

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

Women's Health: Osteoporosis Screening Age 65 and Older Clinical Content White Paper

Department of Veterans Affairs (VA)



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

Clinical Decision Support (CDS) Content and Health Level 7 (HL7)-Compliant Knowledge Artifacts (KNARTs): Women's Health: Osteoporosis Screening Age 65 and Older Clinical Content White Paper

by Department of Veterans Affairs (VA), , , , and

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Table 1. Relevant KNART Information: Women's Health: Women's Health: Osteoporosis Screening Age 65 and Older

Women's Health KNART	Associated CLIN
Osteoporosis Screening Age 65 and Older - Event-Condition-Action (ECA) Rule	CLIN0007BA
Osteoporosis Screening Age 65 and Older - Documentation Template	CLIN0005AB
Osteoporosis Screening Age 65 and Older - Order Set	CLIN0008CA

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1.1. Clinical Context Domains 1

VA Subject Matter Expert (SME) Panel

Name	Title	Project Role
C. Yvette Williams-Harris, MD, MPH	Physician, Atlanta VA Healthcare System, 1670 Clairmont Rd, Atlanta, GA 30033	SME, Primary
Megan Gerber, MD, MPH	Physician, VA Boston Health Care System, 150 South Huntington Ave, Boston, MA 02130	SME, Secondary
Caitlin M. Cusack, MD, MPH	Contractor-Physician Informaticist, Office of Women's Health Services, 810 Vermont Avenue, Washington DC 20420	SME

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 Health Level 7 (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 (CCWP) 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 for this use case.

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
- Default Values: Unless otherwise noted, <obtain> indicates to obtain the most recent observation. 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 clinical user, or general guidance to the clinical or technical teams. Examples include, but are not limited to:

[Begin ...], [End ...]: Indicates 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 Behavior: ...]: Indicates technical constraints or considerations for the selection of items outlined in the section prompt.

[Attach: ...]: Indicates that the specified item (e.g. procedure or result interpretation) should be attached to the documentation template if available.

[Link: ...]: Indicates that rather than attaching an item (e.g. image), a link should be included in the documentation template.

[Clinical Comment: ...]: Indicates technical considerations or notes to be utilized for KNART authoring and at time of implementation planning.

[Technical Note: ...]: Indicates technical considerations or notes to be utilized for KNART authoring and at time of implementation planning.

[If ...]: Indicates the beginning of a conditional section.

[Else, ...]: Indicates the beginning of the alternative branch of a conditional section.

[End if ...]: Indicates the end of a conditional section.

#[Check box]: Indicates items that should be selected based upon the section selection behavior.

Chapter 1. Women's Health: Osteoporosis Screening Age 65 and older

1.1 Clinical Context

[Begin Clinical Context.]

Osteoporosis is a highly prevalent condition with significant attendant morbidity. As osteoporosis is generally silent until a fracture occurs, it is imperative that patients who are at risk be screened according to evidence-based guidelines. Such screening is consistent with public health initiatives and is highly cost-effective, as the cost of care for preventable osteoporosis-related fractures is considerable [American College of Obstetricians and Gynecologists (*ACOG*) 2012; US Preventive Services Task Force (*USPSTF*) 2015]. Fostering adherence across the VA to guideline-recommended screening for osteoporosis could improve resource utilization and promote good patient care.

The latest guidelines chosen by the VA will be used for these knowledge artifacts. In addition, these artifacts are constrained to apply to:

Women aged 65 and older, with no documented history of osteopenia/osteoporosis, who are outpatients.

Clinical context is summarized in the table below.

Table 1.1. Clinical Context Domains

Target User	To include primary care and designated women's health providers.
Patient	Females aged 65 and older
Priority	Routine
Specialty	Primary Care and Gynecology
Location	Outpatient

[End Clinical Context.]

1.2 Knowledge Artifacts

[Begin Knowledge Artifacts.]

This section describes the CDS knowledge artifacts intended for clinical providers, and include:

- An (*ECA*) Rule: Women's Health: Osteoporosis Screening Age 65 and older KNART
 - Rule logic for activation of the documentation template and order set
 - Actions that may include activating documentation templates and order sets
- A Documentation Template: Women's Health: Osteoporosis Screening Age 65 and Older KNART
 - Documents a patient's risk for osteoporosis
 - Includes logic for appropriate display of documentation sections
- An Order Set: Women's Health: Osteoporosis Screening Age 65 and Older KNART

- Orderable items associated with osteoporosis screening
- Includes logic for appropriate display of the order set

[End Knowledge Artifacts.]

Chapter 2. Event Condition Action (ECA) Rule: Osteoporosis Screening Age 65 and older

[Begin ECA Rule.]

2.1 Knowledge Narrative

[Begin Knowledge Narrative.]

[See Clinical Context in Chapter 1.]

[Technical Note: All female outpatients age 65 and older should be included.]

[End Knowledge Narrative.]

