

Neurosurgery: Radiculopathy (Cervical) Order Set

Order Set: Conceptual Structure

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

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Neurosurgery: Radiculopathy (Cervical) 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 20, 2018	Published
June 13, 2018	Published
June 13, 2018	Reviewed
March 28, 2018	Published
March 28, 2018	Reviewed
October 31, 2017	Pre-published
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Table 2. Clinical White Paper Contributors

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Table 3. Artifact Identifier

Domain	Artifact ID	Name
urn:va.gov:kbs:knart:artifact:r1	683f0f1d-fd16-509f-ab27-e2b9ba8a503f	B15

Artifact Applicability

Table 4. Applicability Foci, Description and Codes

Focus	Description	Code System	Code	Value Set	Value Set Version
PatientAgeGroup	Population 18 years old or older			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

No expression definitions are present.

Chapter 3. Medications

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

✱ NSAIDs

Based upon clinical judgment and if not otherwise contraindicated, consider initiating a new order for one or more of the following medications prior to the neurosurgery consultation. NSAIDs increase the risk of serious gastrointestinal adverse events including bleeding, ulceration, and perforation of the stomach or intestines, which can be fatal. The prevailing recommendations in consensus-based clinical guidelines recommend that NSAID/Cyclo-oxygenase-2 (COX-2) should be avoided in Chronic Kidney Disease (CKD).

([Patel 2012])

The influence of creatinine versus GFR on NSAID prescriptions in CKD link [<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3417055/#R6/link>]

✱ Ibuprofen 400 mg tablet oral every 6 hours as needed for neck or arm pain; may increase dose frequency to one tablet every 4 hours 100 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;197805 Ibuprofen 400 MG Oral Tablet] ->(410675002 |Route of administration (attribute))->[260548002 |Oral (qualifier value)]

purpose[0]: Postcoordinated Expression [277132007 |Therapeutic procedure (procedure)] ->(363702006 |Has focus (attribute))->[81680005 |Neck pain (finding)]

purpose[1]: Postcoordinated Expression [277132007 |Therapeutic procedure (procedure)] ->(363702006 |Has focus (attribute))->[102556003 |Pain in upper limb (finding)]

unstructured[1]: 100 tablets 2 refills

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: 6

repetition[0].eventFrequency.includeLowerBound: true

repetition[0].eventFrequency.includeUpperBound: true

repetition[0].eventFrequency.measureSemantic:

Precoordinated Expression 258702006 |hour (qualifier value)|

⊛ Naproxen sodium 550 mg tablet oral every 12 hours as needed for neck or arm pain 100 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;849431 Naproxen sodium 550 MG Oral Tablet] ->(410675002 |Route of administration (attribute))->[260548002 |Oral (qualifier value)]

purpose[0]: Postcoordinated Expression [277132007 |Therapeutic procedure (procedure)] ->(363702006 |Has focus (attribute))->[81680005 |Neck pain (finding)]

purpose[1]: Postcoordinated Expression [277132007 |Therapeutic procedure (procedure)] ->(363702006 |Has focus (attribute))->[102556003 |Pain in upper limb (finding)]

unstructured[1]: 100 tablets 2 refills

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: 12

repetition[0].eventFrequency.upperBound: 12

repetition[0].eventFrequency.includeLowerBound: true

repetition[0].eventFrequency.includeUpperBound: true

repetition[0].eventFrequency.measureSemantic: Precoordinated Expression 258702006 |hour (qualifier value)|

✱ Other Analgesics

Acetaminophen 325 mg tablet oral two tablets every 6 hours as needed for neck or arm pain; may increase dose frequency to two tablets every 4 hours; do not take more than 10 tablets per day 100 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;313782 Acetaminophen 325 MG Oral Tablet] ->(410675002 |Route of administration (attribute))->[260548002 |Oral (qualifier value)]

purpose[0]: Postcoordinated Expression [277132007 |Therapeutic procedure (procedure)] ->(363702006 |Has focus (attribute))->[81680005 |Neck pain (finding)]

