Women's Health: Breast Cancer Screening Rule

Rule: Conceptual Structure

Contract: VA118-16-D-1008, Task Order (TO): VA-118-16-F-1008-0007, CLIN0007BA

Department of Veterans Affairs (VA)

Women's Health: Breast Cancer Screening Rule: Rule: Conceptual Structure

by Knowledge Based Systems (KBS), Office of Informatics and Information Governance (OIIG), and Clinical Decision Support (CDS)

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Preface

Table 1. Revision History

Date	Life Cycle Event
April 17, 2018	Published
April 17, 2018	Reviewed
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Table 2. Clinical White Paper Contributors

Name	Role	Affiliation
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Table 3. Artifact Identifier

Domain	Artifact ID	Name
urn:va.gov:kbs:knart:artifact:r1	18bf1fa5-e352-5edb-8d-d8-bc872a65d326	O4

Artifact Applicability

Table 4. Applicability Foci, Description and Codes

Focus	Description	Code System Name	Code System	Code	Code System Version	Value Set	Value Set Version
PatientAgeGroup	Female out-patients >=40 and <45 years of age.						
ClinicalFocus	Breast Cancer Screening						
ClinicalVenue	Primary Care						
ClinicalVenue	Obstetrics/Gy-necology						
ClinicalVenue	Women's Health						

Models

Table 5. Model References

Referenced Model	Description
urn:solor.io:anf-model:1.0	VA Analysis Normal Form Model

Chapter 1. External Data Definitions

Definitions

Table 1.1. PatientGender

Expression: type=elm:SingletonFrom

Annotation:

Codes: elm:element[elm:Code]: [[a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[248152002 |Female (finding)]]

Table 1.2. MammographyProcedure

Expression: type=elm:Retrieve , dataType=anf:ClinicalStatement, codeProperty=topic, dateProperty=dateTime

Annotation:

Codes: elm:element[elm:Code]: [71651007 |Mammography (procedure)|]

dateRange[elm:Interval]   low: elm:Add(elm:Today() elm:Quantity(-12 Month))

                       high: elm:Today()

Table 1.3. EarlyChestRadiotherapy

Expression: type=elm:Retrieve , dataType=anf:ClinicalStatement, codeProperty=topic, dateProperty=dateTime

Annotation:

Codes: elm:element[elm:Code]: [108290001 |Radiation oncology AND/OR radiotherapy (procedure)|]

dateRange[elm:Interval]   low: ()

                       high: elm:Add(PatientAge elm:Quantity(30 Year))

Table 1.4. MammographyScreeningInterval

Expression: type=elm:Query

Annotation:

Codes: elm:value[elm:Code]: [398166005 |Performed (qualifier value)|]elm:value[elm:Code]: [268547008 |Screening for malignant neoplasm of breast (procedure)|]

Table 1.5. GeneticMarker

Expression: type=elm:Retrieve , dataType=anf:ClinicalStatement, codeProperty=topic, dateProperty=dateTime

Annotation:

Codes: elm:element[elm:Code]: [[a997cc03-3e99-40eb-833a-6374c7750a3a Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[1e53d17c-cd1c-4251-ae9a-f7b999178c90 |Breast cancer genetic marker of susceptibility finding]]elm:element[elm:Code]: [[a997cc03-3e99-40eb-833a-6374c7750a3a Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[1e53d17c-cd1c-4251-ae9a-f7b999178c90 |Breast cancer genetic marker of susceptibility finding (finding)]]

Table 1.6. ScreeningDueDate

Expression: type=elm:Query

Annotation:

Codes: elm:value[elm:Code]: [398166005 |Performed (qualifier value)|]elm:value[elm:Code]: [268547008 |Screening for malignant neoplasm of breast (procedure)|]elm:value[elm:Code]: [385643006 |To be done (qualifier value)|]

Table 1.7. ScreeningScheduleDate

Expression: type=elm:Query

Annotation:

Codes: elm:value[elm:Code]: [398166005 |Performed (qualifier value)|]elm:value[elm:Code]: [268547008 |Screening for malignant neoplasm of breast (procedure)|]elm:value[elm:Code]: [416151008 |Scheduled - procedure status (qualifier value)|]

Triggers

Table 1.8. duringEncounter

Trigger: type=DataEventTrigger, DataElementAccessed

Expression: type=elm:Instance

Annotation: Opening of the patient record during an encounter in either a primary care clinic, an OB/ GYN or during a women's health outpatient visit

Codes:

Table 1.9. Activation of the breast cancer screening order set ECA rule

Trigger: type=DataEventTrigger, DataElementAdded

Expression: type=elm:Instance

Annotation: Activation of the breast cancer screening order set ECA rule.

