

# USING MODEL-DRIVEN HEALTH TOOLS (MDHT)

# FOR PUBLIC HEALTH CASE REPORTS

User Manual Version 1

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Baltimore, Maryland

The *Public Health Data Standards Consortium* (PHDSC, The Consortium) is a national non-profit membership-based organization of federal, state and local health agencies, professional associations, academia, public and private sector organizations, international members, and individuals.

The Consortium is committed to bringing a common voice from the public health community to the national efforts of standardization of health information technology and population health data in order to improve individual and community health.

To fulfill its mission the Consortium: *Identifies priorities for new national standards* for population health data;

*Promotes integrating health-related data systems* to meet the needs of public and private organizations, agencies, and individuals;

*Participates in national and international efforts* to standardize health-related information ;

*Represents public health interests* in standards development organizations, data content committees & standards harmonization entities; and

*Educates* the public health community about health information technology standards and the health information technology community about public health.

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#### **Preparing for MDHT**

Model Driven Health Tools (MDHT) is an open source application to promote interoperability in the development of a shared electronic repository of CDA templates and documents. It promotes shared artifacts between related healthcare standards, and supports the work to develop customized CDA-based document specifications for specific needs. Its other advantage is providing the framework that seamlessly integrates design, publication, and instance generation. The work involved in creating CDA template usually requires a cross project team consisted of epidemiologists, laboratorians, clinicians, standards developers, and information systems specialists. Specifically, it is advisable that the model development team comprises of the following skill areas:

- Programming interface background and experience with the Eclipse IDE
- Public health subject matter expertise
- Vocabulary/terminology experience to look up appropriate codes
- CDA knowledge/experience

To learn how to use MDHT, the Open Health Tools MDHT project site provides many resources including <u>Guides and Tutorials</u>, <u>supplemental downloads</u>, and <u>MDHT Releases and Downloads</u>. The MDHT documentation includes:

This Using MDHT to create PHCR guide does not replace any of the current MDHT guides and tutorials, and supplements them with information about the process for using MDHT to edit and create public health case reports (PHCR).

### Installing the Eclipse software

Open Health Tools provides an MDHT Getting Started Guide that provides detailed steps for the installation of the most current release of the MDHT All-In-One windows software, and describes how to setup a new CDA-based model project. Please refer to that for the latest in-depth instructions on how to setup your environment for MDHT. The following provides a summary guideline on the process of installing and setting up MDHT for PHCR.

Windows

Download the all-in-one package to install from the MDHT project website at: <a href="https://www.projects.openhealthtools.org/sf/projects/mdht/">https://www.projects.openhealthtools.org/sf/projects/mdht/</a>)

You will need to unzip the file in a local directory. Make sure that you do not have spaces in any of the folder names for the location where the MDHT files are unpackaged. Eclipse may not work well with folder names that have spaces. An example of a good name is: *c:/eclipse* 

After unzipping the folder, Eclipse is ready to be used.

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Mac

You will need to download the software and go through step-by-step instructions for complete install. Check the Open Health Tools website to see if there are any updated mac install instructions. At the time of printing, the most up-to-date instructions were located at:

https://www.projects.openhealthtools.org/sf/discussion/do/listPosts/projects.mdht/discussion.forum11 36.topc11540;jsessionid=2DB91C372FBF9456B07168CE12318946?pageSize=-1#post\_post20216)

Once the software is extracted from the zip file into a folder, run the Eclipse software from the unzip folder. When it opens, you will see a welcome screen. Close out of the welcome screen such as the following, with 3 main zones:

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**Figure 1 MDHT Screen Zones** 

The project explorer will list all project files that have been created in the Eclipse workspace.

The Template editor is used to add templates, associations, attributes, constraints etc. It also shows the summary values for the templates and attributes that are added to the project model

The properties editor and results console is the location where the constraints can be directly edited

### **Creating an Implementation Guide Model**

To create a project, go to the project explorer and either a) select the *icon* icon at the top or b) Select File->New->Project from the application menu:

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Figure 2 Create New Project

Next, you will need to select a wizard. You should see a folder *Model Driven Health Tools* with a wizard named, *New CDA Model*. Select this wizard and click next.

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Figure 3 New CDA Model Wizard

On the next screen, enter the information for the implementation guide you will be working on. Note that you should not introduce any spaces in your model name. Use a name that is short and to the point. For example:

- Implementation Guide Namespace: PHCR
- Document: PublicHealthCaseReport
- CDA Document Conformance Reference: ccd::ContinuityOfCareDocument
- (Consult with Sondra Renly (<u>srrenly@us.ibm.com</u>) for assigned names for the Public Health CDA project models.)

