

Clinical Decision Support (CDS) Content and Health Level 7 (HL7)- compliant Knowledge Artifacts (KNARTs)

Rheumatology: Rheumatoid Arthritis Clinical Content White Paper - Order Set (B14, CLIN0004AB), Consult Request Documentation Template (B38, CLIN0005AB), Composite (B59)

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Clinical Decision Support (CDS)

October, 2017

Version 1.0

Comment [KK1]: Team B3 10/11/17: All common issues, per PO, have been addressed/added.

Note: fixing of page numbering in table of contents, having the revision history show the VA logo on the cover page showing, et will attempted to be fixed for final DocBook Word/PDF transformation. However, the DocBook file is the source of truth for all CCWPs and should be the primary reference.

Additionally, all formatting (fonts, sizes, etc.) is handled by the DocBook standard; any deviations shown here are due to copy/paste of information that will be captured in the DocBook file.

Comment [KK2]: Team B3 10/11/17: NOTE – these base/optional # references will be removed for the final DocBook file

Clinical Decision Support (CDS) Content and Health Level 7 (HL7)-compliant Knowledge Artifacts (KNARTS): Rheumatology: Rheumatoid Arthritis Clinical Content White Paper

Order Set (B14, CLIN0004AB), Documentation Template (B38, CLIN0005AB), Consult Request (B59)

Publication date October, 2017

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VA Subject Matter Expert (SME) Panel

Name	Title	Project Role
Amy Joseph, MD	Chief of Rheumatology, St Louis VAMC; Professor of Medicine, Washington University School of Medicine	Subject Matter Expert, Primary
J. Steuart Richards, MD	Chief of Rheumatology, Pittsburgh VAMC	Subject Matter Expert, Secondary

Introduction

The VA is committed to improving the ability of clinicians to provide care for patients while increasing quality, safety, and efficiency. Recognizing the importance of standardizing clinical knowledge in support of this goal, VA is implementing the HL7 Knowledge Artifact Specification for a wide range of VA clinical use cases. Knowledge Artifacts, referred to as KNARTs, enable the structuring and encoding of clinical knowledge so the knowledge can be integrated with electronic health records to enable clinical decision support.

The purpose of this Clinical Content White Paper is to capture the clinical context and intent of KNART use cases in sufficient detail to provide the KNART authoring team with the clinical source material to construct the corresponding knowledge artifacts using the HL7 Knowledge Artifact Specification. This paper has been developed using material from a variety of sources: VA artifacts, clinical practice guidelines, evidence in the body of medical literature, and clinical expertise. After reviewing these sources, the material has been synthesized and harmonized under the guidance of VA subject matter experts to reflect clinical intent.

Unless otherwise noted, items within this white paper (e.g., documentation template fields, orderable items, etc.) are chosen to reflect the clinical intent at the time of creation. To provide an exhaustive list of all possible items and their variations is beyond the scope of this work.

Conventions Used

Conventions used within the knowledge artifact descriptions include:

- <obtain>: Indicates a prompt to obtain the information listed.
 - If possible, the requested information should be obtained from the underlying system(s). Otherwise, prompting the user for information may be required.
 - The technical and clinical notes associated with a section should be consulted for specific constraints on the information (e.g., time-frame, patient interview, etc.).
 - Default values: unless otherwise noted, <obtain> indicates to obtain the most recent observation within the past 2 years. It is recognized that this default time-frame value may be altered by future implementations.
- [...]: Square brackets enclose explanatory text that indicates some action on the part of the user, or general guidance to the clinical or technical teams. Examples include, but are not limited to:
 - [Begin ...], [End ...]: Indicate the start and end of specific areas to clearly delineate them for technical purposes.
 - [Activate ...]: Initiates another knowledge artifact or knowledge artifact section.
 - [Section Prompt: ...]: If this section is applicable, then the following prompt should be displayed to the user.
 - [Section Selection Behavior: ...]: Indicates technical constraints or considerations for the selection of items within the section.

