

DEPARTMENT OF HEALTH & HUMAN  
SERVICES  
Centers for Medicare & Medicaid Services  
7500 Security Boulevard, Mail Stop N2-14-26  
Baltimore, Maryland 21244-1850



## Central Data Administration

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# New Logical Model Review Procedure

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*Prepared by:*

**Centers of Medicare and Medicaid (CMS)  
Data Administration (DA)  
7500 Security Boulevard, Baltimore, Maryland 21244-1850**

## Revision and Change Description History Log

Revision	Date	Revision/Change Description	Pages Affected
Version 1.0	7/7/2009	Initial Document	All
Version 1.1	9/21/2009	Remove ACE links and replace with document names. Change reference to step 1.2.5 to 1.3.5.	pp. 3, 5 and 6
Version 2.0	3/23/2010	<ol style="list-style-type: none"> <li>1. Changed name from "Process" to "Procedure"</li> <li>2. Removed the statement that it was internal to CDA</li> <li>3. Added reference to Logical Design sub-process that it is the procedure for.</li> </ol>	pp. 3
Version 2.1	4/27/2010	Update checklist to make sure representation term consistent with attribute definition	pp. 10
Version 2.2	07/15/2010	Add CMS URL for template request	pp. 5
Version 2.3	8/18/2010	Update to reflect that there are two logical model reviews: at the end of Requirements Analysis and at the end of Design	pp. 4,7
Version 2.4	10/30/2012	Update to reflect reuse of ELDM.	pp. 5
Version 3.0	09/01/2013	Update to align to Revised DM OP&G document.	pp. 4-6,8-13
Version 4.0	10/1/2014	Remove reference to report templates. They are not supported by Erwin 9.5. Add 'domain' check as #20 in Entity list. Correct #17 in Attribute list.	pp. 5-8, 11, and 13
Version 5.0	10/1/2015	Change document name, renumbered processes and linked to sections.	Cover page and footers, remove headers, Appendix E

# Table of Contents

<b>1. INTRODUCTION .....</b>	<b>4</b>
<b>2. PREPARE RESULTS SPREADSHEET .....</b>	<b>4</b>
<b>3. REVIEW MODEL .....</b>	<b>6</b>
3.1 VALIDATE REUSE.....	6
3.2 VALIDATE STANDARDS.....	6
3.3 VALIDATE THIRD NORMAL FORM (3NF) .....	7
3.4 DETERMINE REVIEW RESULT .....	7
3.5 OBTAIN BUSINESS OWNER/REPRESENTATIVE SIGN OFF .....	8
3.6 PROVIDE CENTRAL DATA ADMINISTRATION SIGN OFF.....	8
3.7 REGISTER APPROVED MODEL .....	8
<b>APPENDIX A – MODEL LEVEL STANDARDS CHECKLIST ITEMS.....</b>	<b>9</b>
<b>APPENDIX B – ENTITY LEVEL STANDARDS CHECKLIST ITEMS .....</b>	<b>10</b>
<b>APPENDIX C – ATTRIBUTE LEVEL STANDARDS CHECKLIST ITEMS .....</b>	<b>12</b>
<b>APPENDIX D – RELATIONSHIP LEVEL STANDARDS CHECKLIST ITEMS .....</b>	<b>14</b>
<b>APPENDIX E – MODEL REVIEW PROCESS DIAGRAMS .....</b>	<b>15</b>

## 1. Introduction

This procedure is for the Logical Design sub-process 1.7.1 Perform a Quality Review of the Logical Data Model. There are two reviews, corresponding to Investment Lifecycle (ILC) phases:

- Requirements Analysis Phase – The model is reviewed at the end of this phase to make sure it meets requirements and standards before design begins. The approval at this phase is “preliminary”.
- Design Phase – The model is reviewed again to make sure that any changes made during design are consistent with standards. This is the “final” review. It is only necessary to review the model objects that have changed since the preliminary review.

