Package 'xportr'

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Title Utilities to Output CDISC SDTM/ADaM XPT Files

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Description Tools to build CDISC compliant data sets and check for CDISC compliance.

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BugReports https://github.com/atorus-research/xportr/issues

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`adsl_xportr` *Analysis Dataset Subject Level*

Description

An example dataset containing subject level data

Usage

```
data("adsl_xportr")
```

Format

`adsl_xportr`**:**

A data frame with 306 rows and 51 columns:

STUDYID Study Identifier

USUBJID Unique Subject Identifier

SUBJID Subject Identifier for the Study

RFSTDTC Subject Reference Start Date/Time

RFENDTC Subject Reference End Date/Time

RFXSTDTC Date/Time of First Study Treatment

RFXENDTC Date/Time of Last Study Treatment
RFICDTC Date/Time of Informed Consent
RFPENDTC Date/Time of End of Participation
DTHDTC Date/Time of Death
DTHFL Subject Death Flag
SITEID Study Site Identifier
AGE Age
AGEU Age Units
SEX Sex
RACE Race
ETHNIC Ethnicity
ARMCD Planned Arm Code
ARM Description of Planned Arm
ACTARMCD Actual Arm Code
ACTARM Description of Actual Arm
COUNTRY Country
DMDTC Date/Time of Collection
DMDY Study Day of Collection
TRT01P Planned Treatment for Period 01
TRT01A Actual Treatment for Period 01
TRTSDTM Datetime of First Exposure to Treatment
TRTSTMF Time of First Exposure Imputation Flag
TRTEDTM Datetime of Last Exposure to Treatment
TRTETMF Time of Last Exposure Imputation Flag
TRTSDT Date of First Exposure to Treatment
TRTEDT Date of Last Exposure to Treatment
TRTDURD Total Treatment Duration (Days)
SCRFDT Screen Failure Date
EOSDT End of Study Date
EOSSTT End of Study Status
FRVDT Final Retrieval Visit Date
RANDDT Date of Randomization
DTHDT Date of Death
DTHDTF Date of Death Imputation Flag
DTHADY Relative Day of Death
LDDTHELD Elapsed Days from Last Dose to Death
LSTALVDT Date Last Known Alive
SAFFL Safety Population Flag
RACEGR1 Pooled Race Group 1
AGEGR1 Pooled Age Group 1
REGION1 Geographic Region 1
LDDTHGR1 Last Dose to Death - Days Elapsed Group 1
DTH30FL Death Within 30 Days of Last Trt Flag
DTHA30FL Death After 30 Days from Last Trt Flag
DTHB30FL Death Within 30 Days of First Trt Flag

Source

Dataset created by `admiral::use_ad_template("adsl")`

`dataset_spec` *Example Dataset Specification*

Description

Example Dataset Specification

Usage

```
data("dataset_spec")
```

Format

`dataset_spec`**:**
A data frame with 1 row and 9 columns:

Dataset chr: Dataset
Description chr: Dataset description
Class chr: Dataset class
Structure lgl: Logical, indicating if there's a specific structure
Purpose chr: Purpose of the dataset
Key, Variables chr: Join Key variables in the dataset
Repeating chr: Indicates if the dataset is repeating
Reference Data lgl: Reference Data
Comment chr: Additional comment

`var_spec` *Example Dataset Variable Specification*

Description

Example Dataset Variable Specification

Usage

```
data("var_spec")
```

Format

`var_spec`:
A data frame with 216 rows and 19 columns:

Order Order of variable
Dataset Dataset
Variable Variable
Label Variable Label
Data Type Data Type
Length Variable Length
Significant Digits Significant Digits
Format Variable Format
Mandatory Mandatory Variable Flag
Assigned Value Variable Assigned Value
Codelist Variable Codelist
Common Common Variable Flag
Origin Variable Origin
Pages Pages
Method Variable Method
Predecessor Variable Predecessor
Role Variable Role
Comment Comment
Developer Notes Developer Notes