2.2 Outpatient Visit, 65 and Older Years of Age, No Prior Dual-Energy X-ray Absorptiometry (DEXA)

[Begin Outpatient Visit, 65 and Older Years of Age, No Prior Dual-Energy X-ray Absorptiometry (DEXA).]

Event

[Begin Event.]

- Access of the patient record in a preventive care encounter at a primary care clinic or in an *OB/GYN* or women's health outpatient department.

[End Event.]

Conditions

[Begin Conditions.]

- Patient is aged 65 and older years; and
- There is no *DEXA* scan T-score ≤ -1.0 in the patient's record; and
- Patient has not undergone *DEXA* scanning OR previous *DEXA* was before age 60

[End Conditions.]

Actions

[Begin Actions.]

- Identify the patient as a potential osteoporosis screening candidate; and
- Open Documentation Template: Osteoporosis Screening Age 64 and Older; and
- Make screening guideline recommendations available for review.

Event Condition Action
(ECA) Rule: Osteoporosis
Screening Age 65 and older

[End Actions.]

[End Outpatient Visit, 65 and Older Years of Age, No Prior *DEXA*OR previous *DEXA* was before age 60.]

[End ECA rule]

Chapter 3. Documentation Template: Osteoporosis Screening Age 65 and Older

[Begin Documentation Template.]

3.1 Knowledge Narrative

[Begin Knowledge Narrative.]

[See Clinical Context in Chapter 1.]

[Clinical Comment: The Osteoporosis Screening Age 65 and Older Documentation Template provides a mechanism for documenting a patient's risk for osteoporosis. Although the template is a series of questions and answers, any information that can be obtained from the system should be pre-filled in a manner that is displayed to the user. Users should revise the information provided in the documentation template form as needed during the evaluation.]

[End Knowledge Narrative]

3.2 Pertinent Medical History

[Begin Pertinent Medical History]

[Section Prompt: Does patient report being previously diagnosed with osteoporosis?]

[Technical note: For “yes” response to diagnosis of either osteopenia or osteoporosis, system should not record a confirmed diagnosis until T-Score is provided, thus ECA rule will fire as if patient had never reported these diagnoses. System can record that patient has verbally reported a diagnosis of either osteopenia or osteoporosis. *KNART* should still fire again every 6 months until report/T-score is provided]

[Section Selection Behavior: Select only one. Required.]

Yes

No

[Section Prompt: Does patient report being previously diagnosed with osteopenia?]

[Section Selection Behavior: Select only one. Required.]

Yes

No

[End Pertinent Medical History.]

3.3. Imaging History Outside Electronic Medical Record

[Begin Imaging History Outside Electronic Medical Record.]

[Technical note: this section should be completed automatically, and results displayed if data is available.]

Documentation Template:
Osteoporosis Screening
Age 65 and Older

[Section Prompt: Screening for osteoporosis consists of: a *DEXA*scan in all women at age 65, in addition to identifying (and screening) post-menopausal women less than age 65 who are at higher than normal risk of fracture.]

[Section Prompt: Prior outside *DEXA*scanning done?]

[Section Selection Behavior: Select only one. Required.]

[Technical note: For “yes” response to “Prior outside *DEXA*scanning done?”, system should not record *DEXA*as done until T-Score is provided, thus *ECARule* will fire as if *DEXA*had not been done. System can record that patient has verbally reported *DEXA*results. KNART should still fire again every 6 months until report/T-score is provided]

- # Yes, prior outside *DEXA*scanning was done
 - [Section prompt: IS full*DEXA* scan report provided for review?]
 - [Section Selection Behavior: Select only one. Required.]
 - # Yes, full *DEXA*scan report is provided for review
 - [Section Prompt: Was *DEXA* done before age 60?]
 - [Section Selection Behavior: Select only one. Required.]
 - # Yes, *DEXA* was done before age 60
 - # Most recent T-score >-1.0 (normal)
 - [Technical note: Please prompt user that “Repeat *DEXA* screening is indicated after age 65”, then continue documentation template to completion, then open Order Set: Osteoporosis Screening Age 65 and Older]
 - # Most recent T-score >-2.5 and ≤ -1.0 (osteopenia)
 - [Technical note: Please end documentation template and open future knowledge artifact for management of osteopenia and osteoporosis.
 - # Most recent T-score ≤ -2.5 (osteoporosis)
 - [Technical note: Please end documentation template and prompt user that “Treatment for osteoporosis is indicated”. Open future knowledge artifact for management of osteopenia and osteoporosis.
 - # No, *DEXA* was NOT done before age 60
 - # Most recent T-score >-1.0 (normal)
 - [Technical note: Please end documentation template and prompt user that “*DEXA* screening is complete”]
 - # Most recent T-score is ≤ -2.5 (osteoporosis)
 - [Technical note: Please end documentation template and prompt user that “Treatment for osteoporosis is indicated”. Open future knowledge artifact for management of osteopenia and osteoporosis
 - #No, full *DEXA*scan report is not provided for review
 - [Section Prompt: Has a provider requested this report in the past, and has it been one year or more since the report was first requested?]
 - [Section Selection Behavior: select only one. Required.]