Open Health Tools					
Use to create CDA Implementation Gui	de Model Project				
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Document	PublicHealthCaseReport				
CDA Document Conformance Reference	ccd::ContinuityOfCareDocument				
Template ID (Optional)					
Assigning Authority (Optional)					
Document Base Package	org.openhealthtools.mdht.cda				
Namespace URI	http://www.openhealthtools.org/mdht/uml/cda/phcr				
Document Namespace Prefix	phcr				
Package Name	publichealthcasereport				
Drofiv	PHCP				

**Figure 4 New Project Definition Screen** 

There will be a wait for a few minutes while the project is being created.

Once the application completes the task, you will have three folders created in your project explorer named:

- *org.openhealthtools.mdht.uml.cda.<projectname.model>*, e.g. *phcr.model* This is the UML model folder for the project you just created. This is where the model will be built with the vocabulary details, constraints, etc.
- *org.openhealthtools.mdht.uml.cda.<projectname.doc>*, e.g. *phcr.doc* This uses the content from the .model project to automatically create a pdf implementation guide (uses a *dita* to transform the model into the implementation guide)
- org.openhealthtools.mdht.uml.cda.<projectname>, e.g. phcr This is the project that is
  used to generate the code to produce the project artifacts. The code is used to create the
  document, validate the document and process the document. Java code is generated and
  compiled in the first project file above.

Remove CDA builder - To temporarily turn off the building of the artifacts until the project is complete, "Right-click" on the *<project name>.doc* folder, and from the menu, select add/remove CDA builder. Without executing this step, every time the model is saved, the process will run the time-consuming *dita* transform. This can be turned off temporarily while work on the model continues, until the model is more fully developed, and then, the transform can be turned back on.



Figure 5 Add/Remove CDA Builder

You will be using the Implementation Guide for CDA Release 2: Public Health Case Reporting, Release 1 document to build these templates.

### **Building the Model**

You will be building a sample model using the following sample constraints shown in Table 1 below from the implementation guide for public health case reporting. It provides specific sections that are required, or optional with specified constraints. The document will have a main document body, additional sections, with their own observations, etc.:

Public Health Case Report CDA R2 template root [ClinicalDocument: templateId 2.16.840.1.113883.10.20.15]
SHALL contain [11] code/@code="55751-2" Public Health Case Report (CodeSystem: 2.16.840.1.113883.6.1 LOINC) STATIC (CONF:546)
SHALL contain [11] component/structuredBody (CONF:605), which
SHOULD contain [01] component (CONF:914) (specialized branch), which if present
i.SHALL contain [11] PHCR Social history section (templateId:2.16.840.1.113883.10.20.15.2.22) (CONF:915)  
PHCR Social History Section [section: templateId 2.16.840.1.113883.10.20.15.2.22]
Conforms to CCD Social history section Template (templateId: 2.16.840.1.113883.10.20.1.15). SHALL contain [11] code/@code="29762-2" Social history (CodeSystem: 2.16.840.1.113883.6.1 LOINC) STATIC (CONF:1894) SHALL contain [11] title="Social History" (CONF:1895) SHALL contain [11] text (CONF:1896) SHOULD contain [0*] entry (CONF:1897) (specialized branch), which if present a. SHALL contain [11] @typeCode="DRIV" Is derived from (CodeSystem: 2.16.840.1.113883.5.1002 HL7ActRelationshipType) STATIC (CONF:1898) b. SHALL contain [11] Geotemporal history observation (templateId:2.16.840.1.113883.10.20.15.3.3) (CONF:1899)  
Geotemporal history observation [observation: templateId 2.16.840.1.113883.10.20.15.3.3]
<ol> <li>SHALL contain [11] @classCode="OBS" Observation (CodeSystem: 2.16.840.1.113883.5.6 HL7ActClass) STATIC (CONF:420)</li> <li>SHALL contain [11] @moodCode="EVN" Event (CodeSystem: 2.16.840.1.113883.5.1001 HL7ActClass) STATIC (CONF:421)</li> <li>SHALL contain [11] code/@code="55210-9" Geotemporal History (CodeSystem: 2.16.840.1.113883.6.1 LOINC) STATIC (CONF:422)</li> </ol>
··· ··· ···

You will first create the document root template. From within the *<project name>.model* file, select the <project name>.uml file and double click on it to open the model



Figure 6 Create Document Root Template Part 1

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<sup>&</sup>lt;sup>1</sup> Note that a nested SHALL statement beneath a SHOULD becomes a SHOULD because the parent constraint is optional, meaning that if the parent component exists, then there shall be a social history section. 12/10/12 Page 8 of 26

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Figure 7 Create Document Root Template Part 2

Depending on which row you're on in the template explorer, the properties will change.

From the implementation guide, you will be implementing the document constraints shown in the Table 1 above. These are the *SHALL* and *SHOULD* statements in the implementation guide for the document body. Note that if a SHALL statement is nested under a SHOULD statement, it becomes a SHOULD, (optional). For each statement, you will either be adding a section, or entering attributes and constraints to build the public health case report.

