1 Namespace: "http://www.pharmml.org/2013/03/ModelDefinition"
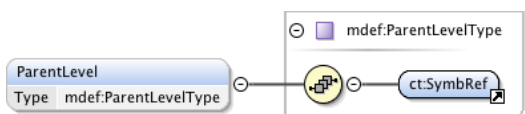
1.1 Schema(s)

1.1.1 Main schema `modelDefinition.xsd`
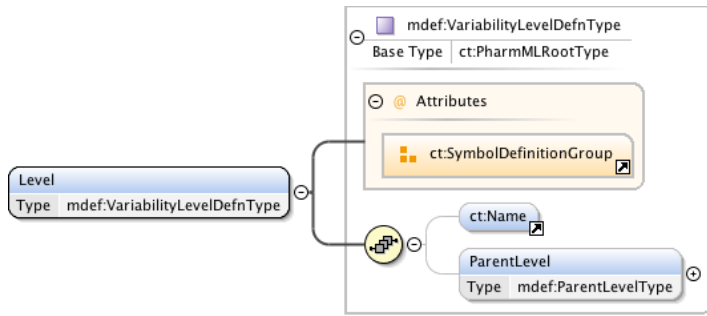
Namespace	http://www.pharmml.org/2013/03/ModelDefinition

1.2 Element(s)

1.2.1 Element `mdef:VariabilityLevelDefnType /mdef:ParentLevel`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Parent variability level.
Diagram	
Type	mdef:ParentLevelType

1.2.2 Element `mdef:VariabilityDefnBlock /mdef:Level`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	A variability level within the model.
Diagram	
Type	mdef:VariabilityLevelDefnType

1.2.3 Element `mdef:CommonParameterElement`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Abstract element defining parameters used in the model.

Diagram	
Type	mdef:CommonParameterType
Substitution Group	• mdef:SimpleParameter • mdef:IndividualParameter • mdef:RandomVariable

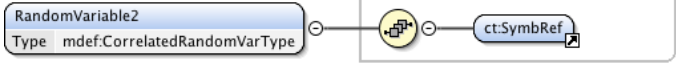### 1.2.4 Element `mdef:CommonParameterModelType /mdef:Correlation`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Defines the correlation between the random effects.
Diagram	
Type	mdef:CorrelationType

1.2.5 Element `mdef:CorrelationType /mdef:RandomVariable1`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	The first correlated parameter.

Diagram	
Type	mdef:CorrelatedRandomVarType
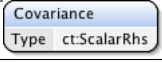
1.2.6 Element `mdef:CorrelationType /mdef:RandomVariable2`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	The second correlated parameter.
Diagram	
Type	mdef:CorrelatedRandomVarType

1.2.7 Element `mdef:CorrelationType /mdef:CorrelationCoefficient`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	The correlation co-efficient variable.
Diagram	
Type	ScalarRhs

1.2.8 Element `mdef:CorrelationType /mdef:Covariance`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	The covariance for both parameters.
Diagram	
Type	ScalarRhs

1.2.9 Element `mdef:ObservationError`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Abstract element defining an observation error.

Diagram	
Type	mdef:ObservationErrorType
Substitution Group	• mdef:Standard • mdef:General

1.2.10 Element `mdef:GaussianObsError /mdef:Transformation`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Defines the transformation (u) applied to both sides of equation.
Diagram	
Type	mdef:LhsTransformationType
Facets	enumeration `log` Natural log transformation. enumeration `logit` Logit transformation. enumeration `probit` Probit transformation.

1.2.11 Element `mdef:GaussianObsError /mdef:Output`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	The output variable from the structural model.
Diagram	

1.2.12 Element `mdef:GaussianObsError /mdef:ErrorModel`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	The error model (g) to apply to the residual error.
Diagram	

1.2.13 Element `mdef:GaussianObsError /mdef:ResidualError`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition

Annotations	The residual error (eps).
Diagram	

1.2.14 Element `mdef:GeneralObsError` /`mdef:Transformation`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Defines a transformation applied to the left-hand-side of the residual error equation.
Diagram	
Type	mdef:LhsTransformationType
Facets	

	enumeration	`log`	Natural log transformation.
	enumeration	`logit`	Logit transformation.
	enumeration	`probit`	Probit transformation.