Possible results of model reviews include:

- Model Approved – There were no deviations from Standards
- Model Conditionally Approved – There were some deviations from standards, but the critical standards (primarily names and definitions) were met.
- Model Not Approved – There were deviations in critical standards.

Multiple reviews may be required before Final Approval is obtained.

## 2. Prepare Results Spreadsheet

Set up the spreadsheet that will contain the results of the review:

1. Create a copy of the New Logical Model Review Results Template that is available from the Central Data Administration group (CDA) and rename it using the following format: CDA Logical Model Review Results [model name] [subject area name] [review date]
2. Initialize the following Result tabs with information from the data model.

<b>Results Tab</b>	<b>Initial Entry</b>
Entity Definition Standards	All entity names and definitions
Manual Entity Name-Domain	All entity names
Entity Key Standards	All entity names and Primary key attribute names
Entity UDPs Standards	Entity name, UDP entity requirement ID, UDP entity security category description, UDP entity ELDM name, and UDP entity data source
Attribute Definition Standards	All entity and attributes names and attribute definitions
Manual Attribute Name-Domain	All entity and attribute names
Attribute UDPs Standards	All entity and attribute names, UDP attribute data source name, UDP attribute ELDM name, and UDP attribute requirement ID

New Logical Model Review Procedure

<b>Results Tab</b>	<b>Initial Entry</b>
Relationship Standards	Parent entity name, Child entity name, and Relationship parent to child phrase

### 3. Review Model

Appendix E contains Data Flow Diagrams (DFDs) that correlate to the review processes.

#### 3.1 Validate Reuse

Validate that the entities and attributes are candidates for adopting existing entity and attribute names and definitions from the Enterprise Logical Data Model (ELDM) and other approved data models (refer to DM OP-006). Fill in tab 'Validate Reuse' in the New Model Review Results spreadsheet as follows:

1. Identify Entities and Attributes that may be candidates
2. Review relevant project models
3. Review Standard Data Models for reuse
4. Document potential candidates
5. Meet with Central Data Administration Organization CDAs to verify recommendations
6. Document decisions in the "Reuse Validation" worksheet of the Results Spreadsheet.

#### 3.2 Validate Standards

The Validate Standards steps consist of checking data model metadata against the Standards Check-List Items (appendices A – D). This is done at the model, entity, attribute, and relationship level. Fill out the Results Tabs using the following values:

Value	Condition
Y or blank	Meets the standard
N	Violates the standard
E	An exception to the standard has been granted for the object

##### 3.2.1 Model Level

Validate the Model Level Standards in Appendix A, and populate the results in the "Model Level Standards" tab of the Results Spreadsheet. Look in "Model/Model Properties", UDPs and the Entity-Relationship Diagram in the data model to find the information.

##### 3.2.2 Entity Level

The Entity Level Standards are in Appendix B. Entity Level Standards are broken into five groups, each on a separate worksheet:

- Definitions
- Names – Use the Name Checker tool
- Manual Name and Domain Check
- Keys
- UDPs

### 3.2.3 Attribute Level

The Attribute Level Standards are in Appendix C. Attribute Level Standards are broken into four groups, each on a separate worksheet:

- Definitions
- Names – Use the Name Checker tool
- Manual Name and Domain Check
- UDPs

### 3.2.4 Relationship Level

Relationship Level Standards are in Appendix D.

## 3.3 Validate Third Normal Form (3NF)

Validate that the model is in Third Normal Form (3NF) (refer to DM OP-017). To be in 3NF:

- Each attribute must be “atomic” (no multi-value attributes), i.e. be in First Normal Form (1NF)
- Each non-key attribute must depend on the entire key (no non-key attribute depends on only part of the key), i.e. be in Second Normal Form (2NF).
- Each non-key attribute is non-transitively dependent on the entire key (no non-key attribute is dependent on one or more other non-key attributes).

Document any violations of 3NF in the Third Normal Form worksheet of the Results Spreadsheet.

