

Rheumatology: Rheumatoid Arthritis Documentation Template

Documentation Template: Conceptual Structure

Contract: VA118-16-D-1008, Task Order (TO): VA-118-16-F-1008-0007, CLIN0005AF

Department of Veterans Affairs (VA)



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

Publication date 06/20/2018

Version: 1.0

Rheumatology: Rheumatoid Arthritis Documentation Template: Documentation Template: Conceptual Structure

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

Publication date 06/20/2018

Copyright © 2018 B3 Group, Inc.

Copyright © 2018 Cognitive Medical Systems, Inc.

B3 Group, Inc.

NOTICE OF GOVERNMENT COPYRIGHT LICENSE AND UNLIMITED RIGHTS LICENSE

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License.

You may obtain a copy of the License at <http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Portions of this content are derivative works from content produced by Cognitive Medical Systems, Inc. licensed under the Apache License, Version 2.0.

Additional portions of this content are derivative works from content contributed by Motive Medical Intelligence Inc., under Creative Commons Attribution-ShareAlike 4.0.

Contributions from 2013-2018 were performed either by US Government employees, or under US Veterans Health Administration contracts.

US Veterans Health Administration contributions by government employees are work of the U.S. Government and are not subject to copyright protection in the United States. Portions contributed by government employees are USGovWork (17USC §105). Not subject to copyright.

See: <https://www.usa.gov/government-works>

Contribution by contractors to the US Veterans Health Administration during this period are contractually contributed under the Apache License, Version 2.0 and US Government sponsorship is acknowledged under Contract VA118-16-D-1008, Task Order VA11817F10080007.

Cognitive Medical Systems, Inc.

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License.

You may obtain a copy of the License at <http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

This and related content produced by Cognitive Medical Systems, Inc. licensed under the Apache License, Version 2.0 is available at: <https://bitbucket.org/cogmedsys/hl7-kas-examples>

Additional portions of this content are derivative works from content contributed by Motive Medical Intelligence Inc., under Creative Commons Attribution-ShareAlike 4.0. <https://bitbucket.org/cogmedsys/kas-source-material>

Contributions from 2013-2018 were performed either by US Government employees, or under US Veterans Health Administration contracts.

US Veterans Health Administration contributions by government employees are work of the U.S. Government and are not subject to copyright protection in the United States. Portions contributed by government employees are USGovWork (17USC §105). Not subject to copyright. See: <https://www.usa.gov/government-works>

Contribution by contractors to the US Veterans Health Administration during this period are contractually contributed under the Apache License, Version 2.0 and US Government sponsorship is acknowledged under Contract VA118-16-D-1008-0007.

Table of Contents

Preface	v
Artifact Applicability	vi
Models	vii
1. External Data Definitions	1
Definitions	1
Triggers	2
2. Expression Definitions	3
3. History	4
4. Physical Exam	5
5. Medication History	6
6. Laboratory Studies	7
7. Imaging and Diagnostic Studies	8
8. Tabular List	9
9. Behavior Symbols	10
A. References	12

List of Tables

1. Revision History	v
2. Clinical White Paper Contributors	v
3. Artifact Identifier	v
4. Applicability Foci, Description and Codes	vi
5. Model References	vii
1.1. cReactiveProteinLab	1
1.2. erythrocyteSedimentationRateLab	1
1.3. hepatitisCAntibodyScreenLab	1
1.4. completeBloodCountLab	1
1.5. completeMetabolicPanelLab	1
1.6. rheumatoidFactorLab	2
1.7. antiCyclicCitruUinatedPeptideAntibodyLab	2
1.8. xRayHandsImaging	2
1.9. xRayHandsImagingInterpretation	2
8.1. Terminology Versions	9
8.2. Terminology References	9
9.1. Group Organizational Behavior	10
9.2. Group Selection Behavior	10
9.3. Required Behavior	10
9.4. Precheck Behavior	11
9.5. Cardinality Behavior	11
9.6. Item Flags	11
9.7. Read Only Behavior	11

Preface

Table 1. Revision History

Date	Life Cycle Event
June 20, 2018	Published
June 6, 2018	Published
March 21, 2018	Published
March 8, 2018	Published
November 6, 2017	Created
August 24, 2017	Pre-published

Table 2. Clinical White Paper Contributors

Name	Role	Affiliation
Amy M. Joseph, MD	Author	Chief of Rheumatology, St Louis VA Medical Center (VAMC), 915 N. Grand, St. Louis, MO 63106 Professor of Medicine, Washington University School of Medicine
John S. Richards, MD	Author	Chief of Rheumatology, Pittsburgh VAMC, University Drive C, Pittsburgh, PA 15240 Clinical Professor Medicine, University of Pittsburgh