From *publichealthcasereport* document in the template editor, right click to get the menu and then select <CDA Tools> and then <Open Template Editor>



Figure 8 Open Template Editor

Because PHCR is a generalization from the CCD (Continuity of Care ) document, there may be existing populated knowledge/requirements within the tool as a result. Select the code checkbox to change the code as specified in the implementation guide, and click ok



**Figure 9 Template Editor** 

The default value is what the CCD would specify. To change this, make sure you are on the code row in the *template editor*. Then, in the *properties explorer* below, under the *Properties* tab, select the **General** tab and change the *Multiplicity* to [1..1]

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Figure 10 Properties Section					

On the next tab - CDA Tools tab - is where you put vocabulary constraints. That is, the associated LOINC code and its display name from Table 1

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	public health case report publichealthcasereport SHALL contain exactly one [11] code 2.16.840.1.113883.6.1 LOINC) (CONF-546)	e/@code="5575	1-2" Public Health Case Report (Codes	system:

Figure 11 Edit Properties on CDA Tools Tab

There is a lot of content in CCD that is static - by using that as the basis for the model, we can hard code many of the rules/constraints for the user of the template, and then only populate or change with data that are dynamic

To save, hit Ctrl S or go to menu, select File and then Save. You will be asked about additional objects that have to be saved with the model. The application does a bit of work in the background while saving.

## **Creating Section Templates**

Now you can create the Public Health Social History section. As Table 1 shows, the implementation guide states that there may be an optional PHCR Social history section, and if there is one, there are further constraints specified for the content of the section. You have created a document template and will now create an associated social history section template.

To create this section, go up to the root node, and from the right-click menu, create the template through the <Add CDA> and then select <Template>

Name		Туре	Multip	licity	Annotation
pub	Add CDA		📕 Template	1	
► c	Filter View by Cont	ainer	🖭 Code Sys	tem Vei	rsion
► C	🐂 Filter View by Reso	urce	🕮 Value Set	Versio	n
► ⊨ le	Open With	•			2.16.840.1
▶ p	Сору			:	2.16.840.1
► <mark>₽,</mark> я √() ► ₽,я √()	😭 Validate				
	CDA Tools	►			

Figure 12 Add CDA Template or Section

You will get a New template screen

	New Template
Enter template name	
PHCRSocialHistorySection	
	Cancel OK

Figure 13 New Template Screen

After selecting OK, you will then get the Model Element Selection screen to allow you to select the CCD template that your new template will be inheriting. Since the social history section is a section that will be constrained beyond CCD Social History Section, the tool already has the CCD Social History Section built in, so we can reference that. Scroll through and select the matching SocialHistorySection and select OK

\varTheta 🔿 🔿 Model Element Selection	
Choose an element:	
Matching elements:	
SDTCPatient	
Section	
ServiceEvent	
SeverityObservation	
SocialHistoryObservation	
SocialHistorySection	
SocialHistoryStatusObservation	
Specimen	
SpecimenRole	
E ST	*
StatusObservation	Ŧ
Owner:	
🔚 ccd - ccd-socialHistory.uml	
	_
(2) Cancel OK	
	1

**Figure 14 Model Element Selection Screen** 

There are additional constraints that we need to specify (e.g. in Table 1 above, there is a code and title constraint.) To implement the constraints, on the Template Editor screen that displays next, select the check boxes for code, and title to make sure they are required, then select OK.

0	0	Templa	te Editor	
phcr_t exte	test::PHCI ends ccd::	SocialHistorySecti SocialHistorySectic	on	
	Image: Class of the sector of the	sCode : ActClass [( : CE {C:LOINC#29 identialityCode : C II [01] uageCode : CS [0 dCode : ActMood Flavor : NullFlavor mCode : CS [0*] ionId : String [01] : StrucDocText : ST id : Infrastructuref alHistoryObservati	01] = DOCSECT 1762-2} 18 [01] 1] [01] = EVN [01] RootTypeld [01] on : SocialHistory	/Observation [0*]
?		(	Cancel	ОК

**Figure 15 Template Editor Screen** 

Once they are added in the template editor, select each one, and enter the additional attributes - on the Properties tab in the properties console. Enter the section title for the name and business name on the properties tab. Then on CDA Tools, put in template ID, severity, etc.

## Creating an association

Once you have created section templates for the document, you will have to link them to the document root. This will be through an *association*, which is used to create a relationship between the root document, in this example the *PublicHealthCaseReport*, and the new section that you just created, in this example the *PHCRSocialHistorySection* 

In MDHT, you can create a relationship between 2 objects using either an association represented by

a solid-headed arrow (  $\sim$  ), or a generalization represented by an open-headed arrow (  $\sim$  ).

An association represents the relationship of one section to another, e.g. a PHCR Social History Section is associated to a Public Health Case Report

Whereas a generalization describes which template the current element is derived from, e.g. derived from the CDA or the CCD

Therefore, to link the PHCR Social History Section to the document root, you will be creating an association. To do this, select the root document, *PublicHealthCaseReport* in the template editor, and then on the right click menu, <Add UML> and then <Association>. Templates are listed in alphabetical order, so the document template might not be at the top of the templates list in the template editor.