## 3.4 Determine Review Result

Determine the results of the Review. The results are based on what deviations were identified in the above steps. Possible choices include:

- Approved – There were no deviations. Obtain business owner sign-off (next step).
- Conditionally Approved – In order to be Conditionally Approved, all of the Standard Items in the Appendices marked as “Required” must be satisfied. Necessary changes are listed which will be made by a specified date. Send to the Project Local DA the list of contingent approval items and obtain business owner sign-off (next step). There may be deviations for those Standard Items that are not marked as required. These deviations must be fixed before Final Approval.
- Unapproved – Deviations were found for Standard Items in the Appendices marked as “Required”. Necessary changes, which need to be made before the model can be approved, are listed. Send the review output to the Project Local DA. After the Local DA has fixed the problems, the model review process should restart from the beginning.

### **3.5 Obtain Business Owner/Representative Sign Off**

This step is required for only the Preliminary Review at the end of the Requirements Analysis phase:

1. Prepare reports for the Business Owner to review (format reports for printing):
  - Entity Definitions
  - Attribute Definitions
2. Fill out a Cover Letter <insert link> explaining what you want the Business Owner to review.
3. Fill out the Central Data Administration Logical Data Model Acceptance/Sign-Off Form (per the included instructions) and send it to the Business Owner/Business Representative for approval, or waiver, to indicate the satisfaction of the model's Business Requirements. Include the reports and Cover Letter from above.

### **3.6 Provide Central Data Administration Sign Off**

Upon receipt of Business Owner/Business Representative's approval or waiver, the Central Data Administration team member should complete the Data Administration Logical Data Model Acceptance/Sign-off Form by specifying the Central DA signature and date of conditional/final approval. The Central Data Administration team member should redistribute a copy of the form to the impacted parties and post the form and model to its corresponding project library.

### **3.7 Register Approved Model**

After approval, send a copy of the model to CMS CDA.

## Appendix A – Model Level Standards Checklist Items

ID	Area	Item	Standard	Reqd? <sup>1</sup>
1	Model Properties	Does the model name conform to standards?	DM OP-028 STD #1	X
2	Model Properties	Does the model use IDEF1X notation?	DM OP-005 STD #3	X
3	Model Properties	Is the Model Author populated?	DM OP-031	X
4	Model Properties	Is the Model defined?	DM OP-028 STD #2	X
5	ERD	Is there text in the upper left corner of the model diagram that includes: the project name; subject area name, if applicable; update date; and modeler identification?	DM OP-005 STD#4	X
6	UDPs	Model Business Owner Name	DM OP 031	X
7	UDPs	Is the Model Central DA Name populated?	DM OP-031	
8	UDPs	Is the Model Version Effective Date populated?	DM OP-031	

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<sup>1</sup>'X' indicates requirement for conditional approval. All items are required for final approval.  
10/1/2015

## Appendix B – Entity Level Standards Checklist Items

ID	Area	Item	Standard	Reqd?
1	Definition	Is the definition clear, concise and unambiguous?	DM OP-008 STD #1& 3	X
2	Definition	Does the definition describe a singular occurrence of the entity?	DM OP-008 STD #4	X
3	Definition	Does the definition exclude references to technology or media?	DM OP-008 STD #6	X
4	Definition	Is an acronym in an Entity Name or Definition spelled out in the definition the first time it is used?	DM OP-008 STD #7, #8	X
5	Definition	Does the application entity that maps to an enterprise entity have the same definition? (appending application specific examples is acceptable)	DM OP-008 STD #2 DM OP-006 STD #5	X
6	Definition	Does the definition begin with “A” or “An”?	DM OP-008 STD #5	X
7	Name	Is the entity name unique throughout the Project Data Model?	DM OP-009 STD #1	X
8	Name	Does the entity name represent a single occurrence of the entity?	DM OP-009 STD #3	X
9	Name	Does the entity name consist of an Object Class Word fully spelled out?	DM OP-009 STD #2 & #4	X
10	Name	Is the first letter of each term Capitalized, and are terms separated by single spaces?	DM OP-035 STD #5 and DM OP 009 Common STD # 2	X
11	Name	Are all terms other than integers in the Glossary?	DM OP-009 Common STD #1	X
12	Name	Are all terms except acronyms spelled out in entity names?	DM OP-009 Common STD #3	X
13	Name	Does the first term of the entity name begin with a letter and is not an ordinal term (e.g. Fifth)?	DM OP-009 Common STD #4	X