- 113 • [Attach: ...]: Indicates that the specified item should be attached to the documentation template if
114 available.
- 115 • [Link: ...]: Indicates that, rather than attaching, a link to the item should be included in the
116 documentation template.
- 117 • [Clinical Comments: ...]: Indicates clinical rationale or guidance.
- 118 • [Technical Note: ...]: Indicates technical considerations or notes.
- 119 • [If ...]: Indicates the beginning of a conditional section.
- 120 • [Else, ...]: Indicates the beginning of the alternative branch of a conditional section.
- 121 • [End if ...] Indicates the end of a conditional section.
- 122 • Check boxes: Indicates items that should be selected based upon the section selection behavior.

Rheumatoid Arthritis

1. Clinical Context

Rheumatoid arthritis is the most prevalent autoimmune inflammatory arthritis. It is associated with substantial disability and impacts quality of life, morbidity, and mortality. Its diagnosis and management, however, remain unclear to many primary care physicians, who generate the majority of referrals to rheumatologists. Exposing the basic American College of Rheumatology recommendations to primary care physicians and integrating the recommendations into the primary care workflow can decrease practice variability and increase the efficiency and appropriateness of subspecialty management (Singh 2016).

Clinical Context Domains

Target User	Provider to include Primary Care
Patient	Adult Patients
Priority	Routine
Specialty	Primary Care
Location	Outpatient

2. Knowledge Artifacts

This section describes the CDS KNARTs that are intended for users caring for adult patients who present to a Primary Care Clinic with joint pain or inflammatory arthritis. The intent of these artifacts is to ensure a minimum workup is initiated prior to a Rheumatology Consultation.

Three knowledge artifacts define this clinical use case and are described in detail in the following sections. They are:

- Consult Request
 - This is a high-level, encompassing artifact meant to communicate the request for a rheumatology consultation.
 - It relies upon the documentation template and order set artifacts.
- Documentation Template
 - This is a template used to document the information provided by the referring provider.
 - It includes logic for appropriate display of documentation sections.
- Order Set
 - This is the set of orderable items associated with the consult request.
 - It includes logic for appropriate display of the order set.

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Composite

[Begin Composite.]

1. Knowledge Narrative

[See Clinical Context in Chapter 1.]

2. Consult Request

[Technical Note: The following list provides the basic components of the consult request. This is the high-level, encompassing artifact, and must be combined with the documentation template and order set to form a fully functional knowledge artifact. The information for the consult request can be obtained as part of the composite or within the corresponding order set component in the consult section If obtained within the composite, this information should pre-populate the respective order set component.]

[Section Prompt: In order to initiate a rheumatology consult, please provide the following information.]

- Reason for Consult: Joint Pain
- Consult Specialty: Rheumatology
- Priority: Routine
- <obtain> Referring Physician
- <obtain> Referring Physician Contact Information

[Activate Documentation Template.]

[End Composite.]

Documentation Template

[Begin Documentation Template.]

1. Knowledge Narrative

[See Clinical Context in Chapter 1.]

[Section Prompt: This documentation template is intended for primary care physicians documenting findings for outpatients with joint pain or inflammatory arthritis in preparation for their referral to rheumatology.]

2. History

[Begin History section.]

[Section Selection Behavior: Select Yes or No for each question.]

[Section Prompt: Please ask the patient the following questions.]

Is the duration of joint pain greater than 6 weeks?

- ☐ Yes

- ☐ No

Are hands or wrists involved?

- ☐ Yes

- ☐ No

Is morning stiffness present?

- ☐ Yes

- ☐ No

Did the pain have a gradual onset?

- ☐ Yes

- ☐ No

<obtain> Optional additional information

[End History section.]

3. Physical Exam

[Begin Physical Examination section.]

[Section Selection Behavior: Select Yes or No for each question.]

