIABILITY_CD34PC>
      <VALUE>91</VALUE>
      <METHOD>7A</METHOD>
      <DATE>2009-09-02</DATE>
    </VIABILITY_CD34PC>
    <LAST_TEST_DATE>2009-09-02</LAST_TEST_DATE>
  </POST_THAW>
  <RELEASE_READY>true</RELEASE_READY>
  <ID>WMDA0CBU001</ID>
  <COLL_DATE>2009-09-02</COLL_DATE>
  <POST_COLL>
    <VOL>100</VOL>
    <TNC>1.20E9</TNC>
    <CD34PC>1.50E6</CD34PC>
  </POST_COLL>
  <POST_PROC>
    <VOL>25</VOL>
    <CFU>1.23E6</CFU>
    <MNC>552999973</MNC>
    <TNC>9.90E8</TNC>
    <VIABILITY_TNC>
      <VALUE>95</VALUE>
      <METHOD>7A</METHOD>
      <DATE>2009-09-02</DATE>
    </VIABILITY_TNC>
    <CD34PC>1.10E6</CD34PC>
    <VIABILITY_CD34PC>
      <VALUE>92</VALUE>
      <METHOD>7A</METHOD>
      <DATE>2009-09-02</DATE>
    </VIABILITY_CD34PC>
    <RED_BC>9.00E7</RED_BC>
  </POST_PROC>
  <MAT>
...
</MAT>

```

## RFC 010 CBU viability

### XSD schema changes

(Impact XML) Add XSD viabilityType to group viability related fields

#### Version 2.4 basicTypes.xsd

```
<xs:complexType name="viabilityType">
  <xs:annotation>
    <xs:documentation>Viability fields</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="VALUE" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">Viability as percentage value</xs:
documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:short">
          <xs:minInclusive value="0"/>
          <xs:maxInclusive value="100"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
    <xs:element name="METHOD" type="viabilityMethodType" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">Method used to calculate the
viability. Note: PI and TB only allowed for TNC!</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="DATE" type="bareDateType" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">Date that viability was tested</xs:
documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>
</xs:complexType>
```

(Impact XML) Add object VIABILITY\_TNC, VIABILITY\_CD34PC in POST\_PROC object

## Version 2.4 basicTypes.xsd

```
<xs:complexType name="postProcBaseType">
  <xs:annotation>
    <xs:documentation>Post-processing (prior cryopreservation) base data</xs:
documentation>
  </xs:annotation>
  ...
  <xs:sequence>
    ...
    <xs:element name="TNC" type="xs:float" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">Total number of nucleated cells</xs:
documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="VIABILITY_TNC" type="viabilityType" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">Viability information regarding TNC<
/xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="CD34PC" type="xs:float" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">Total number of CD34+ cells </xs:
documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="VIABILITY_CD34PC" type="viabilityType" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">Viability information regarding CD43+
cells</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="VIABILITY_CD45PC" type="viabilityType" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">Viability information regarding CD45+
cells</xs:documentation>
      </xs:annotation>
    </xs:element>
    ...
  </xs:sequence>
</xs:complexType>
```

### Example CBU XML for viability

Example usage in POST\_THAW and POST\_PROC:

## XSD 2.4

```
<POST_THAW>
  <CFU>2.1E5</CFU>
  <CFU_GROWTH>true</CFU_GROWTH>
  <CFU_METHOD>GM</CFU_METHOD>
  <TNC>250E7</TNC>
  <VIABILITY_TNC>
    <VALUE>95</VALUE>
    <METHOD>7A</METHOD>
    <DATE>2010-09-02</DATE>
  </VIABILITY_TNC>
  <CD34PC>2.1E6</CD34PC>
  <VIABILITY_CD34PC>
    <VALUE>91</VALUE>
    <METHOD>7A</METHOD>
    <DATE>2009-09-02</DATE>
  </VIABILITY_CD34PC>
  <LAST_TEST_DATE>2009-09-02</LAST_TEST_DATE>
</POST_THAW>
```

## Example usage in POST\_PROC

```
<POST_PROC>
...
    <VIABILITY_TNC>
        <VALUE>95</VALUE>
        <METHOD>7A</METHOD>
        <DATE>2009-09-02</DATE>
    </VIABILITY_TNC>
    <CD34PC>1.10E6</CD34PC>
    <VIABILITY_CD34PC>
        <VALUE>92</VALUE>
        <METHOD>7A</METHOD>
        <DATE>2009-09-02</DATE>
    </VIABILITY_CD34PC>
...
</POST_PROC>
```

## Other structure improvements in XSD schema

### nmbrFieldsGroup

Group the value for number, this is an update and improvement of the XSD schema, and no change of the XML file.

#### Version 2.4 Inventories.xsd

```
<xs:group ref="nmbrFieldsGroup"/>
```

#### Version 2.4 basicTypes.xsd

```
<xs:group name="nmbrFieldsGroup">
  <xs:annotation>
    <xs:documentation>Group of number fields for donors and donors of ADCUs</xs:
documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="NMBR_TRANS" minOccurs="0">
      <xs:annotation>
        <xs:documentation xml:lang="en">Number of blood transfusions</xs:
documentation>
      </xs:annotation>
      <xs:simpleType>
        <xs:restriction base="xs:short">
          <xs:minInclusive value="0"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:element>
```

#### Version 2.3 Inventories.xsd

```
<xs:complexType name="donItemType">
  <xs:annotation>
    <xs:documentation xml:lang="en">A donor is an adult person who has consented to
donate haematopoietic progenitor cells to an unrelated patient.</xs:documentation>
  </xs:annotation>
  <xs:complexContent>
    <xs:extension base="itemBaseType">
      <xs:sequence>
        <xs:element name="ID" minOccurs="0">
          <xs:annotation>
            ...
          </xs:annotation>
          <xs:simpleType>
            <xs:restriction base="xs:short">
              <xs:minInclusive value="0"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:element>
        <xs:element name="NMBR_TRANS" minOccurs="0">
          <xs:annotation>
            <xs:documentation xml:lang="en">Number of blood
transfusions</xs:documentation>
          </xs:annotation>
          <xs:simpleType>
            <xs:restriction base="xs:short">
              <xs:minInclusive value="0"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:element>
```