`xportr` *Wrapper to apply all core xportr functions and write xpt*

Description

Wrapper to apply all core xportr functions and write xpt

Usage

```
xportr(
  .df,
  var_metadata = NULL,
  df_metadata = NULL,
  domain = NULL,
  verbose = NULL,
  path,
  strict_checks = FALSE
)
```

Arguments

.df	A data frame of CDISC standard.
var_metadata	A data frame containing variable level metadata
df_metadata	A data frame containing dataset level metadata.
domain	Appropriate CDISC dataset name, e.g. ADAE, DM. Used to subset the metadata object.
verbose	The action this function takes when an action is taken on the dataset or function validation finds an issue. See 'Messaging' section for details. Options are 'stop', 'warn', 'message', and 'none'
path	Path where transport file will be written. File name sans will be used as xpt name.
strict_checks	If TRUE, xpt validation will report errors and not write out the dataset. If FALSE, xpt validation will report warnings and continue with writing out the dataset. Defaults to FALSE

Value

Returns the input dataframe invisibly

Examples

```
data("adsl_xportr", "dataset_spec", "var_spec")
adsl <- adsl_xportr

test_dir <- tempdir()

pipeline_path <- file.path(test_dir, "adslpipe.xpt")
xportr_path <- file.path(test_dir, "adslxptr.xpt")

dataset_spec_low <- setNames(dataset_spec, tolower(names(dataset_spec)))
names(dataset_spec_low)[[2]] <- "label"

var_spec_low <- setNames(var_spec, tolower(names(var_spec)))
names(var_spec_low)[[5]] <- "type"

adsl |>
  xportr_metadata(var_spec_low, "ADSL", verbose = "none") |>
  xportr_type() |>
  xportr_length() |>
  xportr_label() |>
  xportr_order() |>
  xportr_format() |>
  xportr_df_label(dataset_spec_low) |>
  xportr_write(pipeline_path)

# `xportr()` can be used to apply a whole pipeline at once
xportr(
  adsl,
  var_metadata = var_spec_low,
```

```
  df_metadata = dataset_spec_low,
  domain = "ADSL",
  verbose = "none",
  path = xportr_path
)
```

`xportr_df_label` *Assign Dataset Label*

Description

Assigns dataset label from a dataset level metadata to a given data frame. This is stored in the 'label' attribute of the dataframe.

Usage

```
xportr_df_label(.df, metadata = NULL, domain = NULL)
```

Arguments

`.df`	A data frame of CDISC standard.
`metadata`	A metacore object or a data frame containing dataset level metadata. See 'Metadata' section for details.
`domain`	Appropriate CDISC dataset name, e.g. ADAE, DM. Used to subset the metadata object.

Value

Data frame with label attributes.

Metadata

The argument passed in the 'metadata' argument can either be a metacore object, or a data.frame containing the data listed below. If metacore is used, no changes to options are required.

For data.frame 'metadata' arguments two columns must be present:

1. Domain Name - passed as the 'xportr.df_domain_name' option. Default: "dataset". This is the column subset by the 'domain' argument in the function.
2. Label Name - passed as the 'xportr.df_label' option. Default: "label". Character values to update the 'label' attribute of the dataframe This is passed to `haven::write_xpt` to note the label.

Examples

```
adsl <- data.frame(
  USUBJID = c(1001, 1002, 1003),
  SITEID = c(001, 002, 003),
  AGE = c(63, 35, 27),
  SEX = c("M", "F", "M")
)

metadata <- data.frame(
  dataset = c("adsl", "adae"),
  label = c("Subject-Level Analysis", "Adverse Events Analysis")
)

adsl <- xportr_df_label(adsl, metadata, domain = "adsl")
```

---

xportr_format *Assign SAS Format*

Description

Assigns a SAS format from a variable level metadata to a given data frame. If no format is found for a given variable, it is set as an empty character vector. This is stored in the '`format.sas`' attribute.

