

# **Gastroenterology: Colorectal Cancer Risk - Iron deficiency Order Set**

## **Order Set: Conceptual Structure**

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**Department of Veterans Affairs (VA)**



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

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# Gastroenterology: Colorectal Cancer Risk - Iron deficiency Order Set: Order Set: 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 |
|----------------|------------------|
| June 18, 2018  | Published        |
| May 18, 2018   | Published        |
| May 15, 2018   | Reviewed         |
| April 24, 2018 | Created          |
| April 24, 2018 | Pre-published    |

**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 | ea404948-68ef-5eff-9964-cf56e70ca975 | B23  |

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# Artifact Applicability

**Table 4. Applicability Foci, Description and Codes**

| Focus           | Description   | Code System | Code   | Value Set | Value Set Version |
|-----------------|---|-------------|--|-----------|-------------------|
| TargetUser      | Primary Care Provider   | SNOMED CT   | 453231000124104  Primary care provider (occupation)          | N/A       | N/A               |
| PatientAgeGroup | Adult   | SNOMED CT   | 133936004  Adult (person)                                    | N/A       | N/A               |
| ClinicalFocus   | Routine unless otherwise identified                                 | SNOMED CT   | 50811001  Routine (qualifier value)                          | N/A       | N/A               |
| WorkflowSetting | Primary Care  | SNOMED CT   | 5351000124100  Primary care clinic (environment)             | N/A       | N/A               |
| ClinicalVenue   | Outpatient  | SNOMED CT   | 33022008  Hospital-based outpatient department (environment) | N/A       | N/A               |
| WorkflowTask    | Colorectal Cancer Screening, Diagnostic Evaluation, or Surveillance |             |  | N/A       | N/A               |

---

# 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. Complete blood count**

|   |
|---|
| Expression: type=elm:SingletonFrom<br>Annotation:<br>Codes: elm:element[elm:Code]: [26604007  Complete blood count (procedure)] |
|---|

**Table 1.2. Iron**

|   |
|---|
| Expression: type=elm:SingletonFrom<br>Annotation:<br>Codes: elm:element[elm:Code]: [42950004  Iron measurement (procedure)] |
|---|

**Table 1.3. Ferritin**

|   |
|---|
| Expression: type=elm:SingletonFrom<br>Annotation:<br>Codes: elm:element[elm:Code]: [489004  Ferritin measurement (procedure)] |
|---|

**Table 1.4. Total iron binding capacity**

|   |
|---|
| Expression: type=elm:SingletonFrom<br>Annotation:<br>Codes: elm:element[elm:Code]: [359979000  Total iron binding capacity measurement (procedure)] |
|---|

## Triggers

No trigger definitions are present.



---

# Chapter 2. Expression Definitions

No expression definitions are present.

---

## Chapter 3. Laboratory Tests

**Condition:**elm:Not (elm:Exists( Complete blood count ))

# Complete blood count 1 time (routine)

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

statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|

topic: Precoordinated Expression 26604007 |Complete blood count (procedure)|

priority: Precoordinated Expression 50811001 |Routine (qualifier value)|

**Condition:**elm:Not (elm:Exists( Iron ))

# Iron 1 time (routine)

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

statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|

topic: Precoordinated Expression 42950004 |Iron measurement (procedure)|

priority: Precoordinated Expression 50811001 |Routine (qualifier value)|

**Condition:**elm:Not (elm:Exists( Ferritin ))

# Ferritin 1 time (routine)

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

statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|

topic: Precoordinated Expression 489004 |Ferritin measurement (procedure)|

priority: Precoordinated Expression 50811001 |Routine (qualifier value)|

**Condition:**elm:Not (elm:Exists( Total iron binding capacity ))

# Total iron binding capacity 1 time (routine)

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

statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|

topic: Precoordinated Expression 359979000 |Total iron binding capacity measurement (procedure)|