Add UML	🗆 Attribute
🕆 Filter View by Container	Association
း Filter View by Resource	Operation to
Open With	A Generalization
of Cut	{?} Constraint
Сору	Comment
🗶 Delete	Assigning Authority:
🖆 Validate	
Control	
HL7 Tools	ontain the template identifier 2.1
CDA Tools	
UML Extensions	

Figure 16 Add an Association

Then in the Association Selection screen, scroll through and select the new

*PHCRSocialHistorySection*. Note from Table 1 that this section is constrained as required under an optional constraint. There is a nested SHALL statement beneath a SHOULD, which therefore becomes a SHOULD because the parent constraint is optional. Meaning that if the parent component

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exists, then there shall be a social history section. Therefore, the association should have a multiplicity of [0..1]

Choose the association target: Matching elements: Performer2 Person PhysicalExaminationSection PhysicalExaminationSection PIVL_TS Place PlanOfCareActivity PlanOfCareActivityAct
Matching elements: Performer2 Person PHCRSocialHistorySection PhysicalExaminationSection PIVL_TS Place PlanOfCareActivity PlanOfCareActivityAct
Matching elements: Performer2 Person PHCRSocialHistorySection PhysicalExaminationSection PIVL_TS Place PlanOfCareActivity PlanOfCareActivityAct
Performer2 Person PHCRSocialHistorySection PhysicalExaminationSection PIVL_TS Place PlanOfCareActivity PlanOfCareActivityAct
Person PHCRSocialHistorySection PhysicalExaminationSection PIVL_TS Place PlanOfCareActivity PlanOfCareActivityAct
<ul> <li>PHCRSocialHistorySection</li> <li>PhysicalExaminationSection</li> <li>PIVL_TS</li> <li>Place</li> <li>PlanOfCareActivity</li> <li>PlanOfCareActivityAct</li> </ul>
<ul> <li>PhysicalExaminationSection</li> <li>PIVL_TS</li> <li>Place</li> <li>PlanOfCareActivity</li> <li>PlanOfCareActivityAct</li> </ul>
PIVL_TS Place PlanOfCareActivity PlanOfCareActivityAct
Place PlanOfCareActivity PlanOfCareActivityAct
PlanOfCareActivityAct
- Hanorea cherneyher
PlanOfCareActivityEncounter
PlanOfCareActivityObservation
PlanOfCareActivityProcedure
Owner:
phcr_test - phcr_test.uml
Cancel OK

**Figure 17 Association Selection** 

Now that you have created the PHCRSocialHistorySection, you can create the associated entries for that section as described in Table 1 above. You will create some observation entries that you will then associate to the PHCRSocialHistorySection (similarly to the steps above for creating the PHCRSocialHistorySection and association).

For example, to create the Geotemporal History Observation, repeat step 16 to create a template and enter GeotemporalHistoryObservation as the template name.

Then on the Model Element Selection screen, select *Observation* as the matching element, and click OK

Choose an element:
observation
Matching elements:
Observation
ObservationMedia
ObservationRange
Owner:
cda - cda.uml
Cancel OK

Figure 18 Model Element Selection for Template

You will now select all the required elements from the Template editor as described in Section 4.14 of the implementation guide)

0	Template Editor
phcr_ exte	est::GeotemporalHistoryObservation ends cda::Observation
	Image: Construction         Image: Constructi
_	
?	Cancel OK

**Figure 19 Template Editor** 

Once they are added in the template editor, you'll see them listed as shown in the figure below

*phcr_test.uml				
ame	Туре	Multiplicity	Annotation	Value
phcr_test				
GeotemporalHistoryObservation	1		2.16.840.1.113883.10.20.15.3.	
PHCRSocialHistorySection				
🔁 code	CE	11	🔇 C:LOINC#29762-2	
🖳 title	ST	11	🔕 Social History	
🔁 text	StrucDocText	11	8	
🔻 🗡 geotemporalHistoryObservat	GeotemporalHistor	01		
🔁 classCode	🖆 HL7ActClass	11	8	OBS
🔁 code	CD	11	🙆 C:LOINC#55210-9	
E effectiveTime	IVL_TS	01	Δ	
🔁 moodCode	🖆 HL7ActMood	11	8	EVN
🔄 statusCode	CS	11	C:HL7ActStatus#completed	
🔁 text	ED	01	<b>(i)</b>	
🔁 value	CD	11	🛿 🙆 V:Geographical location histo	
			2.16.840.1.113883.10.20.1.15	
PublicHealthCaseReport				
▶ <sup>Pl,a</sup> <sub>V(I)</sub> (ccd)				

Figure 20 Model After Adding Required Elements

Select each one, and enter the additional attributes on the General and CDA Tools tabs in the properties console that display below the template editor.

