Cardiology: Electrophysiology (EP): Atrial Fibrillation/ Atrial Flutter Order Set

Order Set: Conceptual Structure

Contract: VA118-16-D-1008, Task Order (TO): VA-118-16-F-1008-0007, CLIN0004AE

Department of Veterans Affairs (VA)

Cardiology: Electrophysiology (EP): Atrial Fibrillation/Atrial Flutter 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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Table of Contents

List of Tables

Preface

Table 1. Revision History

Date	Life Cycle Event
June 12, 2018	Published
March 22, 2018	Published
March 21, 2018	Pre-published
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February 25, 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	685caeea-fcfc-59e2-9ecc-87bbda725858	B6

Artifact Applicability

Table 4. Applicability Foci, Description and Codes

Focus	Description	Code System	Code	Value Set	Value Set Version
PatientAgeGroup	Adult outpatient needing Cardiology consult for arrhythmia evaluation			N/A	N/A
ClinicalVenue	Primary Care Clinic			N/A	N/A
TargetUser	Clinical Providers in Primary Care Clinic	SNOMED CT	453231000124104 |Primary care provider (occupation)|	N/A	N/A
WorkflowSetting	Cardiology Consultation	SNOMED CT	246d1a3f-1598-4ca2-a8c8-fbd3aa406882 |Cardiology consultation (procedure)	N/A	N/A
WorkflowTask	Ensure a minimum workup is initiated prior to a Cardiology Consultation for adult patients who present to a Primary Care Clinic for evaluation of atrial fibrillation, atrial flutter			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

No externalData expression definitions and no trigger definitions are present.

Chapter 2. Expression Definitions

Table 2.1. 12LeadElectrocardiogram

Expression: type=elm:Retrieve , dataType=anf:ClinicalStatement, codeProperty=topic, dateProperty=dateTime
Annotation:
Codes: elm:element[elm:Code]: [447113005 |12 lead electrocardiogram at rest (procedure)|]
dateRange[elm:Interval]   low: elm:Add(elm:Today() elm:Quantity(-2 Month))
high: elm:Today()

Table 2.2. 12LeadElectrocardiogramPerformance

Expression: type=elm:Query
Annotation: Resting 12-lead electrocardiogram to evaluate for arrhythmia
Codes: elm:operand[elm:Code]: [398166005 |Performed (qualifier value)|]

Chapter 3. Consults and Referrals

Cardiology consult order

Consider other consult modalities which may be available (e.g., e-consult or other rapidly iterative consult method. A simple consult is included here as the overarching clinical intent.

Referral to cardiology to evaluate atrial fibrillation/atrial flutter

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

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

topic: Precoordinated Expression 183519002 |Referral to cardiology service (procedure)|

purpose[0]: Postcoordinated Expression [386053000 |Evaluation procedure (procedure)] ->(363702006 |Has focus (attribute))->[195080001 |Atrial fibrillation and flutter (disorder)]

Specific goal of the cardiology consultation (e.g., cardiology to manage patient, cardiology to risk stratify and recommend management, etc.)

prompt: Goal of cardiology consultation

response: String (Single)

Chapter 4. Imaging and ECG

Consider ordering prior to the cardiology consultation. Resting 12-lead electrocardiogram is required if it has not been obtained within the past 2 months.

Condition: elm:Not (elm:Exists(12LeadElectrocardiogramPerformance))

✳ Resting 12-lead electrocardiogram to evaluate for arrhythmia now

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

> statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|
>
> topic: Precoordinated Expression 447113005 |12 lead electrocardiogram at rest (procedure)|
>
> purpose[0]: Postcoordinated Expression [386053000 |Evaluation procedure (procedure)] ->(363702006 |Has focus (attribute))->[698247007 |Cardiac arrhythmia (disorder)]
>
> priority: Precoordinated Expression 49499008 |Stat (qualifier value)|

✳ Echocardiogram to evaluate for left ventricular function now

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

> statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|
>
> topic: Precoordinated Expression 40701008 |Echocardiography (procedure)|
>
> purpose[0]: Postcoordinated Expression [386053000 |Evaluation procedure (procedure)] ->(363702006 |Has focus (attribute))->[366188009 |Finding of left ventricular function (finding)]
>
> priority: Precoordinated Expression 49499008 |Stat (qualifier value)|

✳ X-ray chest to evaluate for heart failure now

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

> statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|
>
> topic: Precoordinated Expression 399208008 |Plain chest X-ray (procedure)|
>
> purpose[0]: Postcoordinated Expression [386053000 |Evaluation procedure (procedure)] ->(363702006 |Has focus (attribute))->[84114007 |Heart failure (disorder)]
>
> priority: Precoordinated Expression 49499008 |Stat (qualifier value)|

