**AAVLD/USAHA eCVI Data Exchange Standard**

**Non-normative Description, Explanation, and Background**

**Overall Design:**

The normative standard consists of an XML (extensible markup language) schema[[1]](#footnote-1) that defines the structure and much of the content of a data package (document or file) to be used to exchange the data from electronic certificates of veterinary inspection (eCVI) between dissimilar computer applications. It does not define the structure or function of a valid eCVI program or animal health database. Some important data requirements depend on the values of multiple fields (conditional requirements) and are not enforceable with XML schema language. These are noted in documentation within the schema and in this non-normative background.[[2]](#footnote-2)

The schema defines a single XML document type "eCVI". The document contains both required and optional components[[3]](#footnote-3). The use of "optional" here should not be misunderstood. It does not mean that the information may be ignored by compliant sending or receiving applications. Rather it means that there may exist legitimate data exchange scenarios where the specific component is not available. Making a component "required" means that if the data is unavailable, nothing should be sent because a valid document cannot be created. The committee has done its best to reject inclusion of extraneous data elements that might be considered truly "optional" in the sense that some applications would simply not be interested. An attachment mechanism can be used for applications with internal needs for these kinds of "optional" components.

Lists of valid values create a challenge for this type of standard. The eCVI XML document specifies these in three different ways. The simplest to understand but hardest to maintain are simple lists of valid values. In most cases these cannot avoid the problematic inclusion of an "other" category. Other components are defined by a pattern expressed as one or more regular expressions[[4]](#footnote-4). In a few cases only the datatype such as string, integer or date is specified. Because of its importance and based on experience with the draft version 1 standard, Animal Identifiers fall in a special category in which the type determines the specific pattern to be applied. In this case the standard specifies a fixed list of identifier types that unfortunately also includes an "other" category. Use of "other" is highly discouraged.

**Header Content:**

The document contains required header attributes for CVI Number, Issue and Expiration date, and optional attributes for Shipment Date and Permit Number.

A single Veterinarian element is required. The Veterinarian element includes optional attributes for License State, License Number, and National Accreditation Number. It includes elements for name (Person) and Address. Person is defined as a Name string and an optional Phone Number. The Phone Number includes both type and number, and can include a comment.

An element containing a list of Movement Purposes follows. See Appendix A for list of values for this and other defined fields.

Origin and Destination are each required to appear exactly once. Each is defined the same way as a Premises Type. A Premises consists of an optional Premises ID, Premises Name, and required Address. It can have zero or more Program Statuses. And it requires one or more Persons. [WHY did we make this required? Almost always available but always?]

Consignor and Consignee are optional (really conditional on whether they are the same as origin and destination but this is not enforceable with schema language.) These are defined as Contacts with the same structure as Premises but without Program Statuses. [Does it really make sense to have Prem Id and Prem Name in Contact?]

A list of Accessions allows for a single entry to carry the accession information for any number of individual tests to follow. An accession may be either a Laboratory accession or a Field testing session. A Laboratory accession includes the Lab Name, optional Lab Premises ID and Address, a required Accession Date and Accession Number. A Field test session does not include the Lab Name or Accession Number. Each Accession includes an id that is referenced by individual tests.[[5]](#footnote-5)

**Animals and Groups:**

Each Animal has a required Species Code taken from a list based on the USDA "GDB" species codes. It includes a required Inspection Date, and optional Age, Breed, and Sex. An optional Sex Detail field is available for cases not covered by the standard list. The list of Animals references those animals that are individually identified. Thus each of these elements includes a list of Animal Tags[[6]](#footnote-6). Each Animal also includes an optional list of Tests. Each Test has a Test Code (undefined string) and a list of Results as either Integer, String or Float and labeled as either RESULT or COMMENT. Each test must reference one of the Accessions listed in the header.

Group Lots are similar to Animal entries but for animals that do not include individual identification. This can even be one animal with no ID. The included data are very similar but with a required Quantity and Quantity Unit, and a Description instead of a list of Tags.

**Attachments:**

The defined content of the standard document has been kept intentionally restricted. In order to support a broad range of applications, the standard includes a provision for binary attachments. An Attachment consists of a Base64 encoded "file" and attributes to define its Document Type such as Scanned or PDF CVI or Test Chart, or the usual "Other", and MIME Type and File Name [Why Required?]. There is an optional Comment and Brand Image ID that can be referenced from individual Animal Tag entries to avoid duplication.

Applications that wish to add enhanced value can encode additional information in an Attachment using the "Other" document type and "text/xml" MIME type. The only restriction upon unknown "Other" attachments is that the meaning of the standard content must not be changed by the content of the potentially unknown attachment. It would be inappropriate to attach a list of changes made to the document, re-consignment, etc.