Table 3. Artifact Identifier

Domain	Artifact ID	Name
urn:va.gov:kbs:knart:artifact:r1	2c3ccce7-4e81-590e-b37c-7bdbecbbe77	B38

Artifact Applicability

Table 4. Applicability Foci, Description and Codes

Focus	Description	Code System	Code	Value Set	Value Set Version
PatientAgeGroup	Population 18 years old or older	SNOMED CT	133936004	N/A	N/A
ClinicalVenue	Primary Care			N/A	N/A
ClinicalVenue	Outpatient	SNOMED CT	33022008	N/A	N/A

Models

Table 5. Model References

Referenced Model	Description
urn:solor.io:anf-model:0.8	VA Analysis Normal Form Model

Chapter 1. External Data Definitions

Definitions

Table 1.1. cReactiveProteinLab

Expression: type=elm:Retrieve , dataType=anf:MeasurementOfLaboratoryTestAction, codeProperty=topicFocus, dateProperty=dateTime Annotation: C-reactive protein Codes: elm:element[elm:Code]: [55235003] dateRange[elm:Interval] low: elm:Add(elm:Today() elm:Quantity(-3 Month)) high: elm:Today()

Table 1.2. erythrocyteSedimentationRateLab

Expression: type=elm:Retrieve , dataType=anf:MeasurementOfLaboratoryTestAction, codeProperty=topicFocus, dateProperty=dateTime Annotation: Erythrocyte sedimentation rate Codes: elm:element[elm:Code]: [416838001] dateRange[elm:Interval] low: elm:Add(elm:Today() elm:Quantity(-3 Month)) high: elm:Today()
--

Table 1.3. hepatitisCAntibodyScreenLab

Expression: type=elm:Retrieve , dataType=anf:MeasurementOfLaboratoryTestAction, codeProperty=topicFocus, dateProperty=dateTime Annotation: Hepatitis C antibody screen Codes: elm:element[elm:Code]: [413107006] dateRange[elm:Interval] low: elm:Add(elm:Today() elm:Quantity(-3 Month)) high: elm:Today()

Table 1.4. completeBloodCountLab

Expression: type=elm:Retrieve , dataType=anf:MeasurementOfLaboratoryTestAction, codeProperty=topicFocus, dateProperty=dateTime Annotation: Complete blood count Codes: elm:element[elm:Code]: [26604007] dateRange[elm:Interval] low: elm:Add(elm:Today() elm:Quantity(-3 Month)) high: elm:Today()

Table 1.5. completeMetabolicPanelLab

Expression: type=elm:Retrieve , dataType=anf:MeasurementOfLaboratoryTestAction, codeProperty=topicFocus, dateProperty=dateTime Annotation: Complete metabolic panel Codes: elm:element[elm:Code]: [85acf077-d744-48bc-b57a-fa3b5ce12d97]

dateRange[elm:Interval] low: elm:Add(elm:Today() elm:Quantity(-3 Month)) high: elm:Today()
--

Table 1.6. rheumatoidFactorLab

Expression: type=elm:Retrieve , dataType=anf:MeasurementOfLaboratoryTestAction, codeProperty=topicFocus, dateProperty=dateTime Annotation: Rheumatoid factor Codes: elm:element[elm:Code]: [54921001]
--

Table 1.7. antiCyclicCitruUinatedPeptideAntibodyLab

Expression: type=elm:Retrieve , dataType=anf:MeasurementOfLaboratoryTestAction, codeProperty=topicFocus, dateProperty=dateTime Annotation: Anti-cyclic citruUinated peptide antibody Codes: elm:element[elm:Code]: [408200008]

Table 1.8. xRayHandsImaging

Expression: type=elm:Retrieve , dataType=anf:RadiographicImagingOfBodyStructureAction, codeProperty=topicFocus, dateProperty=dateTime Annotation: x-ray hands, bilateral, to evaluate for possible rheumatoid arthritis Codes: elm:element[elm:Code]: [85562004] dateRange[elm:Interval] low: elm:Add(elm:Today() elm:Quantity(-12 Month)) high: elm:Today()
--

Table 1.9. xRayHandsImagingInterpretation

Expression: type=elm:Retrieve , dataType=anf:InterpretationOfRecordArtifactAction, codeProperty=topicFocus, dateProperty=dateTime Annotation: Codes: elm:element[elm:Code]: [28582-5] dateRange[elm:Interval] low: elm:Add(elm:Today() elm:Quantity(-12 Month)) high: elm:Today()

Triggers

No trigger definitions are present.