[Section Prompt: Please answer the following questions and provide any additional required details.]

Are more than four joints involved?

- ☐ Yes <obtain> Specific Joints Affected

- ☐ No

198 Are there signs of joint inflammation (e.g., warmth, soft tissue swelling, or tenderness)?

199 • ☐ Yes <obtain> Specific Joints Affected

200 • ☐ No

201 [If yes, then present the list of signs.]

202 [Begin list of signs.]

203 [Section Prompt: Check all signs that are applicable.]

204 [Selection Behavior: Select any or none. Optional.]

205 • ☐ Warmth

206 • ☐ Soft Tissue Swelling

207 • ☐ Tenderness

208 [End list of signs.]

209 [End if Yes.]

210 [End Physical Exam section.]

211 4. Medication History

212 [Begin Medication History section.]

213 [Technical Note: Consider automatically including the information in this section if it is available.]

214 [Section Prompt: Please answer the following questions and provide any required additional details.]

215 [Section Selection Behavior: Select Yes or No for each question. If Yes to a given question, then display the
216 subcategories that follow it.]

217 Was there prior use of disease-modifying antirheumatic drugs?

218 • ☐ Yes

219 [If Yes to “Was there prior use of disease-modifying antirheumatic drugs?” then display the subcategories of
220 medications.]

221 • ☐ adalimumab

222 • <obtain> Date initiated

223 • <obtain> Dose

224 • ☐ etanercept

225 • <obtain> Date initiated

226 • <obtain> Dose

227 • ☐ hydroxychloroquine

228 • <obtain> Date initiated

229 • <obtain> Dose

230 • ☐ infliximab

231 • <obtain> Date initiated

232 • <obtain> Dose

233 • ☐ leflunomide

234 • <obtain> Date initiated

235 • <obtain> Dose

236 • ☐ methotrexate

237 • <obtain> Date initiated

238 • <obtain> Dose

239 • ☐ rituximab

240 • <obtain> Date initiated

241 • <obtain> Dose

242 • ☐ sulfasalazine

243 • <obtain> Date initiated

244 • <obtain> Dose

245 • ☐ other

246 • <obtain> Date initiated

247 • <obtain> Dose

248 [End if Yes.]

249 • ☐ No

250 Was there prior use of prednisone or other glucocorticoids?

251 • ☐ Yes

252 [If Yes to “Was there prior use of prednisone or other glucocorticoids?” then display the subcategories of
253 information related to the prior use.]

254 • <obtain> Drug name

255 • <obtain> Date initiated

256 • <obtain> Date ended

257 [End if Yes.]

258 • ☐ No

259 [End Medication History section.]

260 **5. Laboratory Studies**

261 [Begin Laboratory Studies section.]

262 [Technical Note: If available, the most recent results and dates within the past 3 months should be included for
263 the following: C-reactive protein, erythrocyte sedimentation rate, hepatitis C antibody screen, complete blood

count, and complete metabolic panel. If available, the most recent results and dates from any time should be included for the following: rheumatoid factor and anti-cyclic citrullinated peptide antibody (ACPA/Anti-CCP).]

- Anti-cyclic Citrullinated Peptide Antibody (ACPA/Anti-CCP) <obtain> Results and date

- C-Reactive Protein <obtain> Results and date

- Erythrocyte Sedimentation Rate <obtain> Results and date

- Rheumatoid Factor <obtain> Results and date

- Hepatitis C Antibody Screen <obtain> Results and date

- Complete Blood Count <obtain> Results and date

- Complete Metabolic Panel <obtain> Results and date

- Other <obtain> Test <obtain> Results <obtain> Date

[End Laboratory Studies section.]

6. Imaging and Diagnostic Studies

[Begin Imaging and Diagnostic Studies section.]

[Technical Note: Results text should be attached automatically if it is provided for the hand radiograph interpretation field. Include any studies performed within the past year.]

