# Value Domains in DDI4

The figure below shows the model for the SubstantiveValueDomain. A SubstantiveValueDomain may have both an enumeration (list) component and a described component. The EnumerationDomain is typically extended as a CodeList and also references a set of Categories. The description of the domain is via a ValueAndConceptDescription which has several ways of describing a domain, including a text description, a regular expression, or an expression from some external system such as an R function or a mathematical expression like

{i ∈ **R** | 1 <= I <= 300}.

The SubstantiveValueDomain takes concepts from a SubstantiveConceptualDomain which may also be either enumerated via a set of Categories or described.

The structure for SentinelValueDomains is the same as for SubstantiveValueDomains.



Suppose measurements are taken by an infrared thermometer that produces values between -100 C and 300C inclusive. For temperatures above 300C the instrument returns “H” (maybe this should be “Papa bear”). For temperatures below -100C the instrument returns “L”. This is a textual description of the value domain that includes both a description (-100 <= temp <= 300) and an enumeration (H=”above 300”) and L=”below -100”).

We could also describe the value domain with an R function that returns TRUE if the value is valid and FALSE if not.

The following R example shows a value domain description as an R function that returns TRUE if in the domain and FALSE if not.

> # a vector of temperatures returned by our imaginary instrument

> temp <- c(90,-15, "H", "L", "NA", "X", 400)

>

>

> class(temp)

[1] "character"

>

> checkTemp <- function(temp){

+ sapply(temp, function(x){

+ nx <- suppressWarnings(as.double(x))

+ if( is.na(nx)){

+ # enumerations of codes (NA is missing)

+ if(x == "H") TRUE

+ else if(x == "L") TRUE

+ else if(x == "NA") TRUE

+ else FALSE

+ } else {

+ # descriptions for numerics

+ if( !is.na(nx) && nx >= -100 && nx <= 300) TRUE

+ else FALSE

+ }

+ })

+ }

>

>

> checkTemp(temp)

 90 -15 H L NA X 400

 TRUE TRUE TRUE TRUE TRUE FALSE FALSE

>