1.2.15 Element `mdef:IndividualParameterType` /`mdef:GaussianModel`

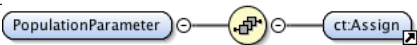|	
Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Defines a Gaussian model, with either linear or non-linear covariates.
Diagram	

1.2.16 Element `mdef:IndividualParameterType` /`mdef:GaussianModel` /`mdef:Transformation`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	The transformation (h) applied to both sides of the equation.
Diagram	
Type	mdef:LhsTransformationType
Facets	

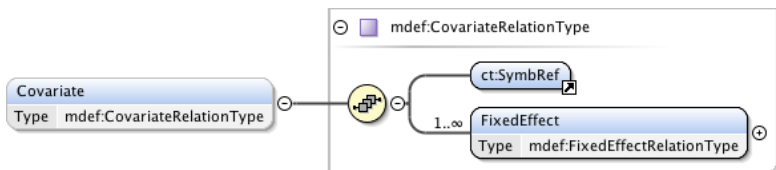|			
	enumeration	`log`	Natural log transformation.
	enumeration	`logit`	Logit transformation.
	enumeration	`probit`	Probit transformation.

1.2.17 Element `mdef:IndividualParameterType` /`mdef:GaussianModel` /`mdef:LinearCovariate`

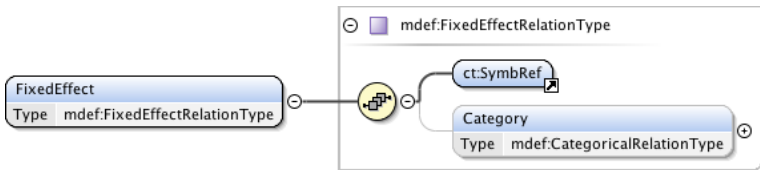|	
Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Defines the linear covariate model: h(psi_pop) + beta c_i
Diagram	

1.2.18 Element `mdef:IndividualParameterType` /`mdef:GaussianModel` /`mdef:LinearCovariate` /`mdef:PopulationParameter`

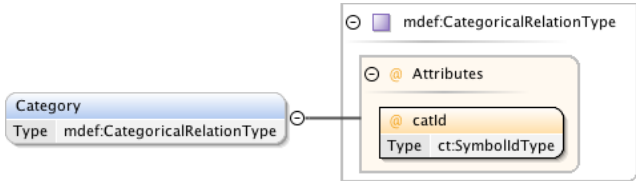|	
Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	The population parameter: psi_pop.
Diagram	

1.2.19 Element `mdef:IndividualParameterType` /`mdef:GaussianModel` /`mdef:LinearCovariate` /`mdef:Covariate`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Defines the linear covates: beta c_i
Diagram	
Type	mdef:CovariateRelationType

1.2.20 Element `mdef:CovariateRelationType` /`mdef:FixedEffect`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	The fixed effect relating the parameter and covariate.
Diagram	
Type	mdef:FixedEffectRelationType

1.2.21 Element `mdef:FixedEffectRelationType` /`mdef:Category`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition				
Annotations	Specifies the category value of the covariate that must apply when this fixed effect is to be used in the parameter equation. This is equivalent to specifying the following: 1_cov=cat . beta.				
Diagram					
Type	mdef:CategoricalRelationType				
Attributes	**QName**	**Type**	**Use**		
	catId	SymbolIdType	required		
	Specifies the category value of the covariate to which this relationship applies. For example if a covariate is sex then the Female category may be specified as catId="F".				

1.2.22 Element `mdef:IndividualParameterType /mdef:GaussianModel /mdef:GeneralCovariate`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	A general covariate model definition. This can be used to define a non-linear covariate model. This equates to H in the above definitions.
Diagram	

1.2.23 Element `mdef:IndividualParameterType /mdef:GaussianModel /mdef:RandomEffects`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	The random effects (eta) used in the gaussian parameter model.
Diagram	
Type	mdef:ParameterRandomEffectType

1.2.24 Element `mdef:CovariateDefinitionType /mdef:Continuous`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Specifies a continuous covariate.
Diagram	
Type	mdef:ContinuousCovariateType

1.2.25 Element `mdef:ContinuousCovariateType /mdef:Transformation`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	The transformation to be applied when the covariate is ued.
Diagram	
Type	mdef:CovariateTransformationType

1.2.26 Element `mdef:CovariateDefinitionType /mdef:Categorical`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Specifies a categprical covariate.
Diagram	
Type	mdef:CategorialCovariateType

1.2.27 Element `mdef:CategorialCovariateType /mdef:Category`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition					
Annotations	A category of the categorical covariate.					
Diagram						
Type	mdef:CategoryType					
Attributes	**QName**	**Type**	**Use**			
	catId	SymbolIdType	required			
		The identifier of the category.				