Properties 🕅	🖉 Tasks 🖹 Problems 📮 Console	₫ ▽ □
🖳 < <codesyst< th=""><th>emConstraint, propertyValidation&gt;&gt; <property> code : CE</property></th><th></th></codesyst<>	emConstraint, propertyValidation>> <property> code : CE</property>	
	Vocabulary Constraints	
General	Concept Domain 🗹 Code System 🗌 Value Set	
CDA Tools	Georepi Soman Geore System Grane Set	
Documentation	Code System	
Advanced	Select Code System X CodeSystems::LOINC	
	Name:         LOINC         ID:         2.16.840.1.113883.6.1         Version:	
	Binding: Static V Code: 29762-2 Code Display Name: Social History	

#### Figure 21 Entering Additional Attributes in Properties Section

To specify the multiplicity of the section or template you just added, you have to do that on the association that allows the template to be integrated into the case report. This is done in the template browser as shown in the picture below.

V	PublicHealthCaseReport			2.16.840.1.113883.10.20.15
	⊑ code	CE	11	🔇 C:LOINC#55751-2
	Mathematical Strategy Provide A Strategy Provide	PhcrSocialHistorySe	01	A
	$\blacktriangleright$ phcrClinicalInformationSection	PhcrClinicalInforma	11	8
	Mathematical provides the second s	PhcrTreatmentInfor	01	
	Mathematical Action Action	PhcrEncountersSect	01	
	MarkelevantDxTestsSection	PhcrRelevantDxTes	01	
	MinimunizationsSection	💾 ImmunizationsSect	01	(i)
	10 DHC DDecord Target			Analysis OCI

Figure 22 Adding Multiplicity to Associations

For example, to enter the multiplicity for the geotemporalHistoryObservation template, expand the public health case report to show the associated templates. Select the

geotempoeralHistoryObservation association, which will have an association arrow in front of it, and

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enter the multiplicity in the multiplicity column of the template browser. Also select the CDA Tools tab within the properties section, and enter a Type Code of "DRIV" for the association

🔻 📃 PhcrSocialHistorySect	ion		2.16.840.1.113883.10.20.15.2.	
🔄 code	CE	11	🔇 C:LOINC#29762-2	
🗖 title	<b>∐</b> ST	11	🙆 Social History	
🔁 text	StrucDocText	11	8	
🕨 🗡 geotemporalHistor	yObservat 📃 GeotemporalHis	stor 0*	\Lambda DRIV (is derived from)	
MostRecentTimeAr	rrivedInUS/ 📃 MostRecentTim	eArı 01	A DRIV (is derived from)	
🕨 🗡 raceObservation	RaceObservatio	n 0*	A DRIV (is derived from)	
✓ occupationObserva	ation OccupationObs	erva 0*	A DRIV (is derived from)	
🕨 🗡 pregnancyObserva	tion PregnancyObse	rvat 0*	(i) DRIV (is derived from)	
	ection		2.16.840.1.113883.10.20.1.15	
PhcrTreatmentInform	ationSectio		2.16.840.1.113883.10.20.15.2.	
PregnancyObservation	n		2.16.840.1.113883.10.20.15.3.	
PublicHealthCaseReport	ort		2.16.840.1.113883.10.20.15	
RaceObservation			2.16.840.1.113883.10.20.15.3.	
ResultObservation			2.16.840.1.113883.10.20.15.3.	
ResultOrganizer			2.16.840.1.113883.10.20.15.3.	
SignsAndSymptomsO	bservation		2.16.840.1.113883.10.20.15.3.	
_				
🗏 Properties 🐹 🛛 🖉 Tasks	🖹 Problems 📮 Console			
/ < <entrv>&gt; <associat< th=""><th>tion&gt; A geotemporalHis</th><th>torvObser</th><th>vation phcrSocialHistorySection</th><th></th></associat<></entrv>	tion> A geotemporalHis	torvObser	vation phcrSocialHistorySection	
Entry		,		
General		ī		
CDA Tools	Je: DRIV (is derived from)			
Documentation	-	[		
Associatio	n Type:	Type Code:	V	
Advanced Validation	1			
Severity:	SHOULD V Rule ID(s):	CONF:1897, (	CONF:1898, CONF:1899	]
Figuro 23	Editing Properties for	or Associ	ation	

Figure 23 Editing Properties for Association

Once you've built all the section templates and have completed the model, the next step is to populate that first project. This is done by building all the MDHT objects for your model.

# Building all the MDHT objects for your model

Now that you have created your UML model, the building process can begin. Building auto-generates all of the java artifacts to be used to create, validate, and digest a case report, and creates a human readable version of the CDA from the generated java artifacts.