priority: Precoordinated Expression 50811001 |Routine (qualifier value)|

---

# Chapter 4. Consults and Referrals

# Referral Gastroenterology evaluate iron deficiency (routine)

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

statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|

topic: Precoordinated Expression 183523005 |Referral to gastroenterology service  
(procedure)|

priority: Precoordinated Expression 50811001 |Routine (qualifier value)|

---

# Chapter 5. Patient and Caregiver Education

# Colorectal cancer testing education (routine)

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

statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|

topic: Postcoordinated Expression [223464006 |Procedure education (procedure)] -  
>(363702006 |Has focus (attribute))->[268548003 |Screening for malignant neoplasm of  
large intestine (procedure)]

priority: Precoordinated Expression 50811001 |Routine (qualifier value)|

# Bowel prep for colonoscopy education (routine)

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

statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|

topic: Precoordinated Expression f165e620-5c1d-4289-b327-d41b4cf3eaac |Education  
about bowel prep for colonoscopy (procedure)

priority: Precoordinated Expression 50811001 |Routine (qualifier value)|

---

# Chapter 6. Tabular List

## *Terminology Service Request (TSR) Mappings*

**Table 6.1. Terminology Versions**

| Name      | Identifier             | Version                        |
|-----------|------------------------|--------------------------------|
| SNOMED CT | 2.16.840.1.113883.6.96 | United States Edition 20180301 |

**Table 6.2. Terminology References**

| System    | Code  | Display Text <sup>a</sup>  | References <sup>b</sup> |
|-----------|---|----------------------------|-------------------------|
| SNOMED CT | 133936004  Adult (person)   | Adult                      | 1                       |
| SNOMED CT | 183523005  Referral to gastroenterology service (procedure)   | Precoordinated Expression  | 1                       |
| SNOMED CT | 26604007  Complete blood count (procedure)  | Precoordinated Expression  | 2                       |
| SNOMED CT | 33022008  Hospital-based outpatient department (environment)  | Outpatient                 | 1                       |
| SNOMED CT | 359979000  Total iron binding capacity measurement (procedure)  | Precoordinated Expression  | 2                       |
| SNOMED CT | 385644000  Requested (qualifier value)  | Precoordinated Expression  | 7                       |
| SNOMED CT | 42950004  Iron measurement (procedure)  | Precoordinated Expression  | 2                       |
| SNOMED CT | 453231000124104  Primary care provider (occupation)   | Primary Care Provider      | 1                       |
| SNOMED CT | 489004  Ferritin measurement (procedure)  | Precoordinated Expression  | 2                       |
| SNOMED CT | 50811001  Routine (qualifier value)   | Precoordinated Expression  | 8                       |
| SNOMED CT | 5351000124100  Primary care clinic (environment)  | Primary Care               | 1                       |
| SNOMED CT | [223464006  Procedure education (procedure)] ->(363702006  Has focus (attribute))->[268548003  Screening for malignant neoplasm of large intestine (procedure)] | Postcoordinated Expression | 1                       |
| SNOMED CT | f165e620-5c1d-4289-b327-d41b4cf3eaac  | Precoordinated Expression  | 1                       |

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Tabular List

---

| System | Code   | Display Text <sup>a</sup> | References <sup>b</sup> |
|--------|--|---------------------------|-------------------------|
|        | Education about bowel<br>prep for colonoscopy<br>(procedure) |                           |                         |

<sup>a</sup>If a code is used multiple times in the KNART, only the display text of the first instance is shown.

<sup>b</sup>Count of the number of times the given code system and code pair is used in the KNART.