	<p>purpose[1]: Postcoordinated Expression [277132007 Therapeutic procedure (procedure)] ->(363702006 Has focus (attribute))->[102556003 Pain in upper limb (finding)]</p> <p>unstructured[0]: Do not take more than 10 tablets per day</p> <p>unstructured[1]: 100 tablets 2 refills</p> <p>requestedResult.lowerBound: 2</p> <p>requestedResult.upperBound: 2</p> <p>requestedResult.includeLowerBound: true</p> <p>requestedResult.includeUpperBound: true</p> <p>requestedResult.measureSemantic: Precoordinated Expression 421026006 Oral tablet (qualifier value) </p> <p>repetition[0].eventFrequency.lowerBound: 4</p> <p>repetition[0].eventFrequency.upperBound: 6</p> <p>repetition[0].eventFrequency.includeLowerBound: true</p> <p>repetition[0].eventFrequency.includeUpperBound: true</p> <p>repetition[0].eventFrequency.measureSemantic: Precoordinated Expression 258702006 hour (qualifier value) </p>
* Glucocorticoids, Oral	<p># Methylprednisolone 4 mg tablet oral by taper: take 6 tablets at once on day 1; on day 2 take one tablet before breakfast, one after lunch, one after dinner, and two at bedtime; on day 3 take one tablet before breakfast, one after lunch, one after dinner, and one at bedtime; on day 4 take one tablet before breakfast, one after lunch, and one at bedtime; on day 5 take one tablet before breakfast and one at bedtime; and on day 6 take one tablet before breakfast. 21 tablets 0 refills</p> <p>actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]</p> <p>statementType: Precoordinated Expression 385644000 Requested (qualifier value) </p> <p>topic: Postcoordinated Expression [416118004 Administration (procedure)] ->(260686004 Method (attribute))->[129445006 Administration - action (qualifier value)] ->(363701004 Direct substance (attribute))->[Rx;259966 methylPREDNISolone 4 MG Oral Tablet] ->(410675002 Route of administration (attribute))->[260548002 Oral (qualifier value)]</p> <p>unstructured[0]: By taper: take 6 tablets at once on day 1; on day 2 take one tablet before breakfast, one after lunch, one after dinner, and two at bedtime; on day 3 take one tablet before breakfast, one after lunch, one after dinner, and one at bedtime; on day 4 take one tablet before breakfast, one after lunch, and one at bedtime; on day 5 take one tablet before breakfast and one at bedtime; and on day 6 take one tablet before breakfast</p> <p>unstructured[1]: 21 tablets 0 refills</p>

Chapter 4. Procedures

Consider ordering the following procedures in conjunction with the neurosurgery consult. Typically for pain management, unless contraindicated for any reason, one would order glucocorticoid injection from the list below first, and if indicated, proceed to selective nerve block based on clinical outcome of patient's symptoms following completion of the series of 3 glucocorticoid injections.

Epidural glucocorticoid injection under fluoroscopic or CT guidance per interventionist (series of three)

```
actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]
    statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|
    topic: Postcoordinated Expression [431612008 |Epidural injection using fluoroscopic
    guidance (procedure)] ->(260686004 |Method (attribute))->[129326001 |Injection - action
    (qualifier value)] ->(363701004 |Direct substance (attribute))->[116596006 |Glucocorticoid
    preparation (product)]
    unstructured[0]: per interventionist
    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: 3
    repetition[0].eventFrequency.upperBound: 3
    repetition[0].eventFrequency.includeLowerBound: true
    repetition[0].eventFrequency.includeUpperBound: true
```

Selective nerve root block per interventionist to distinguish symptomatic level(s) following identification of compressive lesions at multiple levels on MRI or CT myelography

```
actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]
    statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|
    topic: Postcoordinated Expression [386053000 |Evaluation procedure (procedure)] -
    >(363702006 |Has focus (attribute))->[1d7d2d75-b431-40d2-a4d1-d4798512c0b4 |
    Symptomatic compression of cervical nerve root (disorder)]
    unstructured[0]: per interventionist; to distinguish symptomatic level(s) following
    identification of compressive lesions at multiple levels on MRI or CT myelography
```