**Animal Tag Type Definitions:**

Each animal can have one to six Animal Tag types. This is a choice of known official identification number patterns including AIN, NUES (8 and 9) as well as various American ID, Scrapie ID, Swine Premises-Based ID, etc. Each type is defined by one or more regular expressions. [For readability, some very complicated regular expressions can be broken down into a choice of two or more simpler patterns.] Most types have only a single attribute, Number. BrandImage can be either the image itself as a base64 encoded binary image [Problem: Definition of the image compression type] or a reference to an Image attachment.

Unfortunately many of the Animal Tag Types remain defined as just a string. We need to work hard to minimize the need for these wide-open patterns.

Current Tag Type Definitions:

UN

Any String

AIN

(840)\d{12}

AMID

(USA)(\d{8,9}|\d{12})

[5-9]\d{7}

[1-3]\d{8}

4[0-6]\d{7}

470\d{6}

4710\d{5}

471100000

BRAND

Any String

BRAND-IMAGE

BrandImage as base64Binary or Brand Image IDRef

BT

\d{2}[A-Z]{2}\d{4}.?

IMP

((840)|(9[0-8]\d)|(9\d[0-8])|(124)|(484))\d{12}

MGT

Any String

N840RFID

((9[0-8]\d)|(9\d[0-8])|(124)|(484))\d{12}

NUES8

\d{2}[A-Z]{2}\d{4}

NUES9

(\d{2}|MD|MN|NM|NY|US|WY)[A-Z]{3}\d{4}

OFORID

Any String

OTH

Any String

name

Any String

SGFLID

[A-Z]{2}[A-Z0-9]{1,20}[ ][A-Z0-9]{1,20}

NPIN

[A-Z0-9]{7}[ ][A-Z0-9]{1,20}

TAT

Any String

*Others Not Defined*

FPT Feeder Pig Tag

RSSS RSSS Tag

SGFLMEAT Sheep/goat - flock ID tag - MEAT

SGSMEAT Sheep/goat - serial tag - MEAT

SGST Sheep/goat - serial tag - plastic

SGSTM Sheep/goat - serial tag - metal

TATFL Tattoo - flock ID/PIN/LID

*Others Needed?*

**Appendix A (Value Sets)**

**Movement Purposes:**

show

race

rodeo

sale

pet

breeding

feeding

grazing

training

slaughter

medicalTreatment

other

**Species:**

AQU Aquaculture

AVI Avian

BEF Beef

BIS Bison

BOV Bovine (Bison and Cattle)

CAM Camelid (Alpacas, Llamas, etc.)

CAN Canine

CAP Caprine (Goats)

CER Cervids

CHI Chickens

CLM Clams

CRA Crawfish

CTF Catfish

DAI Dairy

DEE Deer

DUC Ducks

ELK Elk

EQU Equine (Horses, Mules, Donkeys, Burros)

FEL Feline

GEE Geese

GUI Guineas

MSL Mussels

OTH Other

OVI Ovine (Sheep)

OYS Oysters

PGN Pigeon

POR Porcine (Swine)

QUA Quail

RTT Ratites (Emus, Ostriches, etc.)

SAL Salmon

SBA Striped Bass

SHR Shrimp

SLP Scallops

TIL Tilapia

TRO Trout

TUR Turkeys

**Sex:**

Female

Male

Gender Unknown

Spayed Female

Neutered Male

True Hermaphrodite

Other

**Program Status Types:**

Bovine Tuberculosis

Brucellosis (state)

Brucellosis (herd)

Johne’s (herd)

NPIP (herd)

Scrapie (herd)

PRV (herd)

PRV (area)

Trichomoniasis (herd)

EIA (herd)

**Program Status Values:**

Free

Modified Accredited

Modified Advanced Accredited

Other

1. The committee considered alternatives including JSON and making the normative standard in for form of pure narrative. XML was the clear consensus format. Given the choice of XML there was clear consensus that a machine-readable standard would be much less prone to misinterpretation. Even adding non-normative narrative documentation was controversial but with such a large part of the affected community needing something human readable, this and related narrative explanations are being added. [↑](#footnote-ref-1)
2. The committee considered more advanced XML programming tools such as schematron, RelaxNG, etc. that do allow enforcement of conditional requirements, but determined that penetration of these techniques in the target industry was too incomplete for these to be effective. The handling of Animal Identifier types is an example of how the standard is sometimes able to work around this limitation of schema language. [↑](#footnote-ref-2)
3. Data in the eCVI XML are included in both XML Elements and XML Attributes. In the interest of plain English, we've used "component" here to include both. Where a statement applies to one or the other the correct type will be used. [↑](#footnote-ref-3)
4. Regular expressions are a much more sophisticated and powerful version of the wildcards such as \* familiar to most computer users. The can specify patterns of letters, numerals, etc. in detail. [↑](#footnote-ref-4)
5. This model is ideal for herd testing where an "Accession" is usually defined by all the tests that come in together for the herd. It is less well suited for EIA testing where the more traditional (from human medicine) definition of "Accession" holds and the Accession Number references a single specimen. [↑](#footnote-ref-5)
6. Something of a misnomer since tattoos, microchips, brands, etc. are also included. [↑](#footnote-ref-6)