Chapter 5. Laboratory Tests

Consider the following tests to be completed prior to the cardiology consultation
# Basic metabolic panel now
actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

	statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|
	topic: Precoordinated Expression bd01faa8-443c-4ad6-9cb6-ea50b4d7a093 |Basic metabolic profile (procedure)|
	priority: Precoordinated Expression 49499008 |Stat (qualifier value)|

# Complete blood count now
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 49499008 |Stat (qualifier value)|

# Lipid panel now
actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

	statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|
	topic: Precoordinated Expression 16254007 |Lipid panel (procedure)|
	priority: Precoordinated Expression 49499008 |Stat (qualifier value)|

# Thyroid function testing now
actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]

	statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|
	topic: Precoordinated Expression 35650009 |Thyroid panel (procedure)|
	priority: Precoordinated Expression 49499008 |Stat (qualifier value)|

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

	statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|
	topic: Precoordinated Expression 105000003 |Troponin measurement (procedure)|
	priority: Precoordinated Expression 49499008 |Stat (qualifier value)|

Brain natriuretic peptide now

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

> statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|
>
> topic: Precoordinated Expression 390917008 |Brain natriuretic peptide measurement (procedure)|
>
> priority: Precoordinated Expression 49499008 |Stat (qualifier value)|

D-dimer now

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

> statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|
>
> topic: Precoordinated Expression 70648006 |D-dimer assay (procedure)|
>
> priority: Precoordinated Expression 49499008 |Stat (qualifier value)|

Chapter 6. Medications

Based upon clinical judgement, consider initiating a new order for one or more of the following medications prior to the cardiology consultation, if not otherwise contraindicated.

#	Rate Control Drugs

✪ Metoprolol tartrate 50 mg tablet oral daily 2 times 60 tablets 2 refills

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

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

> topic: Postcoordinated Expression [416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 |Direct substance (attribute))->[Rx;866514 Metoprolol Tartrate 50 MG Oral Tablet] ->(410675002 |Route of administration (attribute))->[260548002 |Oral (qualifier value)]

> requestedResult.lowerBound: 1

> requestedResult.upperBound: 1

> requestedResult.includeLowerBound: true

> requestedResult.includeUpperBound: true

> requestedResult.measureSemantic: Precoordinated Expression 421026006 | Oral tablet (qualifier value)|

> repetition[0].eventFrequency.lowerBound: 2

> repetition[0].eventFrequency.upperBound: 2

> repetition[0].eventFrequency.includeLowerBound: true

> repetition[0].eventFrequency.includeUpperBound: true

> repetition[0].eventFrequency.measureSemantic: Precoordinated Expression 258703001 |day (qualifier value)|

✪ Metoprolol XL (succinate) 25 mg tablet oral daily 1 time 30 tablets 2 refills

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

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

> topic: Postcoordinated Expression [416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 |Direct substance (attribute))->[Rx;866427 24 HR metoprolol succinate 25 MG Extended Release Oral Tablet] ->(410675002 |Route of administration (attribute))->[260548002 |Oral (qualifier value)]

> requestedResult.lowerBound: 1

> requestedResult.upperBound: 1

> requestedResult.includeLowerBound: true

> requestedResult.includeUpperBound: true

> requestedResult.measureSemantic: Precoordinated Expression 421026006 | Oral tablet (qualifier value)|

> repetition[0].eventFrequency.lowerBound: 1

repetition[0].eventFrequency.upperBound: 1

repetition[0].eventFrequency.includeLowerBound: true

repetition[0].eventFrequency.includeUpperBound: true

repetition[0].eventFrequency.measureSemantic: Precoordinated Expression 258703001 |day (qualifier value)|

✪ Diltiazem 30 mg tablet oral daily 4 times 120 tablets 2 refills

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

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

topic: Postcoordinated Expression [416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 |Direct substance (attribute))->[Rx;833217 Diltiazem Hydrochloride 30 MG Oral Tablet] ->(410675002 |Route of administration (attribute))->[260548002 |Oral (qualifier value)]

requestedResult.lowerBound: 1

requestedResult.upperBound: 1

requestedResult.includeLowerBound: true

requestedResult.includeUpperBound: true

requestedResult.measureSemantic: Precoordinated Expression 421026006 | Oral tablet (qualifier value)|

repetition[0].eventFrequency.lowerBound: 4

repetition[0].eventFrequency.upperBound: 4

repetition[0].eventFrequency.includeLowerBound: true

repetition[0].eventFrequency.includeUpperBound: true

repetition[0].eventFrequency.measureSemantic: Precoordinated Expression 258703001 |day (qualifier value)|