Selective nerve root block per interventionist to distinguish symptomatic level(s) in patient with discordance between clinical symptoms and findings on MRI or CT myelography

```
actionSentence[type=elm:Instance, classType=anf:ClinicalStatement]
    statementType: Precoordinated Expression 385644000 |Requested (qualifier value)|
    topic: Precoordinated Expression [231043002 |Local anesthetic block on spinal nerve root
    (procedure)]
    unstructured[0]: per interventionist; to distinguish symptomatic level(s) in patient with
    discordance between clinical symptoms and findings on MRI or CT myelography
```

purpose[0]: Postcoordinated Expression [386053000 |Evaluation procedure (procedure)]
->(363702006 |Has focus (attribute))->[1d7d2d75-b431-40d2-a4d1-d4798512c0b4 |
Symptomatic compression of cervical nerve root (disorder)]

Chapter 5. Imaging

Consider ordering one of the following imaging studies in conjunction with the neurosurgery consult.

- ✚ X-ray cervical spine anteroposterior (AP) and lateral neck pain

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

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

topic: Precoordinated Expression 21613005 |Radiologic examination of cervical spine, anteroposterior and lateral (procedure)|

purpose[0]: Postcoordinated Expression [386053000 |Evaluation procedure (procedure)] ->(363702006 |Has focus (attribute))->[81680005 |Neck pain (finding)]

- ✚ MRI cervical spine without intravenous (IV) contrast (consider for: chronic neck pain, failed conservative management, candidate for surgical intervention)

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

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

topic: Precoordinated Expression 571891000119109 |Magnetic resonance imaging of cervical spine without contrast (procedure)|

unstructured[0]: consider for: chronic neck pain, failed conservative management, candidate for surgical intervention

- ✚ CT cervical spine without IV contrast (consider for: chronic neck pain, failed conservative management, candidate for surgical intervention, MRI contraindicated, IV contrast contraindicated)

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

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

topic: Precoordinated Expression 572061000119104 |Computed tomography of cervical spine without contrast (procedure)|

unstructured[0]: consider for: chronic neck pain, failed conservative management, candidate for surgical intervention, MRI contraindicated, IV contrast contraindicated

- ✚ CT myelography cervical spine (consider for: chronic neck pain, failed conservative management, candidate for surgical intervention, MRI contraindicated)

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

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

topic: Precoordinated Expression 241590005 |Computed tomography myelogram of cervical region (procedure)|

unstructured[0]: consider for: chronic neck pain, failed conservative management, candidate for surgical intervention, MRI contraindicated

- ✚ CT myelography cervical spine (consider for: chronic neck pain, failed conservative management, candidate for surgical intervention, clinical findings discordant with MRI findings)

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

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

topic: Precoordinated Expression 241590005 |Computed tomography myelogram of cervical region (procedure)|

unstructured[0]: consider for: chronic neck pain, failed conservative management, candidate for surgical intervention, clinical findings discordant with MRI findings)

Chapter 6. Additional Consults

Consider ordering from the following consults in conjunction with the neurosurgery consult.

Consult physical therapy to evaluate for conservative therapy for cervical radiculopathy (e.g., cervical halter traction, electrical stimulation, acupuncture, exercise instruction)

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

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

topic: Precoordinated Expression 71318009 |Physical medicine consultation and report (procedure)|

purpose[0]: Postcoordinated Expression [410158009 |Physical therapy assessment (procedure)] ->(363702006 |Has focus (attribute))->[54404000 |Cervical radiculopathy (disorder)]

Consult psychiatry to evaluate for depression and other psychological factors that may affect patient's perception of pain and ability to manage pain