- <obtain> Hand Radiograph Interpretation

- [Link Images: Hand Radiograph]

[End Imaging and Diagnostic Studies section.]

[End Documentation Template.]

Order Set

[Begin Order Set.]

1. Knowledge Narrative

[See Clinical Context in 1.]

[Clinical Comment: This order set applies to any adult outpatients presenting to a primary care provider with joint pain or equivalent symptoms of inflammatory arthritis. All orders are routine unless otherwise specified.]

2. Medications

[Begin Medications section.]

~~[Clinical Note: No medications are required prior to a rheumatology consult. However, if a user attempts to order prednisone prior to the rheumatology consult, the user should be cautioned that prednisone can mask symptoms and should not be ordered prior to evaluation by rheumatology.]~~

[Section Prompt: No medications are required prior to a rheumatology consult. However, if prednisone is considered prior to the rheumatology consult, be aware that prednisone can potentially mask symptoms that would be evaluated by rheumatology.]

[End Medications section.]

3. Laboratory Studies

[Begin Laboratory Studies section.]

[Section Prompt: Consider ordering the following laboratory studies if they have not been ordered within the last three months. Note: The ANA test is not considered appropriate to be ordered for suspected rheumatoid arthritis.]

[Section Selection Behavior: Select any or none. Optional.]

- ☐ Rheumatoid factor
- ☐ Anti-cyclic citrullinated peptide antibody (ACPA/Anti-CCP)
- ☐ Hepatitis C antibody screen
- ☐ Complete blood count
- ☐ Complete metabolic panel
- ☐ C-reactive protein
- ☐ Erythrocyte sedimentation rate

[End Laboratory Studies section.]

4. Imaging and Diagnostic Services

[Begin Imaging and Diagnostic Studies section.]

[Section Prompt: Consider ordering the following imaging study if it has not been done within the past year.]

[Section Selection Behavior: Optional.]

Comment [WL5]: I am trying to understand the workflow for this. How does the system know that we are in the timeframe “prior to rheumatology consult”? This would be nice but does just opening this order set enable the functionality? If not, then perhaps some kind of guidance presented to the user here would be helpful.

Team B3 10/11/17: Clarified the clinical intent and changed from a clinical comment to an actual prompt to warn ordering providers that prednisone can mask symptoms.

Comment [CS6]: Linda, I agree that it is not clear when and how this order set would be activated. I wonder if the documentation template or the consult request should specify a link to the order set. This is a general issue that should be handled the same across the various KNARTS

- □x-ray hands, bilateral, to evaluate for possible rheumatoid arthritis

[End Imaging and Diagnostic Studies section.]

[End Order Set.]

Bibliography/Evidence

[Aletaha, 2010] D Aletaha, T Neogi, and AJ Silman. “2010 Rheumatoid arthritis classification criteria: an American College of Rheumatology/European League Against Rheumatism collaborative initiative.” *Arthritis Rheum.* 2010. 62. (9). 2569-2581.

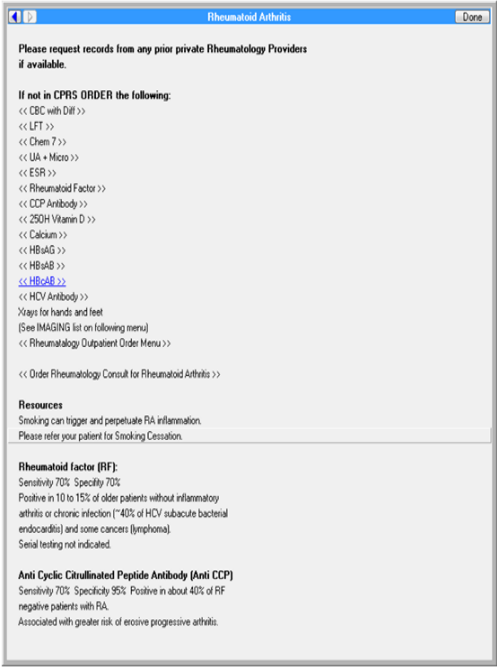
[Singh, 2016] JA Singh, KG Saag, and SL Bridges. “American College of Rheumatology. 2015 American College of Rheumatology Guideline for the Treatment of Rheumatoid Arthritis.” *Arthritis and Rheumatology (Hoboken, NJ)*. 2016. 68. (1). 1-26.