1.2.28 Element `mdef:CategoryType /mdef:Probability`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	The definition of the probability associated with this category.
Diagram	
Type	ScalarRhs

1.2.29 Element `mdef:SimpleParameter`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Defines a simple parameter.
Diagram	
Type	mdef:SimpleParameterType

Substitution Group Affiliation	• mdef:CommonParameterElement

1.2.30 Element `mdef:CovariateModelType /mdef:Covariate`
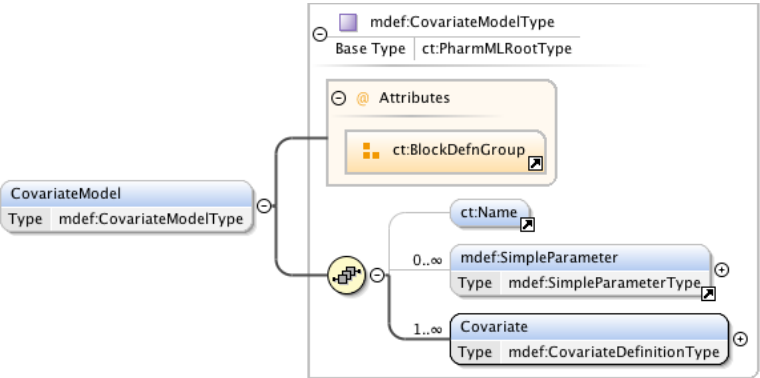
Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Defines a covariate.
Diagram	
Type	mdef:CovariateDefinitionType

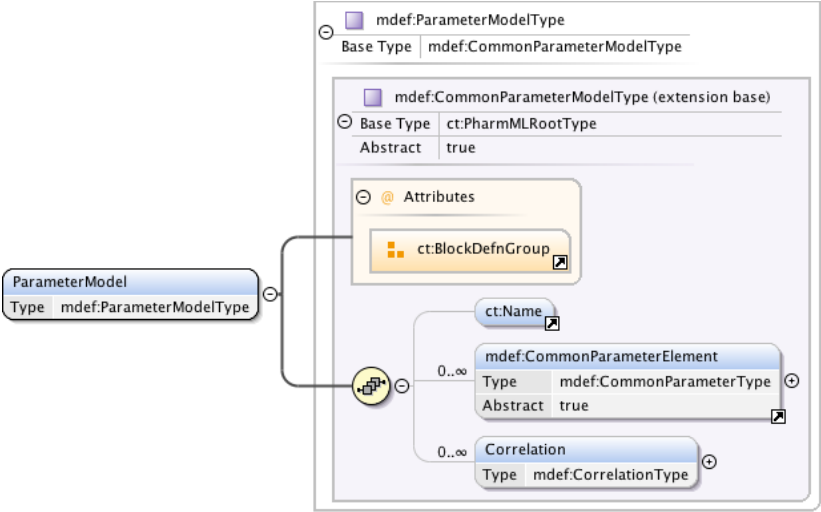### 1.2.31 Element `mdef:ModelDefinitionType /mdef:VariabilityModel`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	A variability level.
Diagram	
Type	mdef:VariabilityDefnBlock

1.2.32 Element `mdef:ModelDefinitionType /mdef:CovariateModel`
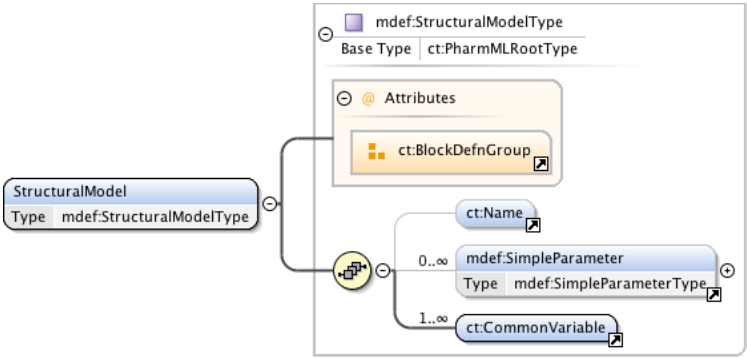
Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	A covariate model.