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

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

topic: Precoordinated Expression bc33b934-5dd3-4742-a09d-ef2d2187bb11 |Psychiatric consultation and report (procedure)|

purpose[0]: Postcoordinated Expression [386053000 |Evaluation procedure (procedure)] ->(363702006 |Has focus (attribute))->[365396002 |Finding related to ability to cope with pain (finding)]

purpose[1]: Postcoordinated Expression [386053000 |Evaluation procedure (procedure)] ->(363702006 |Has focus (attribute))->[35489007 |Depressive disorder (disorder)]

Consult social services to evaluate social factors (e.g., joblessness, homelessness, financial concerns) that may affect patient's ability to adhere to conservative treatment

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

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

topic: Precoordinated Expression f6368012-f67e-4dfa-af9d-2348ff364b7d |Social services consultation and report (procedure)|

purpose[0]: Postcoordinated Expression [386053000 |Evaluation procedure (procedure)] ->(363702006 |Has focus (attribute))->[fddc869a-4e82-4ea8-8de0-12d85fe9b8e8 |Finding related to ability to adhere to conservative treatment (finding)]

Consult pain management to address modalities for treating chronic pain

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

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

topic: Precoordinated Expression c02723c7-8001-41b9-a41d-839a9c2034bb |Consultation for pain management and report (procedure)|

purpose[0]: Postcoordinated Expression [386053000 |Evaluation procedure (procedure)] ->(363702006 |Has focus (attribute))->[408954001 |Chronic pain control (procedure)]

Chapter 7. Patient Education

Consider ordering patient education in conjunction with the neurosurgery consult.

Cervical radiculopathy education (level-appropriate materials on natural progression, conservative management, and procedural management)

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

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

topic: Postcoordinated Expression [409073007 |Education (procedure)] ->(363702006 |Has focus (attribute))-[54404000 |Cervical radiculopathy (disorder)]

Chapter 8. Tabular List

Terminology Service Request (TSR) Mappings

Table 8.1. Terminology Versions

Name	Identifier	Version
SNOMED CT	2.16.840.1.113883.6.96	United States Edition 20180301

Table 8.2. Terminology References

System	Code	Display Text ^a	References ^b
SNOMED CT	21613005 Radiologic examination of cervical spine, anteroposterior and lateral (procedure)	Precoordinated Expression	1
SNOMED CT	241590005 Computed tomography myelogram of cervical region (procedure)	Precoordinated Expression	2
SNOMED CT	258702006 hour (qualifier value)	Precoordinated Expression	3
SNOMED CT	385644000 Requested (qualifier value)	Precoordinated Expression	17
SNOMED CT	421026006 Oral tablet (qualifier value)	Precoordinated Expression	4
SNOMED CT	571891000119109 Magnetic resonance imaging of cervical spine without contrast (procedure)	Precoordinated Expression	1
SNOMED CT	572061000119104 Computed tomography of cervical spine without contrast (procedure)	Precoordinated Expression	1
SNOMED CT	71318009 Physical medicine consultation and report (procedure)	Precoordinated Expression	1
SNOMED CT	[231043002 Local anesthetic block on spinal nerve root (procedure)]	Precoordinated Expression	1
SNOMED CT	[277132007 Therapeutic procedure (procedure)] ->(363702006 Has focus (attribute))->[102556003 Pain in upper limb (finding)]	Postcoordinated Expression	3