✪ Diltiazem ER 120 mg capsule oral daily 1 time 30 capsules 2 refills

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

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

topic: Postcoordinated Expression [416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 |Direct substance (attribute))->[Rx;830861 24 HR Diltiazem Hydrochloride 120 MG Extended Release Oral Capsule] ->(410675002 |Route of administration (attribute))->[260548002 |Oral (qualifier value)] 830861 24 HR Diltiazem Hydrochloride 120 MG Extended Release Oral Capsule

requestedResult.lowerBound: 1

requestedResult.upperBound: 1

requestedResult.includeLowerBound: true

requestedResult.includeUpperBound: true

requestedResult.measureSemantic: Precoordinated Expression 420692007 | Conventional release oral capsule (dose form)|

repetition[0].eventFrequency.lowerBound: 1

repetition[0].eventFrequency.upperBound: 1

repetition[0].eventFrequency.includeLowerBound: true

repetition[0].eventFrequency.includeUpperBound: true

repetition[0].eventFrequency.measureSemantic: Precoordinated Expression 258703001 |day (qualifier value)|

✪ Digoxin 125 micrograms tablet oral daily 1 time 30 tablets 2 refills

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

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

topic: Postcoordinated Expression [416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 |Direct substance (attribute))->[Rx;197604 Digoxin 0.125 MG Oral Tablet] ->(410675002 |Route of administration (attribute))->[260548002 |Oral (qualifier value)]

requestedResult.lowerBound: 1

requestedResult.upperBound: 1

requestedResult.includeLowerBound: true

requestedResult.includeUpperBound: true

requestedResult.measureSemantic: Precoordinated Expression 421026006 | Oral tablet (qualifier value)|

repetition[0].eventFrequency.lowerBound: 1

repetition[0].eventFrequency.upperBound: 1

repetition[0].eventFrequency.includeLowerBound: true

repetition[0].eventFrequency.includeUpperBound: true

repetition[0].eventFrequency.measureSemantic: Precoordinated Expression 258703001 |day (qualifier value)|

\# Antiplatelet Agents

If the CHA2DS2-VASc score was less than 2, then display the list of antiplatelet medications.

✪ Aspirin 81 mg tablet oral daily 1 time 30 tablets 2 refills

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

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

topic: Postcoordinated Expression [416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 |Direct substance (attribute))->[Rx;308416 Aspirin 81 MG Delayed Release Oral Tablet] ->(410675002 |Route of administration (attribute))->[260548002 |Oral (qualifier value)]

requestedResult.lowerBound: 1

requestedResult.upperBound: 1

requestedResult.includeLowerBound: true

requestedResult.includeUpperBound: true

requestedResult.measureSemantic: Precoordinated Expression 421026006 | Oral tablet (qualifier value)|

repetition[0].eventFrequency.lowerBound: 1

repetition[0].eventFrequency.upperBound: 1

repetition[0].eventFrequency.includeLowerBound: true

repetition[0].eventFrequency.includeUpperBound: true

repetition[0].eventFrequency.measureSemantic: Precoordinated Expression 258703001 |day (qualifier value)|

✪ Clopidogrel 75 mg tablet oral daily 1 time 30 tablets 2 refills

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

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

topic: Postcoordinated Expression [416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 |Direct substance (attribute))->[Rx;309362 clopidogrel 75 MG Oral Tablet] ->(410675002 |Route of administration (attribute))->[260548002 |Oral (qualifier value)]

requestedResult.lowerBound: 1

requestedResult.upperBound: 1

requestedResult.includeLowerBound: true

requestedResult.includeUpperBound: true

requestedResult.measureSemantic: Precoordinated Expression 421026006 | Oral tablet (qualifier value)|

repetition[0].eventFrequency.lowerBound: 1

repetition[0].eventFrequency.upperBound: 1

repetition[0].eventFrequency.includeLowerBound: true

repetition[0].eventFrequency.includeUpperBound: true

repetition[0].eventFrequency.measureSemantic: Precoordinated Expression 258703001 |day (qualifier value)|

\# | Anticoagulants

If the CHA2DS2-VASc score was greater than or equal to 2, then display the list of anticoagulants. For patients with a CHA2DS2-VASc score of 2 or greater, consider initiating anticoagulation therapy.