Usage

```
xportr_format(.df, metadata = NULL, domain = NULL, verbose = NULL)
```

Arguments

`.df`	A data frame of CDISC standard.
`metadata`	A metacore object or a data frame containing variable level metadata. See 'Metadata' section for details.
`domain`	Appropriate CDISC dataset name, e.g. ADAE, DM. Used to subset the metadata object.
`verbose`	The action this function takes when an action is taken on the dataset or function validation finds an issue. See 'Messaging' section for details. Options are 'stop', 'warn', 'message', and 'none'

Value

Data frame with `SASformat` attributes for each variable.

Format Checks

This function carries out a series of basic checks to ensure the formats being applied make sense.

Note, the 'type' of message that is generated will depend on the value passed to the `verbose` argument: with 'stop' producing an error, 'warn' producing a warning, or 'message' producing a message. A value of 'none' will not output any messages.

1. If the variable has a suffix of `DT`, `DTM`, or `TM` excluding `ELTM` (indicating a numeric date/time variable) , then a message will be shown if there is no format associated with it.
2. If a variable is character then a message will be shown if there is no `$` prefix in the associated format.
3. If a variable is character then a message will be shown if the associated format has greater than 31 characters (excluding the `$`).
4. If a variable is numeric then a message will be shown if there is a `$` prefix in the associated format.
5. If a variable is numeric then a message will be shown if the associated format has greater than 32 characters.
6. All formats will be checked against a list of formats considered 'standard' as part of an ADaM dataset. Note, however, this list is not exhaustive (it would not be feasible to check all the functions within the scope of this package). If the format is not found in the 'standard' list, then a message is created advising the user to check.

Format Name	w Values	d Values
w.d	1 - 32	., 0 - 31
$w.	1 - 200	
DATEw.	., 5 - 11	
DATETIMEw.	7 - 40	
DDMMYYw.	., 2 - 10	
HHMM.		
MMDDYYw.	., 2 - 10	
TIMEw.	., 2 - 20	
WEEKDATEw.	., 3 - 37	
YYMMDDw.	., 2 - 10	
B8601DAw.	., 8 - 10	
B8601DTw.d	., 15 - 26	., 0 - 6
B8601TM.		
IS8601DA.		
IS8601TM.		
E8601DAw.	., 10	
E8601DNw.	., 10	
E8601DTw.d	., 16 - 26	., 0 - 6
E8601DXw.	., 20 - 35	
E8601LXw.	., 20 - 35	
E8601LZw.	., 9 - 20	
E8601TMw.d	., 8 - 15	., 0 - 6
E8601TXw.	., 9 - 20	
E8601TZw.d	., 9 - 20	., 0 - 6

Metadata

The argument passed in the 'metadata' argument can either be a metacore object, or a data.frame containing the data listed below. If metacore is used, no changes to options are required.

For data.frame 'metadata' arguments three columns must be present:

1. Domain Name - passed as the 'xportr.domain_name' option. Default: "dataset". This is the column subset by the 'domain' argument in the function.
2. Format Name - passed as the 'xportr.format_name' option. Default: "format". Character values to update the '`format.sas`' attribute of the column. This is passed to `haven::write_xpt` to note the format.
3. Variable Name - passed as the 'xportr.variable_name' option. Default: "variable". This is used to match columns in '.df' argument and the metadata.

Examples

```
adsl <- data.frame(
  USUBJID = c(1001, 1002, 1003),
  BRTHDT = c(1, 1, 2)
)

metadata <- data.frame(
  dataset = c("adsl", "adsl"),
  variable = c("USUBJID", "BRTHDT"),
  format = c(NA, "DATE9.")
)

adsl <- xportr_format(adsl, metadata, domain = "adsl")
```

`xportr_label` *Assign Variable Label*

Description

Assigns variable label from a variable level metadata to a given data frame. This function will give detect if a label is greater than 40 characters which isn't allowed in XPT v5. If labels aren't present for the variable it will be assigned an empty character value. Labels are stored in the 'label' attribute of the column.