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Appendix A: Existing VA Artifacts

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Figure A.1. Figure 1



328

Comment [CS7]: [and KBS Team]: I see a lot more content in the existing VA artifacts than what is being included in the KNART tool above. Do we have confidence that the SME Team has made a conscious decision *not* to include all the information from existing artifacts?

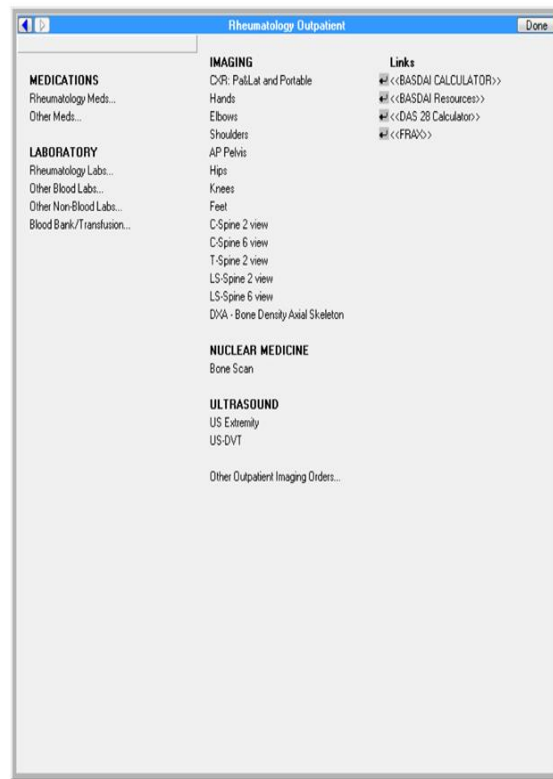
Team B3 10/11/17: Yes. In many cases, the SMEs voiced the opinion that “less is more” to hone in on what is actually needed.

329 **Figure A.2. Figure 2**

The screenshot shows a software window titled "Rheumatology Consult" with a "Done" button in the top right corner. The window contains two sections of text, each with a list of items preceded by double less-than signs (<<). The first section is titled "Symptoms raising the possibility of a Rheumatologic Syndrome:" and lists: "<< Back Pain >>", "<< Joint Pain >>", "<< Systemic Symptoms >>", "<< Widespread Pain >>", and "<< Other >>". The second section is titled "Established diagnoses needing Rheumatology evaluation and follow up:" and lists: "<< Bursitis / Tendinitis >>", "<< Crystal Arthritis >>", "<< Fibromyalgia >>", "<< Myositis >>", "<< Osteoarthritis >>", "<< Polymyalgia Rheumatica / Temporal Arteritis >>", "<< Rheumatoid Arthritis >>", "<< Scleroderma >>", "<< Sjogren Syndrome >>", "<< Spondyloarthritis (includes Psoriatic Arthritis) >>", "<< Systemic Lupus Erythematosus >>", "<< Vasculitis >>", and "<< Other >>".