Chapter 2. Expression Definitions

No expression definitions are present.

Chapter 3. History

Please ask the patient the following questions:

◆ Answer Yes or No to the prompt

prompt: Is the duration of joint pain greater than 6 weeks?

response: Boolean (Single)

◆ Answer Yes or No to the prompt

prompt: Are hands or wrists involved?

response: Boolean (Single)

◆ Answer Yes or No to the prompt

prompt: Is morning stiffness present?

response: Boolean (Single)

◆ Answer Yes or No to the prompt

prompt: Did the pain have a gradual onset?

response: Boolean (Single)

◇ Optional additional information

prompt:

response: String (Single)

Chapter 4. Physical Exam

Please answer the following questions and provide any required additional details.

<p>◆ prompt: Are there greater than four joints involved?</p> <p>response: Boolean (Single)</p> <p>responseBinding: Property ("greaterThan4Joints")</p> <p>Condition:elm:IsTrue (elm:Property("greaterThan4Joints" from: elm:ParameterRef(Responses)))</p>
<p>◆ prompt: Specific Joints Affected</p> <p>response: String (Multiple)</p> <p>response range: EnumerationConstraint (List)</p> <p>item: Hand joint pain(202472008)</p> <p>item: Wrist joint pain(202482009)</p>
<p># prompt: Are there signs of joint inflammation (e.g., warmth, soft tissue swelling, or tenderness)?</p> <p>response: Boolean (Single)</p> <p>responseBinding: Property ("signsOfJointInflammation")</p> <p>Condition:elm:IsTrue (elm:Property("signsOfJointInflammation" from: elm:ParameterRef(Responses)))</p>
<p># prompt: Specific Joints Affected</p> <p>response: String (Multiple)</p> <p># prompt: Check all signs that are applicable.</p> <p>response: Code (Multiple)</p> <p>response range: EnumerationConstraint (List)</p> <p>item: Warmth(298256005)</p> <p>item: Soft Tissue Swelling(271771009)</p> <p>item: Tenderness(110288007)</p>

Chapter 5. Medication History

Please answer the following questions and provide any required additional details.

<p># prompt: Current or prior use of disease-modifying anti-rheumatic drugs? response: Boolean (Single)</p> <p>responseBinding: Property ("currentOrPriorUseOfDMARD")</p>	
#	<p>Condition:elm:IsTrue (elm:Property("currentOrPriorUseOfDMARD" from: elm:ParameterRef(Responses)))</p>
<p>* prompt: DMARDs response: Code (Multiple) response range: ValueSetConstraint (List) response range: EnumerationConstraint (List) item: adalimumab(327361) item: etanercept(214555) item: hydroxychloroquine(5521) item: infliximab(191831) item: leflunomide(27169) item: methotrexate(6851) item: rituximab(121191) item: sulfasalazine(9524) ☞ item: Other Please provide details of this medication</p>	
<p># prompt: Was there prior use of prednisone or other glucocorticoids? response: Boolean (Single)</p> <p>responseBinding: Property ("priorUseOfSteroids")</p>	
# ♦	<p>Condition:elm:IsTrue (elm:Property("priorUseOfSteroids" from: elm:ParameterRef(Responses)))</p>
# ♦	<p>prompt: Drug name response: String (Single) prompt: Date Initiated response: Timestamp (Single)</p>
<p># prompt: If there are any other medication history details, please include them here response: String (Single)</p>	

Chapter 6. Laboratory Studies

<p># prompt: Obtain Rheumatoid Factor Results and Date response: Tuple (Single) initialValue: elm:Last (order by: dateTime) rheumatoidFactorLab</p> <p># prompt: Obtain Anti-cyclic Citrullinated Peptide Antibody (ACPA/ Anti-CCP) Result and date response: Tuple (Single) initialValue: elm:Last (order by: dateTime) antiCyclicCitrullinatedPeptideAntibodyLab</p> <p># prompt: Obtain Hepatitis C Antibody Screen Results and Date response: Tuple (Multiple) initialValue: hepatitisCAntibodyScreenLab</p> <p># prompt: Obtain Complete Blood Count Results and Date response: Tuple (Single) initialValue: elm:Last (order by: dateTime) completeBloodCountLab</p> <p># prompt: Obtain Complete Metabolic Panel Results and Date response: Tuple (Single) initialValue: elm:Last (order by: dateTime) completeMetabolicPanelLab</p> <p># prompt: Obtain C-Reactive Protein Results and Date response: Tuple (Single) initialValue: elm:Last (order by: dateTime) cReactiveProteinLab</p> <p># prompt: Obtain Erythrocyte Sedimentation Rate Results and Date response: Tuple (Single) initialValue: elm:Last (order by: dateTime) erythrocyteSedimentationRateLab</p> <p># prompt: Obtain Other Test response: String (Single) response range: EnumerationConstraint (List) ☞ item: Other Obtain Other Test Results Date</p>
--