Usage

```
xportr_label(.df, metadata = NULL, domain = NULL, verbose = NULL)
```

Arguments

`.df`	A data frame of CDISC standard.
`metadata`	A metacore object or a data frame containing variable level metadata. See 'Metadata' section for details.
`domain`	Appropriate CDISC dataset name, e.g. ADAE, DM. Used to subset the metadata object.
`verbose`	The action this function takes when an action is taken on the dataset or function validation finds an issue. See 'Messaging' section for details. Options are 'stop', 'warn', 'message', and 'none'

Value

Data frame with label attributes for each variable.

Messaging

If there are any columns present in the '.df' that are not noted in the metadata, they are assigned an empty string as a label and a message will be generated noting the number of those variables.

If there are variables in the metadata that don't exist in '.df', they will be skipped and a message will be generated noting the number of metadata variables skipped.

In both cases, if the value passed to the 'verbose' argument is 'stop', 'warn', or 'message', a complete list of the affected variables will be provided.

Additionally, if a variable label is longer than 40 characters, a complete list of those variables will be provided as a warning, regardless of the value of the 'verbose' argument.

Metadata

The argument passed in the 'metadata' argument can either be a metacore object, or a data.frame containing the data listed below. If metacore is used, no changes to options are required.

For data.frame 'metadata' arguments three columns must be present:

1. Domain Name - passed as the 'xportr.domain_name' option. Default: "dataset". This is the column subset by the 'domain' argument in the function.
2. Variable Name - passed as the 'xportr.variable_name' option. Default: "variable". This is used to match columns in '.df' argument and the metadata.
3. Variable Label - passed as the 'xportr.label' option. Default: "label". These character values to update the 'label' attribute of the column. This is passed to `haven::write_xpt` to note the label.

Examples

```
adsl <- data.frame(
  USUBJID = c(1001, 1002, 1003),
  SITEID = c(001, 002, 003),
  AGE = c(63, 35, 27),
  SEX = c("M", "F", "M")
)
```

```
metadata <- data.frame(
  dataset = "adsl",
  variable = c("USUBJID", "SITEID", "AGE", "SEX"),
  label = c("Unique Subject Identifier", "Study Site Identifier", "Age", "Sex")
)

adsl <- xportr_label(adsl, metadata, domain = "adsl")
```

`xportr_length` *Assign SAS Length*

Description

Assigns the SAS length to a specified data frame, either from a metadata object or based on the calculated maximum data length. If a length isn't present for a variable the length value is set to maximum data length for character columns, and 8 for non-character columns. This value is stored in the 'width' attribute of the column.

Usage

```
xportr_length(
  .df,
  metadata = NULL,
  domain = NULL,
  verbose = NULL,
  length_source = c("metadata", "data")
)
```

Arguments

`.df`	A data frame of CDISC standard.
`metadata`	A metacore object or a data frame containing variable level metadata. See 'Metadata' section for details.
`domain`	Appropriate CDISC dataset name, e.g. ADAE, DM. Used to subset the metadata object.
`verbose`	The action this function takes when an action is taken on the dataset or function validation finds an issue. See 'Messaging' section for details. Options are 'stop', 'warn', 'message', and 'none'
`length_source`	Choose the assigned length from either metadata or data. If `"metadata"` is specified, the assigned length is from the metadata length. If `"data"` is specified, the assigned length is determined by the calculated maximum data length. *Permitted Values*: `"metadata"`, `"data"`

Value

Data frame with SAS default length attributes for each variable.

Messaging

If there are any columns present in the '.df' that are not noted in the metadata, or any variables in metadata that have missing length values, their length is set to maximum data length for character columns, and 8 for non-character columns. A message will be generated noting the number of those variables.

If there are variables in the metadata that don't exist in '.df', they will be skipped and a message will be generated noting the number of metadata variables skipped.

In both cases, if the value passed to the 'verbose' argument is 'stop', 'warn', or 'message', a complete list of the affected variables will be provided.

Metadata

The argument passed in the 'metadata' argument can either be a metacore object, or a data.frame containing the data listed below. If metacore is used, no changes to options are required.