New Logical Model Review Procedure

14	Name	If the entity is a code table is the last term in the name Reference?	DM OP-009 STD#5	X
15	Key	Does the entity have a primary key?	DM OP-016	X
16	UDP	Does an Entity ELDM Name (if different from the entity name in the model) exist?	DM OP-006 STD#3, DM OP-031	
17	UDP	Does an Entity Requirement ID exist?	DM OP-031	
18	UDP	Does an Entity Security Category Description exist?	DM OP-021	
19	UDP	For reference entities, does an entity data source exist?	DM OP-018 STD#3 & DM OP031	
20	Domain	For reference entities, is the primary key a Code and is there a non-key attribute for Description?	DM OP-18 STD#2	X

## Appendix C – Attribute Level Standards Checklist Items

ID	Area	Item	Standard	Reqd?
1	Definition	Is the definition clear, concise and unambiguous?	DM OP-010 STD #1 & 2	X
2	Definition	Does the definition describe a singular occurrence of the attribute?	DM OP-010 STD #3	X
3	Definition	Does the definition exclude references to technology or media?	DM OP-010 STD # 6	X
4	Definition	Is an acronym spelled out the first time it appears? And if an acronym is used in the name is it spelled out in the definition.	DM OP-010 STD #4 & #5	X
5	Definition	Does the application attribute that maps to an enterprise attribute have the same definition? (Application Specific Examples May Be Appended)	DM OP-006 STD #5	X
6	Definition	Does the attribute represent non physical control data?	DM OP-011 STD #1	X
7	Definition	Is a “Switch” type attribute defined in terms of its “True” value	DM OP 10 STD #7	X
8	Name	Is the Representation Term consistent with the attribute definition?	DM OP-012 STD #5	X
9	Name	Does the attribute name consist of Representation Term optionally preceded by qualifiers or property terms?	DM OP-012 STD #2 & #3	X
10	Name	Is the first letter of each term Capitalized, and are terms separated by spaces?	DM OP-012 Common STD #2, DM OP-035 STD #5	X
11	Name	Are terms other than integers in the Glossary?	DM OP-012 Common STD #1	X
12	Name	Are all terms except acronyms spelled out in attribute names?	DM OP-012 Common STD #3	X
13	Name	Does the first term in the attribute name begin with a letter and is not an ordinal term (e.g., Fifth)?	DM OP-012 Common STD #4	X
14	Name	Is the attribute name unique within the entity?	DM OP-012 STD #1	X

New Logical Model Review Procedure

15	Name	Is the representation term in the attribute name completely spelled out?	DM OP-012 STD #4	X
16	Name	For non-reference entities do the entity owned primary key attributes start with the entity name?	DM OP-012 STD #6	X
17	Domain	If the non-key attribute is a Code or Indicator are valid values and descriptions documented?	DM OP-018 STD#4	
18	UDP	Is the Attribute Data Source Name documented?	DM OP-031	
19	UDP	If an ELDM attribute is reused and the application attribute name is different, is there a mapping between the application and ELDM attribute?	DM OP-006 STD#4, DM OP-031	
20	UDP	Does an Attribute Requirement ID (if different from entity) exist?	DM OP-031	