To start the build process, first save your model. Then, go to the main project folder and expand the folder. Locate the transform.xml file in that folder (it'll have an image 繼 of an ant next to it )



Figure 24 Running transform.xml

Right click on the file, and from the associated menu, select '*Run As*' and then '*Ant Build*' - (NOTE: Select *1 Ant Build*, not the 2nd one)

▼☆ org.openhea ▶ ➡JRE Syster ▶ ➡ Plug-in D	thtools.mdht.uml.cda.phcr_test n Library [J2SE-1.5] ependencies		Pricesocialitistorysection
Src META-IN	New	►	(cda)
model build.prc plugin.p transfore	Show In て第W Open Open With	► F3	V <sup>a</sup> <sub>D</sub> (vocab) V <sup>a</sup> <sub>D</sub> (CodeSystems)
<ul> <li>▶ 🔁 org.openhe</li> <li>▶ 🔁 org.openhe</li> <li>▶ 🔂 org.openhe</li> </ul>	Copy	жC	
▶ 🛜 org.openhe	Paste	жv	
	💢 Delete	≫	
E Outline 😫	le Remove from Context	ზ#↑	
	🚽 Mark as Landmark 🛛 🔿	1 26 1	perties 🔝 Problems 🧔 Tasks 🗐 Console
	Build Path	•	ated> Publish CDA [Ant Build] /System/Libra
	Move Rename	F2	[fop] WARNING: Page 14: Unresolved [fop] Dec 27, 2011 1:27:15 PM org.( [fop] WARNING: Page 14: Unresolved
	≧a Import ≧ Export		[fop] Dec 27, 2011 1:27:15 PM org.( [fop] WARNING: Page 15: Unresolved [fop] Dec 27, 2011 1:27:15 PM org.( [fop] Dec 27, 2011 1:27:15 PM org.(
	8 Refresh	F5	.fo2pdf.topic.fo: pdf2:
_	Open Javadoc Wizard		df2:
	Run As	•	🛔 1 Ant Build
	Debug As	►	* 2 Ant Build
_	Team	•	latal detailing directory discovering
	Compare With	►	External Tools Configurations

Figure 25 Run As Ant Build Screen

You may get an Edit Configuration screen next. Click on the JRE tab and select the radial button '*Run in the same JRE as the workspace*', then click 'Apply' and 'Run'.

After the process finishes (building and saving...), return to the model folder and select the *<project name*>.genmodel file from the model folder

JRE System Library [J2SE-1.5]
🕨 📥 Plug-in Dependencies
▶ 🗁 src
ETA-INF
🔻 🗁 model
phcr_test_Ecore.uml
phcr_test.ecore
😫 phcr_test.genmodel
🔝 build.properties
plugin.properties
🔊 transform.xml

#### **Figure 26 Select Genmodel**

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PHCRSocia ▼ 🔂 org.openhealthtools.mdht.uml.cda.phcr\_test 🕨 🛋 JRE System Library [ al New ► ▶ 📥 Plug-in Dependenci ▶ / src Show In λ₩ ▶ ► 🔂 META-INF Open F3 🗁 model Open With ► phcr\_test\_Ecore.u phcr\_test.ecore Сору жC 🔓 phcr\_test.ge Copy Qualified Name build.properties жv 💼 Paste plugin.properties X Delete ⊠ ltransform.xml 🔁 org.openhealthtools.m Remove from Context ℃公駕↓ 🔬 Mark as Landmark ℃企業↑ 🗉 Outline 🖾 Build Path ► Move... Rename... F2 0 🚵 Import... 🛃 Export... Refresh F5 Reload... Export Model Figure 27 Reload Genmodel

Right-click on this file and select 'Reload' from the associated menu.

In the Reload screen that will appear, you will accept all defaults and click on 'Next'

00	Reload	
elect a Model Impor	ter	
Create the Ecore mode	l based on UML or CMOF models	
Model Importers:		
Annotated Java		
Ecore model		
Rose class model		
UML model		
S XML Schema		
(m) /		A CONTRACT OF A CONTRACT OF

Figure 28 Select a Model Importer Screen

You will then get a 'UML Import' screen. You shouldn't need to do anything special here. Accept the defaults and click "Next".

0 0	Reload	
JML Import		-1-
Choose options, specify one or mo to load them	re '.uml2', '.uml', '.xmi', or '.cmof' URIs, and tr	· - 🕒
Model URIs:	Browse File System Browse	Workspace
platform:/resource/org.openhealth	tools.mdht.uml.cda.phcr/model/phcr_Ecore.u	ml Load
Options		
Ecore Tagged Values	Process	<b>T</b>
Derived Features	Ignore	T
Duplicate Feature Inheritance	Process	T
Duplicate Features	Process	T
Duplicate Operation Inheritance	Process	T
Duplicate Operations	Process	T
Redefining Operations	Process	•
	Ignore All P	rocess All

Figure 29 UML Import Screen During Genmodel Reload

That will take you to a 'Package Selection' screen. If everything is setup correctly, you should only see one package in the list of packages. Then select 'Finish'