For data.frame 'metadata' arguments three columns must be present:

1. Domain Name - passed as the 'xportr.domain_name' option. Default: "dataset". This is the column subset by the 'domain' argument in the function.
2. Variable Name - passed as the 'xportr.variable_name' option. Default: "variable". This is used to match columns in '.df' argument and the metadata.
3. Variable Label - passed as the 'xportr.length' option. Default: "length". These numeric values to update the 'width' attribute of the column. This is passed to `haven::write_xpt` to note the variable length.

Examples

```
adsl <- data.frame(
  USUBJID = c(1001, 1002, 1003),
  BRTHDT = c(1, 1, 2)
)

metadata <- data.frame(
  dataset = c("adsl", "adsl"),
  variable = c("USUBJID", "BRTHDT"),
  length = c(10, 8)
)

adsl <- xportr_length(adsl, metadata, domain = "adsl", length_source = "metadata")
```

`xportr_metadata` *Set variable specifications and domain*

Description

Sets metadata and/or domain for a dataset in a way that can be accessed by other xportr functions. If used at the start of an xportr pipeline, it removes the need to set metadata and domain at each step individually. For details on the format of the metadata, see the 'Metadata' section for each function in question.

Usage

```
xportr_metadata(.df, metadata = NULL, domain = NULL, verbose = NULL)
```

Arguments

`.df`	A data frame of CDISC standard.
`metadata`	A metacore object or a data frame containing variable level metadata. See 'Metadata' section for details.
`domain`	Appropriate CDISC dataset name, e.g. ADAE, DM. Used to subset the metadata object.
`verbose`	The action this function takes when an action is taken on the dataset or function validation finds an issue. See 'Messaging' section for details. Options are 'stop', 'warn', 'message', and 'none'

Value

`.df` dataset with metadata and domain attributes set

Examples

```
metadata <- data.frame(
  dataset = "test",
  variable = c("Subj", "Param", "Val", "NotUsed"),
  type = c("numeric", "character", "numeric", "character"),
  format = NA,
  order = c(1, 3, 4, 2)
)

adlb <- data.frame(
  Subj = as.character(123, 456, 789),
  Different = c("a", "b", "c"),
  Val = c("1", "2", "3"),
  Param = c("param1", "param2", "param3")
)

xportr_metadata(adlb, metadata, "test")
```

```
adlb |>
  xportr_metadata(metadata, "test") |>
  xportr_type() |>
  xportr_order()
```

`xportr_options` *Get or set xportr options*

Description

There are two mechanisms for working with options for xportr. One is the `options()` function, which is part of base R, and the other is the `xportr_options()` function, which is in the xportr package. The reason for these two mechanisms is has to do with legacy code and scoping.

The `options()` function sets options globally, for the duration of the R process. The `getOption()` function retrieves the value of an option. All xportr related options of this type are prefixed with `"xportr."`.

Usage

```
xportr_options(...)
```

Arguments

`...`	Options to set, with the form `name = value` or a character vector of option names.

Options with `options()`

xportr.df_domain_name defaults to `"dataset"`
The name of the domain "name" column in dataset metadata.

xportr.df_label defaults to `"label"`
The column noting the dataset label in dataset metadata.

xportr.domain_name defaults to `"dataset"`
The name of the domain "name" column in variable metadata.

xportr.variable_name defaults to `"variable"`
The name of the variable "name" in variable metadata.

xportr.type_name defaults to `"type"`
The name of the variable type column in variable metadata.

xportr.label defaults to `"label"`
The name of the variable label column in variable metadata.

xportr.length defaults to `"length"`
The name of the variable length column in variable metadata.

xportr.order_name defaults to `"order"`
The name of the variable order column in variable metadata.

xportr.format_name defaults to "format"
The name of the variable format column in variable metadata.

xportr.format_verbose defaults to "none"
The default argument for the 'verbose' argument for xportr_format.

xportr.label_verbose defaults to "none"
The default argument for the 'verbose' argument for xportr_label.