## Appendix D – Relationship Level Standards Checklist Items

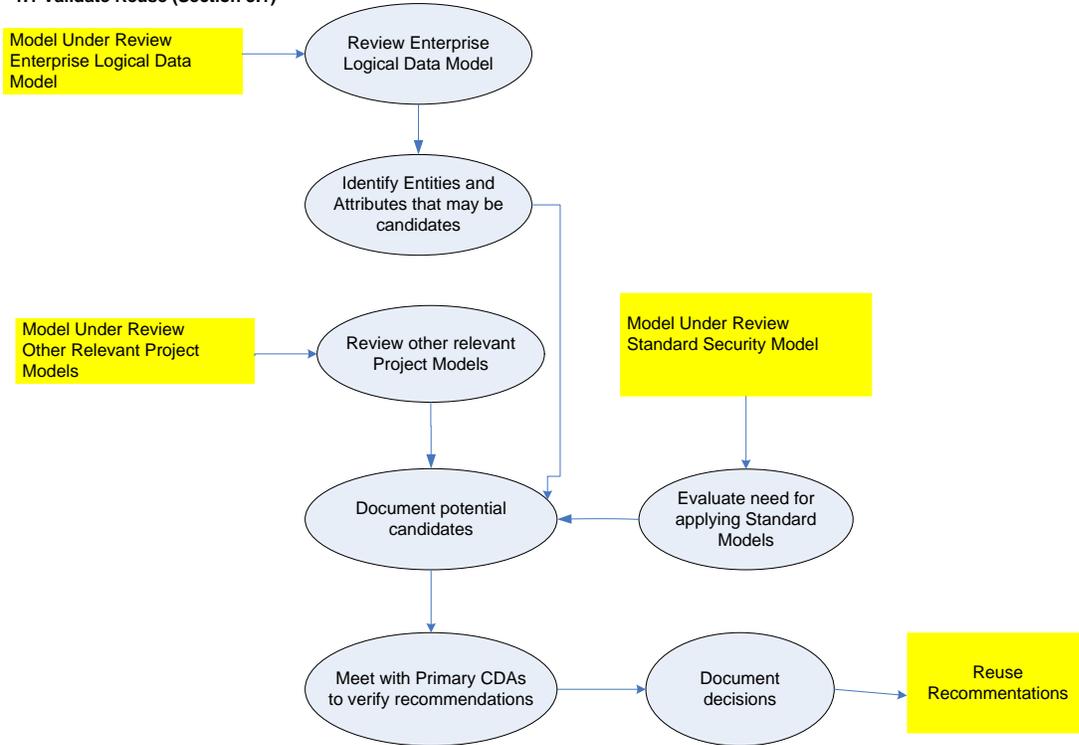
<b>ID</b>	<b>Area</b>	<b>Item</b>	<b>Standard</b>	<b>Reqd?</b>
1	Normalization	Is the relationship not redundant with any other relationship between the two entities?	DM OP-015 STD #1	X
2	Verb Phrase	Has each verb phrase been defined in the Parent to Child direction?	DM OP-015 STD #2	
3	Verb Phrase	Are verb phrases in all lower case letters?	DM OP-15 #2 (by example)	

## **Appendix E – Model Review Process Diagrams**

The intent of this appendix is to provide a graphical representation of the overall Model Review Process. The process diagrams reflect the inputs, processes and expected outputs for each of the sub processes reflected in Section 3 of this document. The rectangles in the diagrams identify the inputs/outputs while the ovals represent the process.

# New Logical Model Review Procedure

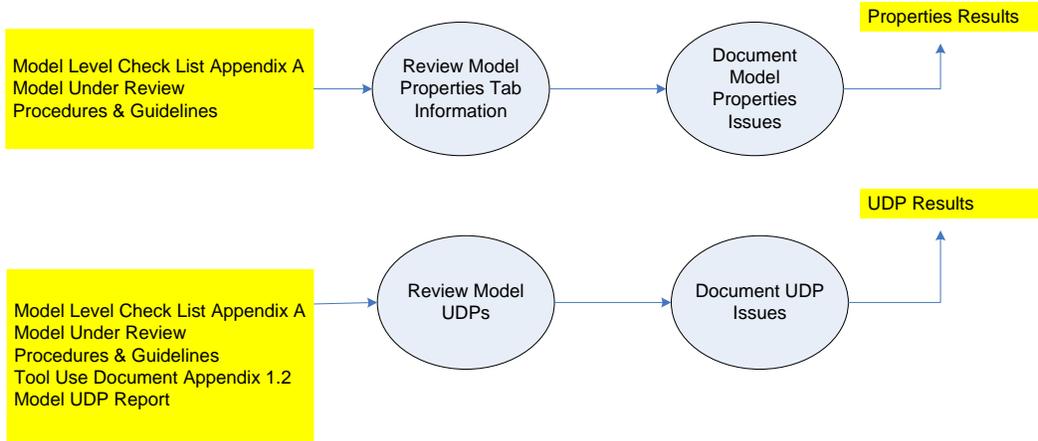
## 1.1 Validate Reuse (Section 3.1)