✪ Apixaban 5 mg tablet oral daily 2 times 60 tablets 2 refills

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

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

topic: Postcoordinated Expression [416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 |Direct substance (attribute))->[Rx;1364445 apixaban 5 MG Oral Tablet] ->(410675002 |Route of administration (attribute))->[260548002 |Oral (qualifier value)]

requestedResult.lowerBound: 1

requestedResult.upperBound: 1

requestedResult.includeLowerBound: true

requestedResult.includeUpperBound: true

requestedResult.measureSemantic: Precoordinated Expression 421026006 | Oral tablet (qualifier value)|

repetition[0].eventFrequency.lowerBound: 2

repetition[0].eventFrequency.upperBound: 2

repetition[0].eventFrequency.includeLowerBound: true

repetition[0].eventFrequency.includeUpperBound: true

repetition[0].eventFrequency.measureSemantic: Precoordinated Expression 258703001 |day (qualifier value)|

✪ Apixaban 2.5 mg tablet oral daily 2 times 60 tablets 2 refills

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

topic: Postcoordinated Expression [416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 |Direct substance (attribute))->[Rx;1364435 apixaban 2.5 MG Oral Tablet] ->(410675002 |Route of administration (attribute))->[260548002 |Oral (qualifier value)]

requestedResult.lowerBound: 1

requestedResult.upperBound: 1

requestedResult.includeLowerBound: true

requestedResult.includeUpperBound: true

requestedResult.measureSemantic: Precoordinated Expression 421026006 | Oral tablet (qualifier value)|

repetition[0].eventFrequency.lowerBound: 2

repetition[0].eventFrequency.upperBound: 2

repetition[0].eventFrequency.includeLowerBound: true

repetition[0].eventFrequency.includeUpperBound: true

repetition[0].eventFrequency.measureSemantic: Precoordinated Expression 258703001 |day (qualifier value)|

✪ Dabigatran 150 mg capsule oral daily 2 times 60 capsules 2 refills

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

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

topic: Postcoordinated Expression [416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 |Direct substance (attribute))->[Rx;1037045 dabigatran etexilate 150 MG Oral Capsule] ->(410675002 |Route of administration (attribute))->[260548002 |Oral (qualifier value)]

requestedResult.lowerBound: 1

requestedResult.upperBound: 1

requestedResult.includeLowerBound: true

requestedResult.includeUpperBound: true

requestedResult.measureSemantic: Precoordinated Expression 420692007 | Conventional release oral capsule (dose form)|

repetition[0].eventFrequency.lowerBound: 2

repetition[0].eventFrequency.upperBound: 2

repetition[0].eventFrequency.includeLowerBound: true

repetition[0].eventFrequency.includeUpperBound: true

repetition[0].eventFrequency.measureSemantic: Precoordinated Expression 258703001 |day (qualifier value)|

✪ Dabigatran 75 mg capsule oral daily 2 times 60 capsules 2 refills

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

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

topic: Postcoordinated Expression [416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 |Direct substance (attribute))->[Rx;1037179 dabigatran etexilate 75 MG Oral Capsule] ->(410675002 |Route of administration (attribute))->[260548002 |Oral (qualifier value)]

requestedResult.lowerBound: 1

requestedResult.upperBound: 1

requestedResult.includeLowerBound: true

requestedResult.includeUpperBound: true

requestedResult.measureSemantic: Precoordinated Expression 420692007 | Conventional release oral capsule (dose form)|

repetition[0].eventFrequency.lowerBound: 2

repetition[0].eventFrequency.upperBound: 2

repetition[0].eventFrequency.includeLowerBound: true

repetition[0].eventFrequency.includeUpperBound: true

repetition[0].eventFrequency.measureSemantic: Precoordinated Expression 258703001 |day (qualifier value)|

✪ Rivaroxaban 20 mg tablet oral daily 1 time 30 tablets 2 refills

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

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

topic: Postcoordinated Expression [416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 |Direct substance (attribute))->[Rx;1232086 rivaroxaban 20 MG Oral Tablet] ->(410675002 |Route of administration (attribute))->[260548002 |Oral (qualifier value)]

requestedResult.lowerBound: 1

requestedResult.upperBound: 1

requestedResult.includeLowerBound: true

requestedResult.includeUpperBound: true

requestedResult.measureSemantic: Precoordinated Expression 421026006 | Oral tablet (qualifier value)|

repetition[0].eventFrequency.lowerBound: 1

repetition[0].eventFrequency.upperBound: 1

repetition[0].eventFrequency.includeLowerBound: true

repetition[0].eventFrequency.includeUpperBound: true

repetition[0].eventFrequency.measureSemantic: Precoordinated Expression 258703001 |day (qualifier value)|