xportr.length_verbose defaults to "none"
The default argument for the 'verbose' argument for xportr_length.

xportr.type_verbose defaults to "none"
The default argument for the 'verbose' argument for xportr_type.

xportr.order_verbose defaults to "none"
The default argument for the 'verbose' argument for xportr_order.

xportr.character_types defaults to "character"
The default character vector used to explicitly coerce R classes to character XPT types.

xportr.character_metadata_types defaults to c("character", "char", "text", "date", "posixct", "posixt", "datetime", "time", "partialdate", "partialtime", "partialdatetime", "incompletedatetime", "durationdatetime", "intervaldatetime")
The default character vector used to explicitly coerce R classes to character XPT types.

xportr.numeric_metadata_types defaults to c("integer", "numeric", "num", "float")
The default character vector used to explicitly coerce R classes to numeric XPT types.

xportr.numeric_types defaults to c("integer", "float", "numeric", "posixct", "posixt", "time", "date", "hms")
The default character vector used to explicitly coerce R classes to numeric XPT types.

Options with xportr_options()

Alternative to the options(), the xportr_options() function can be used to set the options. The xportr_options() function also returns the current options when a character vector of the options keys are passed into it. If nothing is passed into it, it returns the state of all xportr options.

Examples

```
xportr_options("xportr.df_label")
xportr_options(xportr.df_label = "data_label", xportr.label = "custom_label")
xportr_options(c("xportr.label", "xportr.df_label"))
xportr_options()
```

---

xportr_order *Order variables of a dataset according to Spec*

Description

The dplyr::arrange() function is used to order the columns of the dataframe. Any variables that are missing an order value are appended to the end of the dataframe after all of the variables that have an order.

Usage

```
xportr_order(.df, metadata = NULL, domain = NULL, verbose = NULL)
```

Arguments

`.df`	A data frame of CDISC standard.
`metadata`	A metacore object or a data frame containing variable level metadata. See 'Metadata' section for details.
`domain`	Appropriate CDISC dataset name, e.g. ADAE, DM. Used to subset the metadata object.
`verbose`	The action this function takes when an action is taken on the dataset or function validation finds an issue. See 'Messaging' section for details. Options are 'stop', 'warn', 'message', and 'none'

Value

Dataframe that has been re-ordered according to spec

Messaging

There are three primary messages output by `xportr_order()`.

The first identifies the "moved" variables. These are the variables that were either not found in the metadata file or had missing order values, and therefore moved to the end of the dataset. A message will be generated noting the number, if any, of variables that were moved to the end of the dataset.

The second message identifies the "reordered" variables. These are the variables that were in the dataset, but not in the correct order. A message will be generated noting the number, if any, of variables that have been reordered.

The third message identifies the "skipped" metadata variables. These are the metadata variables missing from the dataset and therefore skipped from processing. A message will be generated noting the number, if any, of metadata variables that have been skipped.

In all three cases, if the value passed to the `verbose` argument is `stop`, `warn`, or `message`, a complete list of the affected variables will be provided.

Metadata

The argument passed in the 'metadata' argument can either be a metacore object, or a data.frame containing the data listed below. If metacore is used, no changes to options are required.

For data.frame 'metadata' arguments three columns must be present:

1. Domain Name - passed as the 'xportr.domain_name' option. Default: "dataset". This is the column subset by the 'domain' argument in the function.
2. Variable Name - passed as the 'xportr.variable_name' option. Default: "variable". This is used to match columns in '.df' argument and the metadata.
3. Variable Order - passed as the 'xportr.order_name' option. Default: "order". These values used to arrange the order of the variables. If the values of order metadata are not numeric, they will be coerced to prevent alphabetical sorting of numeric values.