# New Logical Model Review Procedure

## 1.2 Validate Standards (Section 3.2.1)

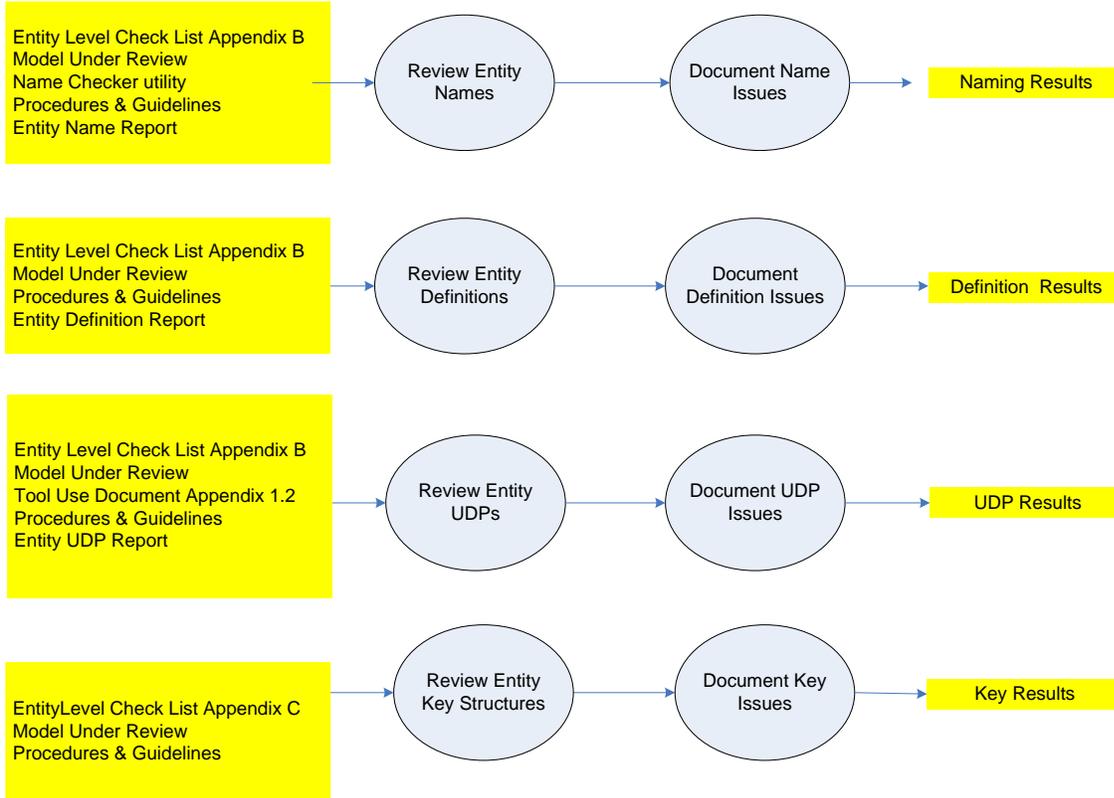
### Model Level Standards



# New Logical Model Review Procedure

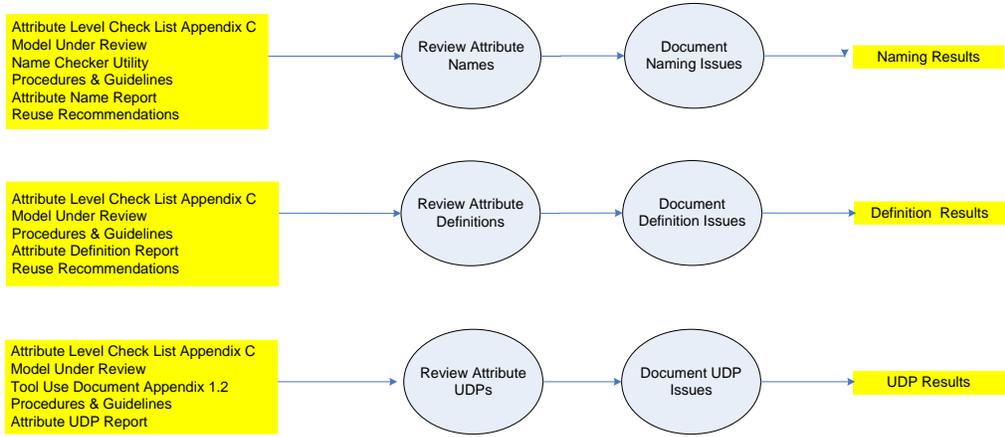