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331 **Figure A.3. Figure 3**



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333 **Figure A.4. Figure 4**

Rheumatology Medications (Rev. 4.28.06)			
Gout	NSAIDs	Other	Information/Guidelines
Gout Guidelines/Medications	Dose and duration depend on risk of MI stroke ARF and renal function	Acetaminophen 650mg BID-QID	<<Medications (ALL)>>
Gout/Pseudogout Guidelines	Ibuprofen 400mg BID-TID	Aspirin EC 650mg BID-QID	<<General EFER Request>>
Pseudogout Meds	Ibuprofen 600mg BID-TID	Calcium Vitamin D Daily	<<Rheumatology EFER Request>>
	Ibuprofen 800mg BID-TID	Cyclosporine 10mg 3-4 x Daily	<<Tablet Cutter>>
		Folic Acid 1mg Daily	
Rheumatoid Arthritis Meds	Naproxen 250-500mg BID	Prednisone	24 Hour Urine Uric Acid
Hydroxychloroquine 400mg Daily	Naproxen 500mg BID	Prednisone TAPER from 40mg	Hypouricemic Therapy
Sulfasalazine 500mg TID		Analgesic Bath (\$0.02/dose)	GI Assessment tool
Sulfasalazine 1000mg TID	Diclofenac 50mg BID	Capzasin 0.025%	NSAID/Cox-2 Guide
Methotrexate 7.5mg DWK	Meloxicam 7.5mg Daily (preferred)	Capzasin 0.1% w/gloves (\$0.11)	Chondroitin/Glucosamine
Azathioprine 50mg Daily	Meloxicam 15mg Daily (preferred)	Lidocaine Patch (Rx)	
Leflunomide (Rx)		Duloxetine (Fibromyalgia)	Links
Osteoporosis	Indomethacin 25-50mg BID-TID	Alcohol Prep Pads	##BASDAI Calculator
Osteoporosis Tx/Information			##BASDAI Website
	Etodolac 400mg BID		##BASDAI Interview
	Sulindac 150mg BID		##DAS 28 Calculator
	Sulindac 200mg BID		##VA FPM NSAID Warning Bullet
	Salsalate 500-1000mg BID-TID		##NSAID Safety Profile Comparison
	CDX-2 Guidelines		
	CDX-2 Medication Menu (Rx)		
	Additional Pain Meds		

Figure A.5. Figure 5

The screenshot shows a window titled "Rheumatology Lab Menu" with a "Done" button in the top right corner. The window is divided into three main columns of test categories and their sub-items.

GENERAL	VASCULITIS	Lab Tests(ALL)
CBC	ANCA	
CBC w/Diff	Cryoglobulins	FOLLOW-UP APPOINTMENTS
Chem 7	SPEP	F/U Lab Appt
LFT	Urine Protein Class Panel	
UA & Micro	Quantitative IgG Subclasses	INFORMATION/GUIDELINES
ESR	KAPPA & LAMBDA LIGHT CHAINS PANEL	Rheumatoid Factor
CRP	KAPPA & LAMBDA LIGHT CHAINS PANEL	HLA B27 Information
RA	HEPATITIS	ANA Information
RF	HBsAg	Anti-DNA Antibody
CCP	HBsAb	Anti-ENA Antibody
	HBcAb	Uric Acid
SLE / APLS	HCV Ab	24 Hour Urine Uric Acid
ANA	HCV PCR	Antineutrophil Cytoplasmic Antibody
Anti-DNA		Erythrocyte Sedimentation Rate
Anti-ENA	ENDOCRINE / METABOLIC	C-Reactive Protein
C3	Free T4	Complement C3/C4
C4	TSH	Cryoglobulins
CH50	Hgb A1C	Synovial Analysis
Anticardiolipin	25-OH Vitamin D	Pseudogout Guidelines (Rev. 3/04)
Beta-2-Glycoprotein Ab	B12/Folate	
Lupus Anticoagulant	Femlin	
	Fe/TIBC	
OTHER	PTH	
Anti-Thyroid Autoantibodies	Calcium	
Anti-TTG Ab	Phosphorus	
HLA B27	Magnesium	
CK	Uric Acid	
Myositis Panel	24 Hr Urine Calcium	
SYNOVIAL ANALYSIS	24 Hr Urine Creatinine	
Synovial Analysis - Cell Count	Random Urine Creatinine	
Culture & Susceptibility - Synovial	Random Urine Protein	