Codes: elm:value[elm:Code]: [TSR-NoCode]

Table 1.10. EveryMonth

Trigger: type=PeriodicEventTrigger,

Expression: type=elm:Instance

Annotation:

Codes: elm:value[elm:Code]: [TSR-NoCode]

Chapter 2. Expression Definitions

Table 2.1. PatientAge

Expression: type=elm:SingletonFrom
Annotation:
Codes: elm:value[elm:Code]: [398166005 |Performed (qualifier value)|]elm:value[elm:Code]: [[a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[105726004 |Age AND/OR growth finding (finding)]]

Chapter 3.

General information

       ☐ prompt: Patient declines early breast cancer screening.

       response: Boolean (Single)

responseBinding: Property ("declinesEarlyScreening")

       ☐ prompt: Patient declines breast cancer screening.

       response: Boolean (Single)

responseBinding: Property ("declinesScreening")

       ☐ prompt: Patient desires to continue breast cancer screening.

       response: Boolean (Single)

responseBinding: Property ("continueScreening")

       ☐ prompt: Patient has a personal history of breast cancer.

       response: Boolean (Single)

responseBinding: Property ("hasPersonalHistoryOfBreastCancer")

       ☐ prompt: Patient has a life expectancy of greater than 10 years.

       response: Boolean (Single)

responseBinding: Property ("hasExtendedLifeExpectancy")

       ☐ prompt: Auto generated patient notifications.

       response: Boolean (Single)

responseBinding: Property ("autoGeneratedPatientNotifications")

Condition:elm:And (elm:GreaterOrEqual(PatientAge elm:Quantity(40))elm:Less(PatientAge elm:Quantity(45)))

Condition:elm:Not (elm:Property("declinesEarlyScreening" from: elm:ParameterRef (Responses)))

Condition:elm:Not (elm:Exists(MammographyScreeningInterval))

Condition:elm:Not (elm:Exists(MammographyProcedure))

Condition:elm:Not (elm:Property("hasPersonalHistoryOfBreastCancer" from: elm:Parameter-Ref (Responses)))

Condition:elm:Not (elm:Exists(EarlyChestRadiotherapy))

Condition:elm:Not (elm:Exists(GeneticMarker))

☆ Set screening interval to annual.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

       "statementType:Precoordinated Expression topic:Precoordinated Expression , result.lowerBound: 12 , result.upperBound: 12 , result.includeLowerBound: TRUE , result.includeLowerBound: TRUE , result.resolution: 12 , result.measureSemantic:Precoordinated Expression"

       (Codes: 385644000 |Requested (qualifier value)| 268547008 |Screening for malignant neoplasm of breast (procedure)| 258706009 |month (qualifier value)|)

☆ Notify the provider that options for breast cancer screening should be discussed with patient and that the discussion should be documented.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

> "statementType:Precoordinated Expression topic:Postcoordinated Expression"

> (Codes: 385644000 |Requested (qualifier value)| [409073007 |Education (procedure)] ->(363702006 |Has focus (attribute))->[268547008 |Screening for malignant neoplasm of breast (procedure)])

☆ Activate the breast cancer screening history section of the documentation template.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

> "statementType:Precoordinated Expression topic:Precoordinated Expression"

> (Codes: 385644000 |Requested (qualifier value)| TSR-NoCode)

☆ Activate the breast cancer risk assessment of the documentation template.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

> "statementType:Precoordinated Expression topic:Precoordinated Expression"

> (Codes: 385644000 |Requested (qualifier value)| TSR-NoCode)

☆ Activate the breast cancer screening order set ECA rule.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

> "statementType:Precoordinated Expression topic:Precoordinated Expression"

> (Codes: 385644000 |Requested (qualifier value)| TSR-NoCode)

Condition:elm:And (elm:GreaterOrEqual(PatientAge elm:Quantity(40))elm:Less(PatientAge elm:Quantity(45)))