## 1.3 Validate Standards (Section 3.2.2)

### Entity Level Standards



# New Logical Model Review Procedure

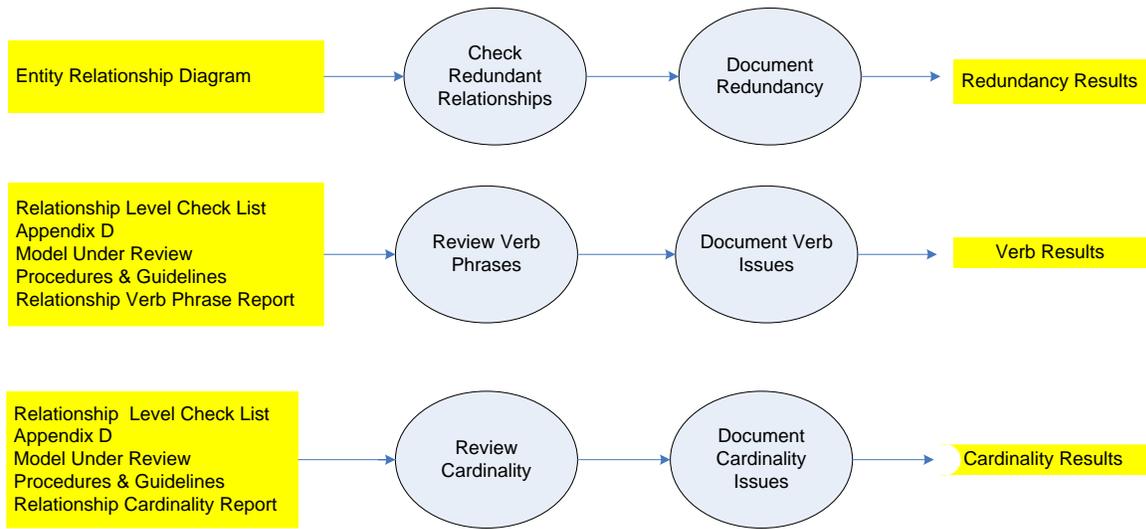
## 1.4 Validate Standards (Section 3.2.3) Attribute Level Standards