Diagram	
Type	mdef:CovariateModelType

1.2.33 Element `mdef:ModelDefinitionType /mdef:ParameterModel`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	A parameter model.
Diagram	
Type	mdef:ParameterModelType

1.2.34 Element `mdef:StructuralModel`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Defines a structural model.
Diagram	
Type	mdef:StructuralModelType

1.2.35 Element `mdef:ModelDefinitionType /mdef:ObservationModel`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	An observations model.
Diagram	
Type	mdef:ObservationModelType

1.2.36 Element `mdef:Standard`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Defines standard error model.
Diagram	
Type	mdef:GaussianObsError

Substitution Group Affiliation	• mdef:ObservationError

1.2.37 Element `mdef:General`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Defines general error model.
Diagram	
Type	mdef:GeneralObsError
Substitution Group Affiliation	• mdef:ObservationError

1.2.38 Element `mdef:IndividualParameter`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Defines an individual parameter.

Diagram	
Type	mdef:IndividualParameterType
Substitution Group Affiliation	• mdef:CommonParameterElement

1.2.39 Element `mdef:RandomVariable`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Defines a random variable.
Diagram	
Type	mdef:ParameterRandomVariableType
Substitution Group Affiliation	• mdef:CommonParameterElement

1.2.40 Element `mdef:ModelDefinition`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	This is the top element defining the defintion of the pharmacometric model. This contains the variability model, covariate model, parameter model, structural model and observations model.
Diagram	
Type	mdef:ModelDefinitionType

1.3 Simple Type(s)

1.3.1 Simple Type `mdef:VariabilityType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition		
Annotations	The type defining the type of variability of the variability model.		
Diagram			
Type	restriction of xs:NCName		
Facets	enumeration	error	Residual error variability.
	enumeration	model	Model variability.

1.3.2 Simple Type `mdef:LhsTransformationType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition		
Annotations	A type defining possible transformation functions that may be applied.		
Diagram			
Type	restriction of xs:token		
Facets	enumeration	log	Natural log transformation.
	enumeration	logit	Logit transformation.
	enumeration	probit	Probit transformation.

1.4 Complex Type(s)

1.4.1 Complex Type `mdef:VariabilityLevelDefnType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Defines the variability level.

Diagram	
Type	extension of PharmMLRootType

1.4.2 Complex Type `mdef:ParentLevelType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Parent level type.
Diagram	

1.4.3 Complex Type `mdef:VariabilityDefnBlock`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Type defining a block defining a variability model.
Diagram	
Type	extension of PharmMLRootType

1.4.4 Complex Type `mdef:CommonParameterModelType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Abstract type defining common parameter model.
Diagram	
Type	extension of PharmMLRootType

1.4.5 Complex Type `mdef:CommonParameterType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition

Annotations	Abstract type defining the common properties of a parameter definition.
Diagram	
Type	extension of PharmMLRootType

1.4.6 Complex Type `mdef:CorrelationType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Type defining a correlation between random effects.
Diagram	
Type	extension of PharmMLRootType

1.4.7 Complex Type `mdef:CorrelatedRandomVarType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Type defining a correlated random variable.
Diagram	
Type	extension of PharmMLRootType

1.4.8 Complex Type `mdef:ParameterModelType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	The type defining a parameter model.
Diagram	
Type	extension of mdef:CommonParameterModelType

1.4.9 Complex Type `mdef:ObservationModelType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Type defining the observation model.
Diagram	
Type	extension of mdef:CommonParameterModelType

1.4.10 Complex Type `mdef:ObservationErrorType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Base observation error type. This defines the name of the variable assigned with the result of the residual error.
Diagram	
Type	extension of PharmMLRootType

1.4.11 Complex Type `mdef:GaussianObsError`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Gaussian residual error definition. Definition is of the form: y = f + g * eps

Diagram	
Type	extension of mdef:ObservationErrorType

1.4.12 Complex Type `mdef:GeneralObsError`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	A general form of the residual error, where the error is unstructured and explicit.
Diagram	
Type	extension of mdef:ObservationErrorType

1.4.13 Complex Type `mdef:IndividualParameterType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Describes an individual parameter. Three encodings of a parameter model are available: Type 1. explicit equation type of parameter model psi_i = H(beta, c_i, eta_i) Type 2. Gaussian model with general covariate model h(psi_i) = H(beta, c_i) + eta_i Type 3. Gaussian model with linear covariate model h(psi_i) = h(psi_pop) + beta c_i + eta_i