Condition:elm:IsTrue (elm:Property("declinesEarlyScreening" from: elm:ParameterRef (Responses)))

Condition:elm:Not (elm:Exists(MammographyScreeningInterval))

Condition:elm:Not (elm:Exists(MammographyProcedure))

Condition:elm:Not (elm:Property("hasPersonalHistoryOfBreastCancer" from: elm:ParameterRef (Responses)))

Condition:elm:Not (elm:Exists(EarlyChestRadiotherapy))

Condition:elm:Not (elm:Exists(GeneticMarker))

☆ Activate declines breast cancer screening section of the documentation template.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

> "statementType:Precoordinated Expression topic:Precoordinated Expression"

> (Codes: 385644000 |Requested (qualifier value)| TSR-NoCode)

☆ Set screening interval to declines early breast cancer screening.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

> "statementType:Precoordinated Expression topic:Precoordinated Expression , result.status:Precoordinated Expression"

> (Codes: 385644000 |Requested (qualifier value)| 268547008 |Screening for malignant neoplasm of breast (procedure)| 410528005 |Not wanted (qualifier value)|)

Condition:elm:And (elm:GreaterOrEqual(PatientAge elm:Quantity(45))elm:Less(PatientAge elm:Quantity(55)))

Condition:elm:Not (elm:Exists(MammographyProcedure))

Condition:elm:Not (elm:Property("hasPersonalHistoryOfBreastCancer" from: elm:Parameter-Ref (Responses)))

Condition:elm:Not (elm:Exists(EarlyChestRadiotherapy))

Condition:elm:Not (elm:Exists(GeneticMarker))

☆ Set screening interval to annual.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

> "statementType:Precoordinated Expression topic:Precoordinated Expression , result.lowerBound: 12 , result.upperBound: 12 , result.includeLowerBound: TRUE , result.includeLowerBound: TRUE , result.resolution: 12 , result.measureSemantic:Precoordinated Expression"

> (Codes: 385644000 |Requested (qualifier value)| 268547008 |Screening for malignant neoplasm of breast (procedure)| 258706009 |month (qualifier value)|)

☆ Notify the provider that options for breast cancer screening should be discussed with patient and that the discussion should be documented.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

> "statementType:Precoordinated Expression topic:Postcoordinated Expression"

> (Codes: 385644000 |Requested (qualifier value)| [409073007 |Education (procedure)] ->(363702006 |Has focus (attribute))->[268547008 |Screening for malignant neoplasm of breast (procedure)])

☆ Activate the breast cancer screening history section of the documentation template.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

> "statementType:Precoordinated Expression topic:Precoordinated Expression"

> (Codes: 385644000 |Requested (qualifier value)| TSR-NoCode)

☆ Activate the breast cancer risk assessment of the documentation template.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

> "statementType:Precoordinated Expression topic:Precoordinated Expression"

> (Codes: 385644000 |Requested (qualifier value)| TSR-NoCode)

☆ Activate the breast cancer screening order set ECA rule.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

> "statementType:Precoordinated Expression topic:Precoordinated Expression"

> (Codes: 385644000 |Requested (qualifier value)| TSR-NoCode)

Condition:elm:And (elm:GreaterOrEqual(PatientAge elm:Quantity(55))elm:Less(PatientAge elm:Quantity(75)))

Condition:elm:Not (elm:Exists(MammographyProcedure))

Condition:elm:Not (elm:Exists(MammographyScreeningInterval))

Condition:elm:Not (elm:Property("hasPersonalHistoryOfBreastCancer" from: elm:Parameter-Ref (Responses)))

Condition:elm:Not (elm:Exists(EarlyChestRadiotherapy))

Condition:elm:Not (elm:Exists(GeneticMarker))

☆ Set screening interval to biennial.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

> "statementType:Precoordinated Expression topic:Precoordinated Expression , result.lowerBound: 24 , result.upperBound: 24 , result.include-LowerBound: TRUE , result.includeLowerBound: TRUE , result.resolution: 24 , result.measureSemantic:Precoordinated Expression"

> (Codes: 385644000 |Requested (qualifier value)| 268547008 |Screening for malignant neoplasm of breast (procedure)| 258706009 |month (qualifier value)|)

☆ Notify the provider that options for breast cancer screening should be discussed with patient and that the discussion should be documented.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