Examples

```
adsl <- data.frame(
  BRTHDT = c(1, 1, 2),
  STUDYID = c("mid987650", "mid987650", "mid987650"),
  TRT01A = c("Active", "Active", "Placebo"),
  USUBJID = c(1001, 1002, 1003)
)

metadata <- data.frame(
  dataset = c("adsl", "adsl", "adsl", "adsl"),
  variable = c("STUDYID", "USUBJID", "TRT01A", "BRTHDT"),
  order = 1:4
)

adsl <- xportr_order(adsl, metadata, domain = "adsl")
```

---

xportr_split *Deprecated - Split xpt file output*

Description

[Deprecated]

This function is *deprecated*. Please use the argument `max_gb_size` in the function xportr_write()‘ instead.

Per the FDA Study Data Technical Conformance Guide(https://www.fda.gov/media/88173/download) section 3.3.2, dataset files sizes shouldn't exceed 5 GB. If datasets are large enough, they should be split based on a variable. For example, laboratory readings in `ADLB` can be split by `LBCAT` to split up hematology and chemistry data.

This function will tell `xportr_write()` to split the data frame based on the variable passed in `split_by`. When written, the file name will be prepended with a number for uniqueness. These files should be noted in the Reviewer Guides per CDISC guidance to note how you split your files.

Usage

```
xportr_split(.df, split_by = NULL)
```

Arguments

`.df`	A data frame of CDISC standard.
`split_by`	A quoted variable that will be passed to `base::split()`.

Value

A data frame with an additional attribute added so `xportr_write()` knows how to split the data frame.

Examples

```
adlb <- data.frame(
  USUBJID = c(1001, 1002, 1003),
  LBCAT = c("HEMATOLOGY", "HEMATOLOGY", "CHEMISTRY")
)

adlb <- xportr_split(adlb, "LBCAT")
```

---

xportr_type *Coerce variable type*

Description

XPT v5 datasets only have data types of character and numeric. `xportr_type()` attempts to collapse R classes to those two XPT types. The 'xportr.character_types' option is used to explicitly collapse the class of a column to character using `as.character()`. Similarly, 'xportr.numeric_types' will collapse a column to a numeric type. (See `xportr_options()` for default values of these options.) If no type is passed for a variable, it is assumed to be numeric and coerced with `as.numeric()`.

Usage

```
xportr_type(.df, metadata = NULL, domain = NULL, verbose = NULL)
```

Arguments

`.df`	A data frame of CDISC standard.
`metadata`	A metacore object or a data frame containing variable level metadata. See 'Metadata' section for details.
`domain`	Appropriate CDISC dataset name, e.g. ADAE, DM. Used to subset the metadata object.
`verbose`	The action this function takes when an action is taken on the dataset or function validation finds an issue. See 'Messaging' section for details. Options are 'stop', 'warn', 'message', and 'none'

Details

Certain care should be taken when using timing variables. R serializes dates based on a reference date of 01/01/1970 where XPT uses 01/01/1960. This can result in dates being 10 years off when outputting from R to XPT if you're using a date class. For this reason, `xportr` will try to determine what should happen with variables that appear to be used to denote time.

Value

Returns the modified table.

Messaging

`type_log()` is the primary messaging tool for `xportr_type()`. The number of column types that mismatch the reported type in the metadata, if any, is reported by `xportr_type()`. If there are any type mismatches, and the 'verbose' argument is 'stop', 'warn', or 'message', each mismatch will be detailed with the actual type in the data and the type noted in the metadata.

Metadata

The argument passed in the 'metadata' argument can either be a metacore object, or a data.frame containing the data listed below. If metacore is used, no changes to options are required.

For data.frame 'metadata' arguments four columns must be present:

1. Domain Name - passed as the 'xportr.domain_name' option. Default: "dataset". This is the column subset by the 'domain' argument in the function.
2. Variable Name - passed as the 'xportr.variable_name' option. Default: "variable". This is used to match columns in '.df' argument and the metadata.
3. Variable Type - passed as the 'xportr.type_name'. Default: "type". This is used to note the XPT variable "type" options are numeric or character.
4. (Option only) Character Types - The list of classes that should be explicitly coerced to a XPT Character type. Default: c("character", "char", "text", "date", "posixct", "posixt", "datetime", "time", "partialdate", "partialtime", "partialdatetime", "incompletedatetime", "durationdatetime", "intervaldatetime")‘
5. (Option only) Numeric Types - The list of classes that should be explicitly coerced to a XPT numeric type. Default: c("integer", "numeric", "num", "float")