Diagram	
Type	extension of mdef:CommonParameterType

1.4.14 Complex Type `mdef:CovariateRelationType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Type defining the relationship between the covariate and a fixed effect parameter. Typically this defines a linear relationships.
Diagram	
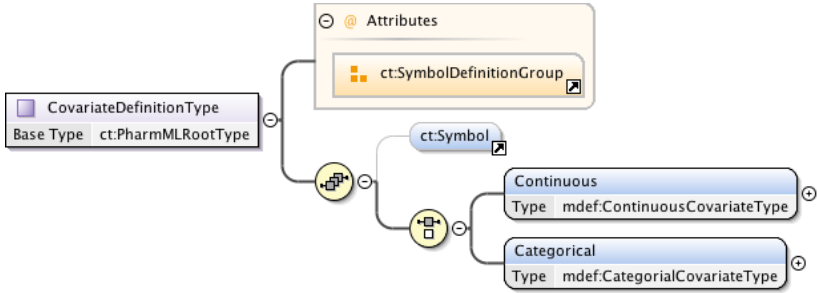
1.4.15 Complex Type `mdef:FixedEffectRelationType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Defines a fixed effect.
Diagram	
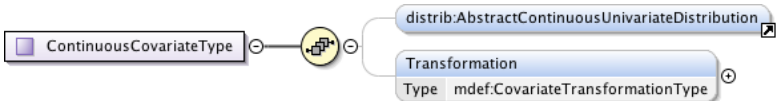
1.4.16 Complex Type `mdef:CategoricalRelationType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Type specifying a relationship to a specific category value in a categorical covariate.
Diagram	

	QName	Type	Use			
Attributes	**catId**	SymbolIdType	required			
		Specifies the category value of the covariate to which this relationship applies. For example if a covariate is sex then the Female category may be specified as catId="F".				

1.4.17 Complex Type `mdef:ParameterRandomEffectType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Type defining a Random effect using a reference to a Random variable.
Diagram	

1.4.18 Complex Type `mdef:SimpleParameterType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	This defines a parameter that does not contain any random effects. Once initialised its value will not change over time. The parameter is of type real.
Diagram	
Type	extension of mdef:CommonParameterType

1.4.19 Complex Type `mdef:ParameterRandomVariableType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Type specifies a random variable definition.
Diagram	
Type	extension of mdef:CommonParameterType

1.4.20 Complex Type `mdef:CovariateDefinitionType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Type that specifies a covariate definition.

Diagram	
Type	extension of PharmMLRootType

1.4.21 Complex Type `mdef:ContinuousCovariateType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Type defines a continuous covariate.
Diagram	
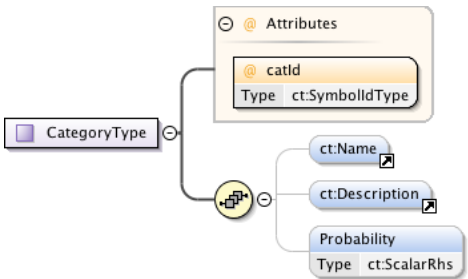
1.4.22 Complex Type `mdef:CovariateTransformationType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Type defines how the covariate is transformed when used.
Diagram	

1.4.23 Complex Type `mdef:CategorialCovariateType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Type defines a categorical covariate.
Diagram	

1.4.24 Complex Type `mdef:CategoryType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Type defines a category in a categorical covariate.
Diagram	

Attributes	QName	Type	Use			
	catId	SymbolIdType	required			
		The identifier of the category.				

1.4.25 Complex Type `mdef:StructuralModelType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Type that specifies a structural model.
Diagram	
Type	extension of PharmMLRootType

1.4.26 Complex Type `mdef:CovariateModelType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	A type defining a covariate model.
Diagram	
Type	extension of PharmMLRootType

1.4.27 Complex Type `mdef:ModelDefinitionType`

Namespace	http://www.pharmml.org/2013/03/ModelDefinition
Annotations	Type that specifies the model definition section of the PharmML document.
Diagram	

Type	extension of PharmMLRootType

2 Namespace: ""

2.1 Attribute(s)

2.1.1 Attribute `mdef:VariabilityDefnBlock /@type`

Namespace	No namespace
Annotations	Defines the type of the variability model.
Type	mdef:VariabilityType
Facets	enumeration error Residual error variability. enumeration model Model variability.

2.1.2 Attribute `mdef:CommonParameterType /@symbId`

Namespace	No namespace
Annotations	The symbol id for this parameter.
Type	SymbolIdType

2.1.3 Attribute `mdef:CategoricalRelationType /@catId`

Namespace	No namespace
Annotations	Specifies the category value of the covariate to which this relationship applies. For example if a covariate is sex then the Female category may be specified as catId="F".
Type	SymbolIdType

2.1.4 Attribute `mdef:CategoryType /@catId`

Namespace	No namespace
Annotations	The identifier of the category.
Type	SymbolIdType