- # Yes
 - [Technical note: Please prompt user that “Repeat DEXA screening is indicated”, then continue documentation template to completion, then open Order Set: Osteoporosis Screening Age 65 and Older]
- # No
 - [Technical note: Please prompt provider to “Please request that patient provide outside *DEXA* results”.]
 - <Obtain> Any patient reported details
- # No, prior outside *DEXA* scanning was not done
 - [Technical note: Please continue documentation template to completion, then open Order Set: Osteoporosis Screening Age 65 and Older]

[End Imaging History Outside Electronic Medical Record.]

3.5 Patient Preference

[Begin Patient Preference]

[Section Prompt: Patient declines *DEXA* scanning?]

[Section Selection Behavior: Select only one. Required.]

Yes

- [Technical note: Continue documentation template to completion, but do not open order set for patients who decline *DEXA* scanning.]

No

[End Patient Preference]

3.6 Risk Factors

[Begin Risk Factors]

[Technical note: The “Risk Factors” section should only be displayed if “yes” is selected for “Patient declines *DEXA* scanning” in section 3.5.]

[Section Prompt: Risk Factors for osteoporosis]

[Section Prompt: History of fragility fracture (due to falls from standing height or lower)?]

[Section Selection Behavior: Select only one. Required.]

- # Yes
- # No

[Section Prompt: BMI (Body Mass Index) <21?]

<obtain> BMI

- # Yes

Documentation Template:
Osteoporosis Screening
Age 65 and Older

- # No

[Section Prompt: Potential causes of bone loss?]

[Section Selection Behavior: Select all applicable. Optional.]

- # Glucocorticoid therapy (5 mg per day for longer than 3 months)
- # Anticonvulsant therapy greater than 2 years
- # Hypogonadism
- # History of gastrectomy
- # History of malabsorption
- # History of celiac disease
- # History of metabolic surgery
- # Rheumatoid arthritis
- # Other

<obtain>

[Section Prompt: Parental hip fracture?]

[Section Selection Behavior: Select one. Required.]

- # Yes
- # No

[Section Prompt: Tobacco use history and advice to quit]

[Technical note: activate chapter 2.2, “Tobacco Use History”, and chapter 2.3, “Advising users to quit” in the “Tobacco Assessment and Cessation Counseling” documentation template KNART. Pull the following data from that KNART into this one]

[Section Prompt: Do you currently use tobacco?]

- # Every day
- # Some days
- # Not at all

[Section Prompt: Have you ever used tobacco?]

[Technical Note: Display this question only if current tobacco use is “not at all”.]

- # Yes
- # No

[Section Prompt: Daily alcohol use/Alcoholism?]

[Section Selection Behavior: Select one. Required.]

- # Yes
- # No

Documentation Template:
Osteoporosis Screening
Age 65 and Older

[Section Prompt: If there are any risk factors for osteoporosis noted then ask the patient if she still declines screening.]

[End Risk Factors.]

[End Documentation Template.]

Chapter 4. Order Set: Osteoporosis Screening Age 65 and Older

[Begin Order Set.]

4.1 Knowledge Narrative

[Begin Knowledge Narrative.]

[See Clinical Context in Chapter 1.]

[This order set applies to any patient who requires osteoporosis screening. All orders are routine unless otherwise specified.]

[End Knowledge Narrative.]

4.3 Imaging Studies

[Begin Imaging Studies.]

[Section Prompt: Imaging Studies]

[Section Selection Behavior: Select one. Optional.]

Dual-energy x-ray absorptiometry screen for osteoporosis

[End Imaging Studies.]

4.4 Patient and Caregiver Education

[Begin Patient and Caregiver Educations.]

[Section Prompt: Patient and Caregiver Education.]

[Section Selection Behavior: Select one. Optional.]

Osteoporosis education

[End Patient and Caregiver Education.]

4.5 Consults and Referrals

[Begin Consults and Referrals.]

[Section Prompt: Radiology consult for osteoporosis screening.]

[Section Prompt: A radiology consult order would be used to refer a patient to radiology outside the VA]

[Section Selection Behavior: Optional.]

Consult: Radiology

Reason for Consult: Osteoporosis Screening

Priority: Routine

Order Set: Osteoporosis
Screening Age 65 and Older

[Section Prompt: Referring Physician Information]

<obtain> Referring Physician Name

<obtain> Referring Physician Contact Information

[End Consults and Referrals.]

[End Order Set.]

Bibliography/Evidence

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Appendix A. Existing Sample VA Artifacts

Figure A.1. Reminder Resolution: Osteoporosis Screen

Figure A.2. Reminder Resolution: Osteoporosis Education

Reminder Resolution: Osteoporosis Education

- ☒ Patient was educated on factors that might reduce risk for osteoporosis.
- ☐ Patient received osteoporosis education previously at another facility.
- ☐ Patient declined osteoporosis education at this encounter.
- ☐ Learning Needs Assessment

Clear Clinical Maint Visit Info < Back Next > Finish Cancel

<No encounter information entered>