<b>acka</b> Speci other	<b>ige Selection</b> ify which packages to generate a	d'
	r generator models	nd which to reference from
Root p	packages:	Select All Deselect All
Pa	ackage	File Name
1	org.openhealthtools.mdht.uml.	.cda.phcr phcr.ecore
	🛙 📴 Cda ('org.openhealthtools.m	ndht.uml.cda' plugin)
2	g org.openhealthtools.mdh	it.uml.cda
3	Datatypes (org.opennealthto arg.opennealthtools mdb	ools.mdht.uml.nl7.datatypes' plugin) at uml hIZ datatypes

Figure 30 Package Selection Screen During Genmodel Reload

Once the process completes, you will have the <project name>\_*Ecore* folder open in the Template Editor. Right click on this file and select '*Generate Model Code* '



Figure 31 Run Ecore

After the process completes successfully, you will get a '**BUILD SUCCESSFUL**' message. If not, that means there is a problem that needs to be resolved with the model, so you'll have to go through troubleshooting steps. Once the model has been built successfully, this means that the model has now been used to auto-generate the associated files. You can now browse the src folder that is created in your project folder to see the java code that was generated for the project.



Figure 32 Folders Created from After Generating Model Code

## Creating value sets and adding them to your model

The easiest way to start off adding value sets is to copy one of the vocab UML files from one of the other project model folders that are in the project explorer.



Figure 33 Example of PHCR-vocab UML File

Copy this file and paste it in your model folder for the case report you are working on. Right-click and rename the file using the naming convention <project root name>-vocab.uml. You will then be modifying it to include the value sets that you require for your model.

Once you have the file copied, double click on it to open it for editing

It will open in the template browser.

Delete all the value sets that are listed by right clicking and selecting delete for each one until you have no value sets listed in your roject>-vocab.uml file.

Name	Type	Multiplicity	
🔻 🛅 ihe-vocab			
<ul> <li>✓ ConcernEntryStatus</li> <li>✓ HealthStatusValue</li> <li>✓ ProblemStatusValue</li> <li>✓ SeverityObservation</li> <li>✓ CodeSystems)</li> </ul>	Add CDA Add UML S Filter View by Container S Filter View by Resource		
	Open With	•	
	o∱ Cut È Copy X Delete	_	

Figure 34 Deleting Existing Value Sets from <proj>-vocab.uml

Then select the <old project name>-vocab listing that is the only entry left, and rename it by editing the Properties tab on the bottom half of the screen

📬 *pertussis2-voo	ab.uml 🛿		
Name		Туре	Multiplicity
ertussis-vo	cab		
Properties 🕱	🖉 Tasks   🛣 Pr	oblems 📃 Console	)
🖆 <package></package>	pertussis-vocal	b	
General	Name:	pertussis-vocab	
Documentation	Business Name:	pertussis-vocab	
Advanced			

Figure 35 Renaming Root Name in Copied <project>-vocab.uml File

Now you're ready to add in your value sets. Currently, you can only import value sets from the CDC PHIN-VADS system. In order to import a value set, you must first download a zip file of the value set from the <u>https://phinvads.cdc.gov/</u> website. Note that at this time, 50 values is the size limit for value sets that can be imported into MDHT.

Once you've downloaded the zip file for the value set, you're ready to import the value set into MDHT.

Right click on <project>-vocab file in the project browser and select OHT Model Tools, Import from PHIN VADS

#### Using MDHT Tool

🔻 🗁 org.openhealthtools.mdht.uml.cda.phc	r.pertussis.model		Name	
🔻 🗁 model				dition_vocab
🎁 pertussis.uml		_	T R Nev	WalueSetVersion1
🕨 🍞 pertussis2-vocab.uml 👘				NewCode
pertussis-vocab.uml	New	•		temeoue
org.openhealthtools.mdht.uml.cda.ph	Open Medel			
org.openhealthtools.mdht.uml.cda.ph	Open Model			
org.openhealthtools.mdht.uml.cda.ph	Open	F3		
org.openhealthtools.mdht.uml.cda.ph	Open With	•		
org.openhealthtools.mdht.uml.cda.ph	E Camu	w C		
org.openhealthtools.mdht.uml.cda.ph	Сору	жC		
org.openhealthtools.mdht.uml.cda.ph	📑 Paste	жV		
org.openhealthtools.mdht.uml.cda.ph	💢 Delete	$\mathbf{X}$		
org.openhealthtools.mdht.uml.cda.ph	Move			
org.openhealthtools.mdht.uml.cda.ph	Rename	F2		
org.openhealthtools.mdht.uml.cda.ph				
org.openhealthtools.mdht.uml.cda.ph	Export to XMI			
org.openhealthtools.mdht.uml.cda.ph	Pa Import			
org.openhealthtools.mdht.uml.cda.ph	- A Export			
org.openhealthtools.mdht.uml.cda.ph	Export			
org.openhealthtools.mdht.uml.cda.ph	Refresh	E5	- Branartia	🕅 👘 Taska
org.openhealthtools.mdht.uml.cda.ph	& Refresh	13	- Properties	
org.openhealthtools.mdht.uml.cda.ph	Validate		pertussis2	-vocab.uml - or
org.openhealthtools.mdht.uml.cda.ph	Run As	•		Property
org.openhealthtools.mdht.uml.cda.ph	Debug As	P	Resource	▼Info
org.openhealthtools.mdht.uml.cda.pil	Team	t		derived
org.openhealthtools.mdht.uml.cda.pil	Carrier Mitch	r		editable
org.openhealthtools.mdht.uml.cda.re	Compare With	► e		last modified
org.openhealthtools.mdht.uml.cda.to	Replace With	► <u>1</u>		linked
org.openhealthtools.mdht.uml.cda.to	OHT Model Tools		Import from	PHIN VADS
org.openhealthtools.mdht.uml.cda.tra	Source			name