Chapter 7. Imaging and Diagnostic Studies

Attach or link Hand Radiograph

prompt: Obtain Hand Radiograph

response: Tuple (Multiple)

initialValue: elm:Last (order by: dateTime) xRayHandsImaging

Attach or link Hand Radiograph Interpretation

prompt: Obtain Hand Radiograph Interpretation

response: Tuple (Multiple)

initialValue: elm:Last (order by: dateTime) xRayHandsImagingInterpretation

Chapter 8. Tabular List

Terminology Service Request (TSR) Mappings

Table 8.1. Terminology Versions

Name	Identifier	Version
SNOMED CT	2.16.840.1.113883.6.96	United States Edition 20180301
RXNorm	2.16.840.1.113883.6.88	5-Mar-18
LOINC	2.16.840.1.113883.6.1	2.61

Table 8.2. Terminology References

System	Code	Display Text ^a	References ^b
LOINC	28582-5	XR Hand	1
RXNorm	121191	rituximab	1
RXNorm	191831	infliximab	1
RXNorm	214555	etanercept	1
RXNorm	27169	leflunomide	1
RXNorm	327361	adalimumab	1
RXNorm	5521	hydroxychloroquine	1
RXNorm	6851	methotrexate	1
RXNorm	9524	sulfasalazine	1
SNOMED CT	110288007	Tenderness	1
SNOMED CT	133936004	Population 18 years old or older	1
SNOMED CT	202472008	Hand joint pain	1
SNOMED CT	202482009	Wrist joint pain	1
SNOMED CT	26604007	Complete blood count	1
SNOMED CT	271771009	Soft Tissue Swelling	1
SNOMED CT	298256005	Warmth	1
SNOMED CT	33022008	Outpatient	1
SNOMED CT	408200008	Anti-cyclic citrullinated peptide antibody	1
SNOMED CT	413107006	Hepatitis C antibody screen	1
SNOMED CT	416838001	Erythrocyte sedimentation rate	1
SNOMED CT	54921001	Rheumatoid factor	1
SNOMED CT	55235003	C-reactive protein	1
SNOMED CT	85562004	x-ray hands, bilateral	1
SNOMED CT	85acf077-d744-48bc-b57a-fa3b5ce12d97	Complete metabolic panel	1

^aIf a code is used multiple times in the KNART, only the display text of the first instance is shown.

^bCount of the number of times the given code system and code pair is used in the KNART.

Chapter 9. Behavior Symbols

Table 9.1. 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 9.2. 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 9.3. 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.
◇	Could	An action with this behavior may be included in the set of actions processed by the end user.

Symbol	Name	Definition
➤	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 9.4. Precheck Behavior

Symbol	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 9.5. Cardinality Behavior

Symbol	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 9.6. Item Flags

Symbol	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 9.7. Read Only Behavior

Symbol	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] *Rheumatology: Rheumatoid Arthritis Clinical Content White Paper*

[CSD] *Rheumatology: Rheumatoid Arthritis Documentation Template Conceptual Structure Document*

[KVRpt] *Rheumatology: Rheumatoid Arthritis Documentation Template KNART Validation Report*

Supporting Evidence

[Aletaha 2010] Aletaha, D., Neogi, T., Silman, A. J., Funovits, J., Felson, D. T., Bingham, C. O., et al. (2010). 2010 rheumatoid arthritis classification criteria: An american college of rheumatology/european league against rheumatism collaborative initiative. *Arthritis and Rheumatism*, 62(9), 2569-2581. doi:10.1002/art.27584 [doi] (link [https://doi.org/doi:10.1002/art.27584])

[Singh 2015] Singh, J. A., Saag, K. G., Bridges, S. L., Akl, E. A., Bannuru, R. R., Sullivan, M. C., et al. (2016). 2015 american college of rheumatology guideline for the treatment of rheumatoid arthritis. *Arthritis & Rheumatology (Hoboken, N.J.)*, 68(1), 1-26. doi:10.1002/art.39480 [doi] (link [https://doi.org/doi:10.1002/art.39480])