✪ Rivaroxaban 15 mg tablet oral daily 1 time 30 tablets 2 refills

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

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

topic: Postcoordinated Expression [416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 |Direct substance (attribute))->[Rx;1232082 rivaroxaban 15 MG Oral Tablet] ->(410675002 |Route of administration (attribute))->[260548002 |Oral (qualifier value)]

requestedResult.lowerBound: 1

requestedResult.upperBound: 1

requestedResult.includeLowerBound: true

requestedResult.includeUpperBound: true

requestedResult.measureSemantic: Precoordinated Expression 421026006 | Oral tablet (qualifier value)|

repetition[0].eventFrequency.lowerBound: 1

repetition[0].eventFrequency.upperBound: 1

repetition[0].eventFrequency.includeLowerBound: true

repetition[0].eventFrequency.includeUpperBound: true

repetition[0].eventFrequency.measureSemantic: Precoordinated Expression 258703001 |day (qualifier value)|

Logical # ✪ | If warfarin is ordered, the following laboratory test should also be ordered.

Warfarin 2 mg tablet oral daily 1 time 30 tablets 2 refills

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

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

topic: Postcoordinated Expression [416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 |Direct substance (attribute))->[Rx;855302 Warfarin Sodium 2 MG Oral Tablet] ->(410675002 |Route of administration (attribute))->[260548002 |Oral (qualifier value)]

requestedResult.lowerBound: 1

requestedResult.upperBound: 1

requestedResult.includeLowerBound: true

requestedResult.includeUpperBound: true

requestedResult.measureSemantic: Precoordinated Expression 421026006 |Oral tablet (qualifier value)|

repetition[0].eventFrequency.lowerBound: 1

repetition[0].eventFrequency.upperBound: 1

repetition[0].eventFrequency.includeLowerBound: true

repetition[0].eventFrequency.includeUpperBound: true

repetition[0].eventFrequency.measureSemantic: Precoordinated Expression 258703001 |day (qualifier value)|

International normalized ratio (INR) now and then every 1 month routine

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

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

topic: Precoordinated Expression 440685005 |Calculation of international normalized ratio (procedure)|

priority: Precoordinated Expression 49499008 |Stat (qualifier value)|

repetition[0].periodStart.includeLowerBound: true

repetition[0].periodStart.includeUpperBound: true

repetition[0].eventFrequency.lowerBound: 1

repetition[0].eventFrequency.upperBound: 1

repetition[0].eventFrequency.includeLowerBound: true

repetition[0].eventFrequency.includeUpperBound: true

repetition[0].eventFrequency.measureSemantic: Precoordinated Expression 258706009 |month (qualifier value)|

Chapter 7. Tabular List

Terminology Service Request (TSR) Mappings

Table 7.1. Terminology Versions

Name	Identifer	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

Table 7.2. Terminology References

System	Code	Display Text[a]	References[b]
SNOMED CT	105000003 |Troponin measurement (procedure)|	Precoordinated Expression	1
SNOMED CT	16254007 |Lipid panel (procedure)|	Precoordinated Expression	1
SNOMED CT	183519002 |Referral to cardiology service (procedure)|	Precoordinated Expression	1
SNOMED CT	246d1a3f-1598-4ca2-a8c8-fbd3aa406882 |Cardiology consultation (procedure)	Cardiology Consultation	1
SNOMED CT	258703001 |day (qualifier value)|	Precoordinated Expression	14
SNOMED CT	258706009 |month (qualifier value)|	Precoordinated Expression	1
SNOMED CT	26604007 |Complete blood count (procedure)|	Precoordinated Expression	1
SNOMED CT	35650009 |Thyroid panel (procedure)|	Precoordinated Expression	1
SNOMED CT	385644000 |Requested (qualifier value)|	Precoordinated Expression	25
SNOMED CT	390917008 |Brain natriuretic peptide measurement (procedure)|	Precoordinated Expression	1
SNOMED CT	398166005 |Performed (qualifier value)|	Precoordinated Expression	1
SNOMED CT	399208008 |Plain chest X-ray (procedure)|	Precoordinated Expression	1
SNOMED CT	40701008 |Echocardiography (procedure)|	Precoordinated Expression	1
SNOMED CT	420692007 |Conventional release oral capsule (dose form)|	Precoordinated Expression	3