Figure 36 Importing Value Sets into MDHT

You will get a file selection screen. Browse to the location for your downloaded value set zip file and select the file. The process will run and the value set file will be imported. At the end of the process, you should see a 'BUIILD SUCCESSFUL' message. You will have to troubleshoot the process if you do not see this message.

#### Adding a New Value Set

If you're adding a brand new value set that does not need to be imported, or adding a reference to a value set that is too large to be imported into MDHT, then right click on the <project>-vocab and select Add CDA, and then Value Set Version.

ᅾ *pertussis2-vocab.uml 🛛				
Name	Туре	Multiplicity	Annotation	Valu
- mycondition-vocab	Add CDA Add UML f: Filter View by f: Filter View by	► Container Resource	Template Code System Ve Code System Ve Code System Ve Code Set Versio	ersion on
	Open With	•		
	CDA Tools UML Extensions	) 		

Figure 37 Adding a New Value Sset

Edit the value set information in the Properties tab by adding the value set name under General tab, and the Code system, OID, Source, URL, and additional information under the CDA Tools tab.

Name	Type	Multiplicity	Annotation	Value
T mycondition	-vocab			
🖻 NewValue	SetVersion1			
		1	1	
Properties 🛛	🖉 Tasks 🔝 Problems 📮 Cons	ole		
🖻 < <valueset< td=""><td>/ersion&gt;&gt; <enumeration> Ne</enumeration></td><td>wValueSetVersior</td><td>1</td><td></td></valueset<>	/ersion>> <enumeration> Ne</enumeration>	wValueSetVersior	1	
	Value Set Version			
General	Select Code System X			
CDA Tools	Name: NewArdsonCatVersion 1			
Documentation	Name: Newvaluesetversion1		10:	
Advanced	Full Name:			
	Source:			
	URL:			
	Type: Intensional 🔻 Binding:	Static Vers	ion:	
	Release Date:	ffective Date:		
	Definition:			

Figure 38 Adding Definition to New Value Set

Now you're ready to add values to the value set. Select the value set and right click and from the menu, select Add CDA and then Value Set Code

Name	Type	Multiplicity	Annotation
▼			
NewValueSetVersion1	Add CDA		😑 Value Set Code
	Add UML	► y Container	
	E Filter view D	y kesource	

Figure 39 Adding a New Code to a Value Set

You will get a NewCode entry added to the page. In the Properties section beneath the template editor, enter the code in the Name field of the General tab, and add in the Code System, Concept Code, Concept Name, and Usage Code on the CDA Tools tab. Select the '*Add New Code*' button to continue to enter the value set codes until you are done.

## Publishing the implementation guide for your model

At the point that you have a valid MDHT model, after all errors have been correct, you can generate the implementation guide automatically for your model. This steps provides you with a pdf that will look like a typical implementation guide with all the constraints specified for your model.

Access your <project name>.doc folder, which contains all the dita files for generating the documentation for your project

Right click on the dita-transform.xml file and select Run as Ant

T provide a state of the sta CSS 🕨 🧁 dita META-INF abuild.properties dita.properties 🏨 dita-transform.xml 🐝 Pertussis Case Report CDA R2 developer.pdf 🖗 Pertussis Case Report CDA R2.pdf plugin.properties жC Copy 💼 Paste жV X Delete  $\boxtimes$ Move... Rename... F2 s.model llosis 🚵 Import... llosis.doc 🛃 Export... llosis.model 🔊 Refresh F5 doc model Validate Open Javadoc Wizard... 🌸 1 Ant Build Run As Debug As ► Team ►

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Compare With

#### Figure 40 Running the Dita Transform

External Tools Cor

You may get a dialog box that asks you to choose an Ant configuration to run. Just accept the default selection and hit OK

The process will run and if it completes successfully, you will get a "BUILD SUCCESSFUL" message.

Now go to the dita folder and right-click on spec-book.ditamap and select **MDHT** from the menu, and then select the **Publish** option



Figure 41 Running Publish Step for Implementation Guide

Once this process completes successfully, you will get a 'BUILD SUCCESSFUL' message, and the implementation guide will be generated and placed in the <project name>.doc folder (you should find it listed under the dita transform (e.g. Pertussis Case Report CDA R2 developer.pdf)