> "statementType:Precoordinated Expression topic:Postcoordinated Expression"

> (Codes: 385644000 |Requested (qualifier value)| [409073007 |Education (procedure)] ->(363702006 |Has focus (attribute))->[268547008 |Screening for malignant neoplasm of breast (procedure)])

☆ Activate the breast cancer screening history section of the documentation template.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

> "statementType:Precoordinated Expression topic:Precoordinated Expression"

> (Codes: 385644000 |Requested (qualifier value)| TSR-NoCode)

☆ Activate the breast cancer screening documentation template.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

> "statementType:Precoordinated Expression topic:Precoordinated Expression"

> (Codes: 385644000 |Requested (qualifier value)| TSR-NoCode)

☆ Activate the breast cancer screening order set ECA rule.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

> "statementType:Precoordinated Expression topic:Precoordinated Expression"

> (Codes: 385644000 |Requested (qualifier value)| TSR-NoCode)

Condition:elm:GreaterOrEqual (PatientAge elm:Quantity(75))

Condition:elm:IsTrue (elm:Property("hasExtendedLifeExpectancy" from: elm:ParameterRef (Responses)))

Condition:elm:IsTrue (elm:Property("continueScreening" from: elm:ParameterRef (Responses)))

Condition:elm:Not (elm:Exists(MammographyProcedure))

Condition:elm:Not (elm:Contains(MammographyScreeningInterval elm:Code()))

Condition:elm:Not (elm:Property("hasPersonalHistoryOfBreastCancer" from: elm:Parameter-Ref (Responses)))

Condition:elm:Not (elm:Exists(EarlyChestRadiotherapy))

Condition:elm:Not (elm:Exists(GeneticMarker))

☆ Set screening interval to biennial.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

"statementType:Precoordinated Expression topic:Precoordinated Expression , result.lowerBound: 24 , result.upperBound: 24 , result.includeLowerBound: TRUE , result.includeLowerBound: TRUE , result.resolution: 24 , result.measureSemantic:Precoordinated Expression"

(Codes: 385644000 |Requested (qualifier value)| 268547008 |Screening for malignant neoplasm of breast (procedure)| 258706009 |month (qualifier value)|)

☆ Notify the provider that options for breast cancer screening should be discussed with patient and that the discussion should be documented.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

"statementType:Precoordinated Expression topic:Postcoordinated Expression"

(Codes: 385644000 |Requested (qualifier value)| [409073007 |Education (procedure)] ->(363702006 |Has focus (attribute))->[268547008 |Screening for malignant neoplasm of breast (procedure)])

☆ Activate the breast cancer screening history section of the documentation template.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

"statementType:Precoordinated Expression topic:Precoordinated Expression"

(Codes: 385644000 |Requested (qualifier value)| TSR-NoCode)

☆ Activate the breast cancer screening documentation template.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

"statementType:Precoordinated Expression topic:Precoordinated Expression"

(Codes: 385644000 |Requested (qualifier value)| TSR-NoCode)

☆ Activate the breast cancer screening order set ECA rule.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

"statementType:Precoordinated Expression topic:Precoordinated Expression"

(Codes: 385644000 |Requested (qualifier value)| TSR-NoCode)

Condition:elm:GreaterOrEqual (PatientAge elm:Quantity(75))

Condition:elm:IsTrue (elm:Property("hasExtendedLifeExpectancy" from: elm:ParameterRef (Responses)))

Condition:elm:IsFalse (elm:Property("continueScreening" from: elm:ParameterRef (Responses)))

Condition:elm:Not (elm:Exists(MammographyProcedure))

Condition:elm:Not (elm:Contains(MammographyScreeningInterval elm:Code()))

Condition:elm:Not (elm:Property("hasPersonalHistoryOfBreastCancer" from: elm:Parameter-Ref (Responses)))

Condition:elm:Not (elm:Exists(EarlyChestRadiotherapy))

Condition:elm:Not (elm:Exists(GeneticMarker))

☆ Set screening interval to stop screening.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

"statementType:Precoordinated Expression topic:Precoordinated Expression , result.status:Precoordinated Expression"

(Codes: 385644000 |Requested (qualifier value)| 268547008 |Screening for malignant neoplasm of breast (procedure)| 410546004 |Discontinued (qualifier value)|)