System	Code	Display Text[a]	References[b]
SNOMED CT	421026006 |Oral tablet (qualifier value)|	Precoordinated Expression	11
SNOMED CT	440685005 |Calculation of international normalized ratio (procedure)|	Precoordinated Expression	1
SNOMED CT	447113005 |12 lead electrocardiogram at rest (procedure)|	Precoordinated Expression	2
SNOMED CT	453231000124104 |Primary care provider (occupation)|	Clinical Providers in Primary Care Clinic	1
SNOMED CT	49499008 |Stat (qualifier value)|	Precoordinated Expression	11
SNOMED CT	70648006 |D-dimer assay (procedure)|	Precoordinated Expression	1
SNOMED CT	[386053000 |Evaluation procedure (procedure)] ->(363702006 |Has focus (attribute))->[195080001 | Atrial fibrillation and flutter (disorder)]	Postcoordinated Expression	1
SNOMED CT	[386053000 |Evaluation procedure (procedure)] ->(363702006 |Has focus (attribute))->[366188009 | Finding of left ventricular function (finding)]	Postcoordinated Expression	1
SNOMED CT	[386053000 |Evaluation procedure (procedure)] ->(363702006 |Has focus (attribute))->[698247007 | Cardiac arrhythmia (disorder)]	Postcoordinated Expression	1
SNOMED CT	[386053000 |Evaluation procedure (procedure)] ->(363702006 |Has focus (attribute))->[84114007 | Heart failure (disorder)]	Postcoordinated Expression	1
SNOMED CT	[416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 | Direct substance (attribute))->[Rx;1037045 dabigatran etexilate 150	Postcoordinated Expression	1

System	Code	Display Text[a]	References[b]
	MG Oral Capsule] ->(410675002	Route of administration (attribute))->[260548002	Oral (qualifier value)]		
SNOMED CT	[416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004	Direct substance (attribute))->[Rx;1037179 dabigatran etexilate 75 MG Oral Capsule] ->(410675002 |Route of administration (attribute))->[260548002	Oral (qualifier value)]	Postcoordinated Expression	1
SNOMED CT	[416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004	Direct substance (attribute))->[Rx;1232082 rivaroxaban 15 MG Oral Tablet] ->(410675002	Route of administration (attribute))->[260548002	Oral (qualifier value)]	Postcoordinated Expression	1
SNOMED CT	[416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004	Direct substance (attribute))->[Rx;1232086 rivaroxaban 20 MG Oral Tablet] ->(410675002	Route of administration (attribute))->[260548002	Oral (qualifier value)]	Postcoordinated Expression	1
SNOMED CT	[416118004 |Administration (procedure)] ->(260686004 |Method (at-	Postcoordinated Expression	1

System	Code	Display Text[a]	References[b]
	tribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 | Direct substance (attribute))->[Rx;1364435 apixaban 2.5 MG Oral Tablet] ->(410675002 | Route of administration (attribute))->[260548002 | Oral (qualifier value)]		
SNOMED CT	[416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 | Direct substance (attribute))->[Rx;1364445 apixaban 5 MG Oral Tablet] ->(410675002 | Route of administration (attribute))->[260548002 | Oral (qualifier value)]	Postcoordinated Expression	1
SNOMED CT	[416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 | Direct substance (attribute))->[Rx;197604 Digoxin 0.125 MG Oral Tablet] ->(410675002 | Route of administration (attribute))->[260548002 | Oral (qualifier value)]	Postcoordinated Expression	1
SNOMED CT	[416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 | Direct substance (attribute))->[Rx;308416 Aspirin 81 MG Delayed Release Oral Tablet] ->(410675002 |Route	Postcoordinated Expression	1

System	Code	Display Text[a]	References[b]
	of administration (attribute))->[260548002	Oral (qualifier value)]		
SNOMED CT	[416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004	Direct substance (attribute))->[Rx;309362 clopidogrel 75 MG Oral Tablet] ->(410675002	Route of administration (attribute))->[260548002	Oral (qualifier value)]	Postcoordinated Expression	1
SNOMED CT	[416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004	Direct substance (attribute))->[Rx;830861 24 HR Diltiazem Hydrochloride 120 MG Extended Release Oral Capsule] ->(410675002 |Route of administration (attribute))->[260548002	Oral (qualifier value)] 830861 24 HR Diltiazem Hydrochloride 120 MG Extended Release Oral Capsule	Postcoordinated Expression	1
SNOMED CT	[416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004	Direct substance (attribute))->[Rx;833217 Diltiazem Hydrochloride 30 MG Oral Tablet] ->(410675002 |Route of administration (at-	Postcoordinated Expression	1

System	Code	Display Text[a]	References[b]
	tribute))->[260548002 | Oral (qualifier value)]		
SNOMED CT	[416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 | Direct substance (attribute))->[Rx;855302 Warfarin Sodium 2 MG Oral Tablet] ->(410675002 |Route of administration (attribute))->[260548002 | Oral (qualifier value)]	Postcoordinated Expression	1
SNOMED CT	[416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 | Direct substance (attribute))->[Rx;866427 24 HR metoprolol succinate 25 MG Extended Release Oral Tablet] ->(410675002 |Route of administration (attribute))->[260548002 | Oral (qualifier value)]	Postcoordinated Expression	1
SNOMED CT	[416118004 |Administration (procedure)] ->(260686004 |Method (attribute))->[129445006 |Administration - action (qualifier value)] ->(363701004 | Direct substance (attribute))->[Rx;866514 Metoprolol Tartrate 50 MG Oral Tablet] ->(410675002 |Route of administration (attribute))->[260548002 | Oral (qualifier value)]	Postcoordinated Expression	1
SNOMED CT	bd01faa8-443c-4ad6-9cb6-ea50b4d7a093 |Basic	Precoordinated Expression	1