---

# Chapter 7. Behavior Symbols

**Table 7.1. 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 7.2. 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 7.3. 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 7.4. 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 7.5. 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 7.6. 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 7.7. 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] *Gastroenterology: Colorectal Cancer Risk Clinical Content White Paper*

[CSD] *Gastroenterology: Colorectal Cancer Risk - Iron deficiency Order Set Conceptual Structure Document*

[KVRpt] *Gastroenterology: Colorectal Cancer Risk - Iron deficiency Order Set KNART Validation Report*

## Supporting Evidence

[Giardiello 2014] *Giardiello FM, Allen JJ, Axilbund JE, et al. Guidelines on genetic evaluation and management of Lynch syndrome: a consensus statement by the US Multi-Society Task Force on colorectal cancer. Am J Gastroenterol. 2014 Aug;109(8):1159-79. (link [https://doi.org/10.1038/ajg.2014.186])*

[Johnson 2014] *Johnson DA, Barkun AN, Cohen LB, et al; US Multi-Society Task Force on Colorectal Cancer. Optimizing adequacy of bowel cleansing for colonoscopy: recommendations from the US multi-society task force on colorectal cancer. Gastroenterology. 2014;147(4):903-924. (link [https://doi.org/10.1053/j.gastro.2014.07.002])*

[Levin 2008] *Levin B, Lieberman DA, McFarland B, et al; American Cancer Society Colorectal Cancer Advisory Group; US Multi-Society Task Force; American College of Radiology Colon Cancer Committee. Screening and surveillance for the early detection of colorectal cancer and adenomatous polyps, 2008: a joint guideline from the American Cancer Society, the US Multi-Society Task Force on Colorectal Cancer, and the American College of Radiology. CA Cancer J Clin. 2008;58(3):130-160. (link [https://doi.org/10.3322/CA.2007.0018])*

[Lieberman 2012] *Lieberman DA, Rex DK, Winawer SJ, Giardiello FM, Johnson DA, Levin TR. Guidelines for colonoscopy surveillance after screening and polypectomy: a consensus update by the US Multi-Society Task Force on Colorectal Cancer. Gastroenterology. 2012;143(3):844-857. (link [https://doi.org/10.1053/j.gastro.2012.06.001])*

[NCHPCP 2017a] *National Center for Health Promotion and Disease Prevention. Get Recommended Screening Tests and Immunizations for Men. National Center for Health Promotion and Disease Prevention website. https://www.prevention.va.gov/Healthy\_Living/Get\_Recommended\_Screening\_Tests\_and\_Immunizations\_for\_Men.asp. Accessed August 25, 2017. (link [https://www.prevention.va.gov/Healthy\_Living/Get\_Recommended\_Screening\_Tests\_and\_Immunizations\_for\_Men.asp])*

[NCHPDP 2017b] *National Center for Health Promotion and Disease Prevention. Get Recommended Screening Tests and Immunizations for Women. National Center for Health Promotion and Disease Prevention website. https://www.prevention.va.gov/Healthy\_Living/Get\_Recommended\_Screening\_Tests\_and\_Immunizations\_for\_Women.asp. Accessed August 25, 2017. (link [https://www.prevention.va.gov/Healthy\_Living/Get\_Recommended\_Screening\_Tests\_and\_Immunizations\_for\_Women.asp])*

- [Rex 2017] *Rex DK, Boland CR, Dominitz JA, et al. Colorectal cancer screening: recommendations for physicians and patients from the U.S. Multi-Society Task Force on Colorectal Cancer. Gastroenterology. 2017;153(1):307-323. (link [https://doi.org/10.1053/j.gastro.2017.05.013])*
- [Shaukat 2013] *Shaukat A, Mongin SJ, Geisser MS, et al. Long-term mortality after screening for colorectal cancer. N Engl J Med. 2013;369(12):1106-1114. (link [https://doi.org/10.1056/NEJMoal300720])*
- [VA 2017] *U.S. Department of Veterans Affairs. Colorectal cancer screening/surveillance (CRCS/S): reminder system. CRCS-S CR F2F 20171018 KGALPIN.pptx. PowerPoint (Jason Dominitz, MD, email communication, November 2, 2017). (link [Email Communication])*
- [USPSTF 2016] *U.S. Preventive Services Task Force. Final Recommendation Statement: Colorectal Cancer: Screening. U.S. Preventive Services Task Force website. https://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/colorectal-cancer-screening2. Reviewed June 2016. (link [https://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/colorectal-cancer-screening2])*