Condition:elm:Exists (Activation of the breast cancer screening order set ECA rule)

Condition:elm:Before (ScreeningDueDate elm:Add(elm:Now() elm:Quantity(60 days)))

Condition:elm:IsFalse (elm:Exists(ScreeningScheduleDate))

Condition:elm:Not (elm:Property("declinesScreening" from: elm:ParameterRef (Responses)))

☆ Activate the breast cancer screening order set.

actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

"statementType:Precoordinated Expression topic:Precoordinated Expression"

(Codes: 385644000 |Requested (qualifier value)| TSR-NoCode)

Condition:elm:Exists (EveryMonth)

Condition:elm:In (ScreeningDueDate elm:Interval())

Condition:elm:IsFalse (elm:Exists(ScreeningScheduleDate))

Condition:elm:Not (elm:Property("declinesScreening" from: elm:ParameterRef (Responses)))

	Condition:elm:IsTrue (elm:Property("autoGeneratedPatientNotifications" from: elm:ParameterRef (Responses)))
	☆ Notify the patient of their Breast Cancer Screening due date.
	actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]
	"statementType:Precoordinated Expression topic:Precoordinated Expression"
	(Codes: 385644000 |Requested (qualifier value)| TSR-NoCode)
	Condition:elm:IsFalse (elm:Property("autoGeneratedPatientNotifications" from: elm:ParameterRef (Responses)))
	☆ Add the patient to the report of patients due for breast cancer screening with their Breast Cancer Screening due date.
	actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]
	"statementType:Precoordinated Expression topic:Precoordinated Expression"
	(Codes: 385644000 |Requested (qualifier value)| TSR-NoCode)

Chapter 4. Tabular List

Terminology Service Request (TSR) Mappings

Table 4.1. Terminology Versions

Name	Identifer	Version
SNOMED CT	2.16.840.1.113883.6.96	United States Edition 20180301

Table 4.2. Terminology References

System	Code	Display Text	References
SNOMED CT	108290001 |Radiation oncology AND/OR radiotherapy (procedure)|	Postcoordinated Expression	1
SNOMED CT	258706009 |month (qualifier value)|	Precoordinated Expression	4
SNOMED CT	268547008 |Screening for malignant neoplasm of breast (procedure)|	Precoordinated Expression	9
SNOMED CT	385643006 |To be done (qualifier value)|	Precoordinated Expression	1
SNOMED CT	385644000 |Requested (qualifier value)|	Precoordinated Expression	26
SNOMED CT	398166005 |Performed (qualifier value)|	Precoordinated Expression	4
SNOMED CT	410528005 |Not wanted (qualifier value)|	Precoordinated Expression	1
SNOMED CT	410546004 |Discontinued (qualifier value)|	Precoordinated Expression	3
SNOMED CT	416151008 |Scheduled - procedure status (qualifier value)|	Precoordinated Expression	1
SNOMED CT	71651007 |Mammography (procedure)|	Postcoordinated Expression	1
SNOMED CT	TSR-NoCode	Precoordinated Expression	18
SNOMED CT	[409073007 |Education (procedure)] ->(363702006 |Has focus (attribute))->[268547008 |Screening for malignant neoplasm of breast (procedure)]	Postcoordinated Expression	4
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a Observation procedure (procedure)] -	Postcoordianted Expression	1

System	Code	Display Text	References
	>(363702006 |Has focus (attribute))->[1e53d17c-cd1c-4251-ae9a-f7b999178c90 |Breast cancer genetic marker of susceptibility finding (finding)]		
SNOMED CT	[a997cc03-3e99-40eb-833a-6374c7750a3a Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[1e53d17c-cd1c-4251-ae9a-f7b999178c90 |Breast cancer genetic marker of susceptibility finding]	Postcoordianted Expression	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[105726004 |Age AND/OR growth finding (finding)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[248152002 | Female (finding)]	Postcoordinated Expression	2

Chapter 5. Behavior Symbols

Table 5.1. Group Organizational Behavior

Symbol	Name	Definition
▶	Sentence Group	A group of related alternative actions is a sentence group if the item referenced by the action is the same in all the actions, and each action simply constitutes a different variation on how to specify the details for that item. For example, two actions that could be in a SentenceGroup are "aspirin, 500 mg, 2 times per day" and "aspirin, 300 mg, 3 times per day". In both cases, aspirin is the item referenced by the action, and the two actions represent two different options for how aspirin might be ordered for the patient. Note that a SentenceGroup would almost always have an associated selection behavior of "AtMostOne", unless it's a required action, in which case, it would be "ExactlyOne".
▷	Logical Group	A group with this behavior logically groups its sub-elements, and may be shown as a visual group to the end user, but it is not required to do so.
➤	Visual Group	Any group marked with this behavior should be displayed as a visual group to the end user.