# New Logical Model Review Procedure

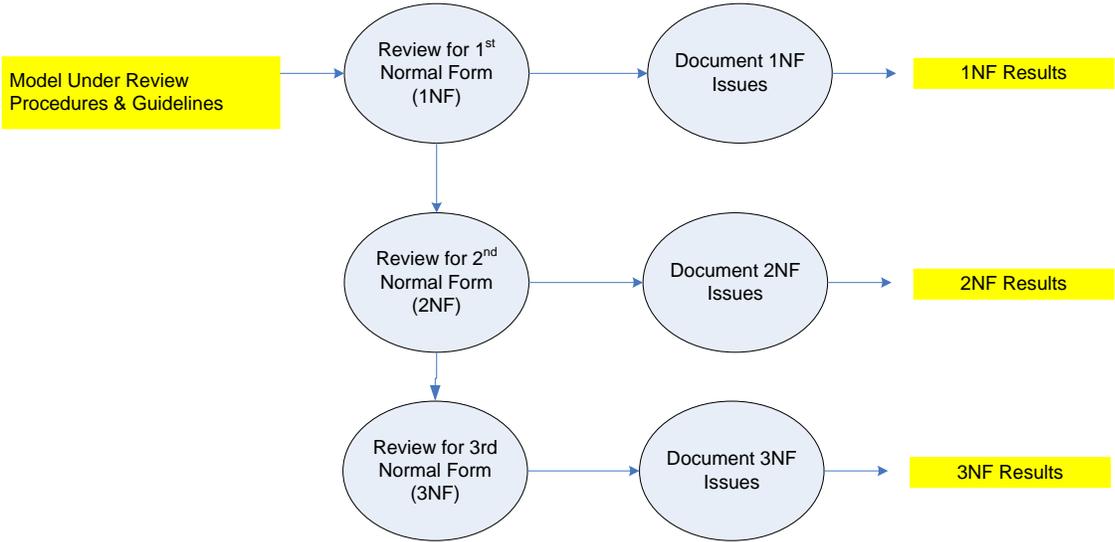
## 1.4 Validate Standards (Section 3.2.4)

### Relationship Level Standards



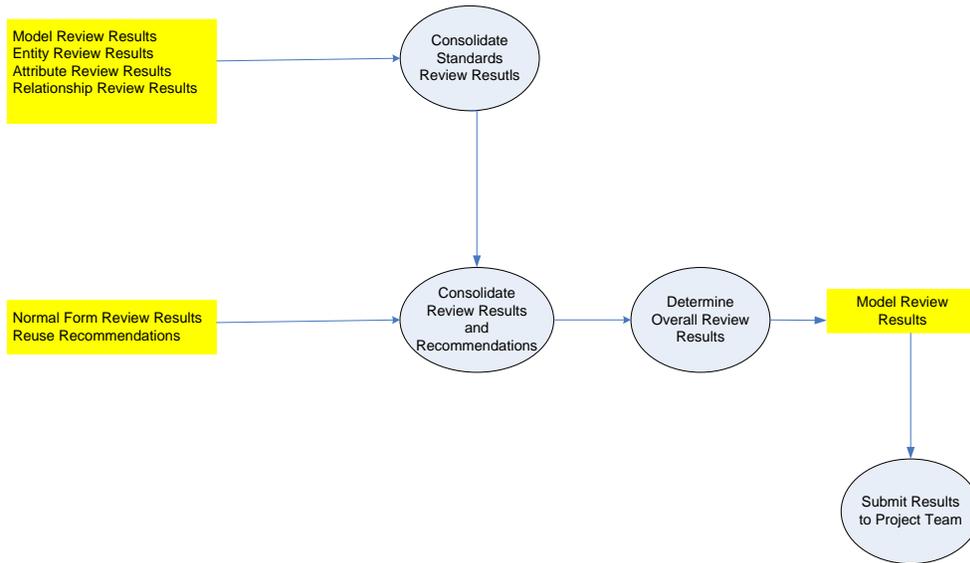
# New Logical Model Review Procedure

## 2.0 Validate Third Normal Form (3NF) (Section 3.3)



# New Logical Model Review Procedure

## 3.0 Determine Review Results (Section 3.4)



# New Logical Model Review Procedure

- 4.0 Obtain Business Owner Signoff (Section 3.5)
- 5.0 Document Approval (Section 3.6)
- 6.0 Register Approved Model (Section 3.7)