Examples

```
metadata <- data.frame(
  dataset = "test",
  variable = c("Subj", "Param", "Val", "NotUsed"),
  type = c("numeric", "character", "numeric", "character")
)

.df <- data.frame(
  Subj = as.character(c(123, 456, 789)),
  Different = c("a", "b", "c"),
  Val = c("1", "2", "3"),
  Param = c("param1", "param2", "param3")
)

df2 <- xportr_type(.df, metadata, "test")
```

`xportr_write` *Write xpt v5 transport file*

Description

Writes a local data frame into SAS transport file of version 5. The SAS transport format is an open format, as is required for submission of the data to the FDA.

Usage

```
xportr_write(
  .df,
  path,
  max_size_gb = NULL,
  metadata = NULL,
  domain = NULL,
  strict_checks = FALSE
)
```

Arguments

`.df`	A data frame to write.
`path`	Path where transport file will be written. File name sans will be used as `xpt` name.
`max_size_gb`	Maximum size in GB of the exported file(s). If size of xpt file exceeds the specified maximum, it will split the data frame into multiple exported chunk(s).
`metadata`	A metacore object or a data frame containing dataset level metadata. See 'Metadata' section for details. If provided, `xportr_df_label()` will be called to set the dataset label before writing the XPT file.
`domain`	Appropriate CDISC dataset name, e.g. ADAE, DM. Used to subset the metadata object.
`strict_checks`	If TRUE, xpt validation will report errors and not write out the dataset. If FALSE, xpt validation will report warnings and continue with writing out the dataset. Defaults to FALSE

Details

- Variable and dataset labels are stored in the "label" attribute.
- SAS format are stored in the "SASformat" attribute.
- SAS type are based on the `metadata` attribute.

Value

A data frame. `xportr_write()` returns the input data invisibly.

Metadata

The argument passed in the 'metadata' argument can either be a metacore object, or a data.frame containing the data listed below. If metacore is used, no changes to options are required.

For data.frame 'metadata' arguments two columns must be present:

1. Domain Name - passed as the 'xportr.df_domain_name' option. Default: "dataset". This is the column subset by the 'domain' argument in the function.
2. Label Name - passed as the 'xportr.df_label' option. Default: "label". Character values to update the 'label' attribute of the dataframe This is passed to `haven::write_xpt` to note the label.

Examples

```
adsl <- data.frame(
  SUBL = as.character(123, 456, 789),
  DIFF = c("a", "b", "c"),
  VAL = c("1", "2", "3"),
  PARAM = c("param1", "param2", "param3")
)

var_spec <- data.frame(
  dataset = "adsl",
  label = "Subject-Level Analysis Dataset",
  data_label = "ADSL"
)
xportr_write(adsl,
  path = paste0(tempdir(), "/adsl.xpt"),
  domain = "adsl",
  metadata = var_spec,
  strict_checks = FALSE
)
```

`xpt_validate` *Validate Dataset Can be Written to xpt*

Description

Function used to validate dataframes before they are sent to `haven::write_xpt` for writing.

Usage

```
xpt_validate(data)
```

Arguments

`data`	Dataset to be exported as xpt file

Details

`xpt_validate()` performs four focused checks before `xportr_write()` attempts to create an XPT file:

- **Variable names** – maximum of 8 characters, must start with a letter, use only ASCII alphanumeric characters (no underscores or symbols), and remain uppercase.
- **Variable labels** – maximum of 40 characters and limited to ASCII printable characters.
- **Formats** – SAS format attributes must match the internal allow-list or follow a `w.d` pattern such as `8.` or `12.3`.
- **Character data lengths** – each character column's maximum byte length cannot exceed 200.

Value

Returns a character vector of failed conditions

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