Table 5.2. Group Selection Behavior

Symbol	Name	Definition
☐	Any	Any number of the items in the group may be chosen, from zero to all.
⊙	All	All the items in the group must be selected as a single unit.
◎	AllOrNone	All the items in the group are meant to be chosen as a single unit: either all must be selected by the end user, or none may be selected.
○	ExactlyOne	The end user must choose one and only one of the selectable items in the group. The user may not choose none of the items in the group.
✪	AtMostOne	The end user may choose zero or at most one of the items in the group.
☀	OneOrMore	The end user must choose a minimum of one, and as many additional as desired.

Table 5.3. Required Behavior

Symbol	Name	Definition
✦	Must	An action with this behavior must be included in the actions processed by the end user; the end user may not choose not to include this action.

Sym-bol	Name	Definition
✧	Could	An action with this behavior may be included in the set of actions processed by the end user.
➢	MustUnlessDocumented	An action with this behavior must be included in the set of actions processed by the end user, unless the end user provides documentation as to why the action was not included.

Table 5.4. Precheck Behavior

Sym-bol	Name	Definition
▲	Yes	An action with this behavior is one of the most frequent actions that is, or should be, included by an end user, for the particular context in which the action occurs. The system displaying the action to the end user should consider "pre-checking" such an action as a convenience for the user.
▽	No	An action with this behavior is one of the less frequent actions included by the end user, for the particular context in which the action occurs. The system displaying the actions to the end user would typically not "pre-check" such an action.

Table 5.5. Cardinality Behavior

Sym-bol	Name	Definition
◆	Single	An action with this behavior may only be completed once.
❖	Multiple	An action with this behavior may be repeated multiple times.

Table 5.6. Item Flags

Sym-bol	Name	Definition
☞	fillIn	This item, in a list entry, allows the user to enter a fill in value that is not present in the set of presented choices.

Table 5.7. Read Only Behavior

Sym-bol	Name	Definition
☆	true	For a particular action or action group, specifies whether the elements are read only.

Appendix A. References

This appendix contains the list of related resources and supporting documents used in creating this KNART.

List of References

Related Resources

[CCWP] *Women's Health: Breast Cancer Screening Clinical Content White Paper* (link [20171221CDSK_CCW-P_O4B31B53BCS_final.xml])

[CSD] *Women's Health: Breast Cancer Screening Rule Conceptual Structure Document*

[KVRpt] *Women's Health: Breast Cancer Screening Rule KNART Validation Report*

Supporting Evidence

[Nelson 2009] *H. D. Nelson et al., Screening for Breast Cancer A Systematic Review to Update the 2009 U.S. Preventive Services Task Force Recommendation, Agency for Healthcare Research and Quality, USA, Jan. 2016.* (link [https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/breast-cancer-screening])

[Oeffinger 2015] *Oeffinger, 2015. Oeffinger KC, Fontham ETH, Etzioni R, et al. Breast Cancer Screening for Women at Average Risk: 2015 Guideline Update From the American Cancer Society. JAMA. 2015;314(15):1599-1614* (link [https://doi.org/10.1001/jama.2015.12783])

[Pearlman 2017] *Pearlman, 2017. Pearlman M, Jeudy M, Chelmow D. Breast Cancer Risk Assessment and Screening in Average-Risk Women. OBSTETRICS AND GYNECOLOGY. 2017 Jul 1;130(1):E1-6* (link [https://doi.org/10.1097/AOG.0000000000002158])

[ACS 2017] *American Cancer Society Breast Cancer Screening Guidelines. American Cancer Society [Internet]. 2018 [cited 2018 Jan 24].* (link [https://www.cancer.org/health-care-professionals/american-cancer-society-prevention-early-detection-guidelines/breast-cancer-screening-guidelines.html])