System	Code	Display Text ^a	References ^b
SNOMED CT	[277132007 Therapeutic procedure (procedure)] ->(363702006 Has focus (attribute))->[81680005 Neck pain (finding)]	Postcoordinated Expression	3
SNOMED CT	[386053000 Evaluation procedure (procedure)] ->(363702006 Has focus (attribute))->[1d7d2d75-b431-40d2-a4d1-d4798512c0b4 Symptomatic compression of cervical nerve root (disorder)]	Postcoordinated Expression	2
SNOMED CT	[386053000 Evaluation procedure (procedure)] ->(363702006 Has focus (attribute))->[35489007 Depressive disorder (disorder)]	Postcoordinated Expression	1
SNOMED CT	[386053000 Evaluation procedure (procedure)] ->(363702006 Has focus (attribute))->[365396002 Finding related to ability to cope with pain (finding)]	Postcoordinated Expression	1
SNOMED CT	[386053000 Evaluation procedure (procedure)] ->(363702006 Has focus (attribute))->[408954001 Chronic pain control (procedure)]	Postcoordinated Expression	1
SNOMED CT	[386053000 Evaluation procedure (procedure)] ->(363702006 Has focus (attribute))->[81680005 Neck pain (finding)]	Postcoordinated Expression	1
SNOMED CT	[386053000 Evaluation procedure (procedure)] ->(363702006 Has focus (attribute))->[fddc869a-4e82-4ea8-8de0-12d85fe9b8e8 Finding related to ability to adhere to conservative treatment (finding)]	Postcoordinated Expression	1
SNOMED CT	[409073007 Education (procedure)] ->(363702006 Has focus (attribute))-	Postcoordinated Expression	1

System	Code	Display Text ^a	References ^b
	>[54404000 Cervical radiculopathy (disorder)]		
SNOMED CT	[410158009 Physical therapy assessment (procedure)] ->(363702006 Has focus (attribute))->[54404000 Cervical radiculopathy (disorder)]	Postcoordinated Expression	1
SNOMED CT	[416118004 Administration (procedure)] ->(260686004 Method (attribute))->[129445006 Administration - action (qualifier value)] ->(363701004 Direct substance (attribute))->[Rx;197805 Ibuprofen 400 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;259966 methylPREDNISolone 4 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;313782 Acetaminophen 325 MG Oral Tablet] ->(410675002	Postcoordinated Expression	1

System	Code	Display Text ^a	References ^b
	[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;849431 Naproxen sodium 550 MG Oral Tablet] ->(410675002 Route of administration (attribute))->[260548002 Oral (qualifier value)]	Postcoordinated Expression	1
SNOMED CT	[431612008 Epidural injection using fluoroscopic guidance (procedure)] ->(260686004 [Method (attribute))->[129326001 Injection - action (qualifier value)] ->(363701004 Direct substance (attribute))->[116596006 Glucocorticoid preparation (product)]	Postcoordinated Expression	1
SNOMED CT	bc33b934-5dd3-4742-a09d-ef2d2187bb11 Psychiatric consultation and report (procedure)	Precoordinated Expression	1
SNOMED CT	c02723c7-8001-41b9-a41d-839a9c2034bb Consultation for pain management and report (procedure)	Precoordinated Expression	1
SNOMED CT	f6368012-f67e-4dfa-af9d-2348ff364b7d Social services consultation and report (procedure)	Precoordinated Expression	1

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

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

Chapter 9. Behavior Symbols

Table 9.1. Group Organizational Behavior

Symbol	Name	Definition
#	Sentence Group	A group of related alternative actions is a sentence group if the item referenced by the action is the same in all the actions, and each action simply constitutes a different variation on how to specify the details for that item. For example, two actions that could be in a SentenceGroup are "aspirin, 500 mg, 2 times per day" and "aspirin, 300 mg, 3 times per day". In both cases, aspirin is the item referenced by the action, and the two actions represent two different options for how aspirin might be ordered for the patient. Note that a SentenceGroup would almost always have an associated selection behavior of "AtMostOne", unless it's a required action, in which case, it would be "ExactlyOne".
#	Logical Group	A group with this behavior logically groups its sub-elements, and may be shown as a visual group to the end user, but it is not required to do so.
➤	Visual Group	Any group marked with this behavior should be displayed as a visual group to the end user.

Table 9.2. Group Selection Behavior

Symbol	Name	Definition
#	Any	Any number of the items in the group may be chosen, from zero to all.
#	All	All the items in the group must be selected as a single unit.
#	AllOrNone	All the items in the group are meant to be chosen as a single unit: either all must be selected by the end user, or none may be selected.
#	ExactlyOne	The end user must choose one and only one of the selectable items in the group. The user may not choose none of the items in the group.
⬠	AtMostOne	The end user may choose zero or at most one of the items in the group.
✱	OneOrMore	The end user must choose a minimum of one, and as many additional as desired.