System	Code	Display Text[a]	References[b]
	metabolic profile (proce-dure)		

[a]If a code is used multiple times in the KNART, only the display text of the first instance is shown.

[b]Count of the number of times the given code system and code pair is used in the KNART.

Chapter 8. Behavior Symbols

Table 8.1. Group Organizational Behavior

Sym-bol	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 8.2. Group Selection Behavior

Sym-bol	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 8.3. Required Behavior

Sym-bol	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 8.4. 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 8.5. 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 8.6. 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 8.7. 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] *Cardiology: Electrophysiology (EP) Arrhythmias Clinical Content White Paper*

[CSD] *Cardiology: Electrophysiology (EP): Atrial Fibrillation/Atrial Flutter Order Set Conceptual Structure Document*

[KVRpt] *Cardiology: Electrophysiology (EP): Atrial Fibrillation/Atrial Flutter Order Set KNART Validation Report*

Supporting Evidence

[Heidenreich 2016] *Heidenreich, P., Solis, P., Estes, M., Fonarow, G., Jurgens, C., Marine, J., McManus, D., McNamara, R. 2016 ACC/AHA Clinical Performance and Quality Measures for Adults With Atrial Fibrillation or Atrial Flutter. A Report of the American College of Cardiology/American Heart Association Task Force on Performance Measures* (link [https://doi.org/10.1161/HCQ.0000000000000018])

[Holbrook 2012] *Holbrook, A., Schulman, S., Witt, D., Vandvik, P., Fish, J., Kovacs, M., Svensson, P., Veenstra, D., Crowther, M., Guyatt, G., et.al. Evidence-Based Management of Anticoagulant Therapy. (2012) Official Publication of the American College of Ches Physiains. 2012 February 12;141(2):e152S-e184S* (link [http://dx.doi.org/10.1378/chest.11-2295])

[January 2014] *January, C. T., Wann, L. S., Alpert, J. S., Calkins, H., Cigarroa, J. E., Cleveland, J. C., ... Yancy, C. W. (2014). 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: Executive summary: A report of the American College of cardiology/American heart association task force on practice guidelines and the heart rhythm society. Circulation, 130(23), 2071-2104* (link [https://doi.org/10.1161/CIR.0000000000000040])

[Kearon 2016] *Kearon, C., Aki, E., Ornelas, J., Blaivas, A., Jimenez, D., Bounameaux, H., et al. Antithrombotic therapy for VTE disease: CHEST guideline and expert panel report. (2016) CHEST Journal, Official Publication of the College of Chest Physicians 2016 February 149(2) 315–352* (link [http://dx.doi.org/10.1016/j.chest.2015.11.026])

[Page 2016] *Page, R., Joglar, J., Caldwell, M., Calkins, H., Conti, J., Deal, B., Estes, M., Field, M., Goldberger, Z., Hammill, S., Indik, J., Lindsay, B., et al. 2015 ACC/AHA/HRS Guideline for the Management of Adult Patients With Supraventricular Tachycardia. (2016) Journal of the American College of Cardiology Volume 67, Issue 13, April 2016* (link [http://www.onlinejacc.org/content/67/13/e27?_ga=1.87330320.984974867.1480494374])

[Shen 2017] *Shen, W.K., Sheldon, R., Benditt, D., Cohen, M., Forman, D., Goldberger, Z., Grubb, B., Field, M., Goldberger, Z., Hamdan, M., Krahn, A., Link, M.,Olshansky, B., et al. 2017 ACC/AHA/HRS Guideline for the Evaluation and Management of Patients With Syncope: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines, and the Heart Rhythm Society. (2017) 2017 ACC/AHA/HRS guideline for the evaluation and management of patients with syncope. August 2017 Volume 14, Issue 8, Pages e155–e21* (link [http://dx.doi.org/10.1016/j.hrthm.2017.03.004])

[NLM 2017a] *LABEL: AMIODARONE HCL- amiodarone hydrochloride tablet [Internet].: National Library of Medicine; 2017. Available from: https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=08641e51-abca-4c1c-ba19-d24435332018.* (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=08641e51-abca-4c1c-ba19-d24435332018])