Table 9.3. Required Behavior

Symbol	Name	Definition
◆	Must	An action with this behavior must be included in the actions processed by the end user; the end user may not choose not to include this action.
◇	Could	An action with this behavior may be included in the set of actions processed by the end user.

Symbol	Name	Definition
➤	MustUnlessDocumented	An action with this behavior must be included in the set of actions processed by the end user, unless the end user provides documentation as to why the action was not included.

Table 9.4. Precheck Behavior

Symbol	Name	Definition
▲	Yes	An action with this behavior is one of the most frequent actions that is, or should be, included by an end user, for the particular context in which the action occurs. The system displaying the action to the end user should consider "pre-checking" such an action as a convenience for the user.
#	No	An action with this behavior is one of the less frequent actions included by the end user, for the particular context in which the action occurs. The system displaying the actions to the end user would typically not "pre-check" such an action.

Table 9.5. Cardinality Behavior

Symbol	Name	Definition
◆	Single	An action with this behavior may only be completed once.
❖	Multiple	An action with this behavior may be repeated multiple times.

Table 9.6. Item Flags

Symbol	Name	Definition
☞	fillIn	This item, in a list entry, allows the user to enter a fill in value that is not present in the set of presented choices.

Table 9.7. Read Only Behavior

Symbol	Name	Definition
#	true	For a particular action or action group, specifies whether the elements are read only.

Appendix A. References

This appendix contains the list of related resources and supporting documents used in creating this KNART.

List of References

Related Resources

[CCWP] *Neurosurgery: Radiculopathy (Cervical) Clinical Content White Paper*

[CSD] *Neurosurgery: Radiculopathy (Cervical) Order Set Conceptual Structure Document*

[KVRpt] *Neurosurgery: Radiculopathy (Cervical) Order Set KNART Validation Report*

[Patel 2012] Patel K, Diamantidis C, Zhan M, et al. *The influence of creatinine versus GFR on NSAID prescriptions in CKD. American journal of nephrology.* 2012;36(1):19-26. doi:10.1159/000339439. (link [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3417055/#R6/link])

Supporting Evidence

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[Matz 2009] Matz, Paul G., Paul A. Anderson, Michael G. Kaiser, Langston T. Holly, Michael W. Groff, Robert F. Heary, Praveen V. Mummaneni, et al. 2009. "Introduction and Methodology: Guidelines for the Surgical Management of Cervical Degenerative Disease." *Journal of Neurosurgery. Spine* 11 (2): 101–3. doi:10.3171/2009.1.SPINE08712. (link [https://www.ncbi.nlm.nih.gov/pubmed/19769488])

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[NLM 2017a] *IBU- ibuprofen tablet [Internet].: National Library of Medicine; 2017. Available from: https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=24731405-219c-79b4-ecf0-7d5fbfda94ba* (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=24731405-219c-79b4-ecf0-7d5fbfda94ba])

[NLM 2017b] *MEDROL- methylprednisolone tablet [Internet].: National Library of Medicine; 2017. Available from: https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=39d5270b-d957-4821-93d6-501b7b9f02d4* (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=39d5270b-d957-4821-93d6-501b7b9f02d4])

[NLM 2017c] *NAPROSYN- naproxen tablet; EC-NAPROSYN- naproxen tablet delayed release; NAPROSYN- naproxen suspension; ANAPROX- naproxen sodium tablet; ANAPROX DS-*

- naproxen sodium tablet [Internet].: National Library of Medicine; 2017. Available from: <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=68848217-03c9-4377-9be6-6f567e629129> (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=68848217-03c9-4377-9be6-6f567e629129])*
- [NLM 2017d] *Tylenol Regular Strength-acetaminophen tablet [Internet].: National Library of Medicine; 2017. Available from: <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=68848217-03c9-4377-9be6-6f567e629129> (link [https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=1622f694-4d63-4c56-8737-fae31f0ecfb7])*