[NLM 2017b] *LABEL: ASPIRIN 81 MG- aspirin tablet, coated [Internet].: National Library of Medicine; 2017. Available from: https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=b4064039-2345-4227-b83d-54dc13a838d3.* (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=b4064039-2345-4227-b83d-54dc13a838d3])

[NLM 2016a] *LABEL: CARDIZEM- diltiazem hydrochloride tablet, coated [Internet].: National Library of Medicine; 2016. Available from: https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=f3e7ecef-f360-4987-a4f5-933214130ab2.* (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=f3e7ecef-f360-4987-a4f5-933214130ab2])

[NLM 2017c] *LABEL: CLOPIDOGREL- clopidogrel bisulfate tablet, film coated, [Internet].: National Library of Medicine; 2016. Available from: https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=edae8df1-caf9-ff72-1304-5ae8b355f8e7.* (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=edae8df1-caf9-ff72-1304-5ae8b355f8e7])

[NLM 2017d] *LABEL: COUMADIN- warfarin sodium tablet, [Internet].: National Library of Medicine; 2017. Available from: https://dailymed.nlm.nih.gov/dailymed/lookup.cfm?setid=d91934a0-902e-c26c-23ca-d5accc4151b6.* (link [https://dailymed.nlm.nih.gov/dailymed/lookup.cfm?setid=d91934a0-902e-c26c-23ca-d5accc4151b6])

[NLM 2016b] *LABEL: DIGOXIN- digoxin tablet, [Internet].: National Library of Medicine; 2016. Available from: https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=dfac7f13-28be-423d-9389-9089da29da17.* (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=dfac7f13-28be-423d-9389-9089da29da17])

[NLM 2016c] *LABEL: DILTIAZEM HCL CD- diltiazem hydrochloride capsule, coated, extended release, [Internet].: National Library of Medicine; 2016. Available from: https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=5e39be50-ea17-4077-a2dc-668267049f6a.* (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=5e39be50-ea17-4077-a2dc-668267049f6a])

[NLM 2017e] *LABEL: ELIQUIS- apixaban tablet, film coated ELIQUIS 30-DAY STARTER PACK- apixaban, [Internet].: National Library of Medicine; 2017. Available from: https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=e9481622-7cc6-418a-acb6-c5450daae9b0.* (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=e9481622-7cc6-418a-acb6-c5450daae9b0])

[NLM 2012] *LABEL: FLECAINIDE ACETATE- flecainide tablet, [Internet].: National Library of Medicine; 2012. Available from: https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=fa68b35e-9f50-408b-9e70-e84cecf3fd6e.* (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=fa68b35e-9f50-408b-9e70-e84cecf3fd6e])

[NLM 2008] *LABEL: ISOPTIN SR- verapamil hydrochloride tablet, coated, [Internet].: National Library of Medicine; 2018. Available from: https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=6ae13cb4-0316-40d1-9216-c7d5556aaed3.* (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=6ae13cb4-0316-40d1-9216-c7d5556aaed3])

[NLM 2017f] *LABEL: LOPRESSOR- metoprolol tartrate tablet, [Internet].: National Library of Medicine; 2017. Available from: https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=0283bc9d-6998-493a-824a-d4c85f704111.* (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=0283bc9d-6998-493a-824a-d4c85f704111])

[NLM 2017g] *LABEL: PRADAXA- dabigatran etexilate mesylate capsule, [Internet].: National Library of Medicine; 2017. Available from: https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=ba74e3cd-*

b06f-4145-b284-5fd6b84ff3c9. (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=ba74e3cd-b06f-4145-b284-5fd6b84ff3c9])

[NLM 2017h] *LABEL: PROPAFENONE HCL- propafenone hydrochloride tablet, film coated, [Internet].: National Library of Medicine; 2017. Available from: https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=a313c111-e539-47bc-9d57-c3767f74bcca.* (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=a313c111-e539-47bc-9d57-c3767f74bcca])

[NLM 2017i] *LABEL: TOPROL XL- metoprolol succinate tablet, extended release, [Internet].: National Library of Medicine; 2017. Available from: https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=4a5762c6-d7a2-4e4c-10b7-8832b36fa5f4.* (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=4a5762c6-d7a2-4e4c-10b7-8832b36fa5f4])

[NLM 2017j] *LABEL: XARELTO- rivaroxaban tablet, film coated XARELTO- rivaroxaban, [Internet].: National Library of Medicine; 2017. Available from: https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=10db92f9-2300-4a80-836b-673e1ae91610.* (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=10db92f9-2300-4a80-836b-673e1ae91610])