Neurology: Traumatic Brain Injury (TBI) Screening Documentation Template

Documentation Template: Conceptual Structure

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

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Table 1. Revision History

Date	Life Cycle Event
June 20, 2018	Published
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Table 2. Clinical White Paper Contributors

Name	Role	Affiliation
Donald Higgins, MD	Author	National Program Director of Neurology 810 Vermont Ave NW Rm 668 Washington, DC 20420
Glenn Graham, MD	Author	Deputy National Director of Neurology 810 Vermont Ave NW Rm 670 Washington, DC 20420
Ellis Boudreau, MD	Author	Staff Neurologist, Portland VAMC Portland VAMC 3710 SW US Veterans Hospital Road Portland, OR 97239
Jason Sico, MD	Author	Physician, VAMC Connecticut VAMC Connecticut 950 Campbell Ave West Haven, CT 06516
Michael Phipps, MD	Author	Neurologist, VAMC Baltimore, Baltimore VAMC 10 N Greene St Baltimore, MD 21201
Sarah Maulden, MD	Author	Assistant Professor of Neurology 550 Foothill Dr, Ste 400 SLC, UT 84113
Joel Scholten, MD	Author	National Director, Physical Medicine and Rehabilitation, 50 Irving St NW Washington, DC 20422
Lisa Perla	Author	Rehabilitation Planning Specialist, 31 Hopkins Plaza, Room 1250 Baltimore, MD 21201

Table 3. Artifact Identifier

Domain	Artifact ID	Name
urn:va.gov:kbs:knart:artifact:r1	693a6b6b-4ac2-5d20-b8f5-4050ebea0028	B55

Artifact Applicability

Table 4. Applicability Foci, Description and Codes

Focus	Description	Code System	Code	Value Set	Value Set Version
TargetUser	Primary Care	SNOMED CT	5351000124100 | Primary care clinic (environment)|	N/A	N/A
PatientAgeGroup	Adult patients	SNOMED CT	133936004 |Adult (person)|	N/A	N/A
ClinicalFocus	Adult patients with suspected Traumatic Brain Injury			N/A	N/A
ClinicalVenue	Outpatient	SNOMED CT	33022008 | Hospital-based outpatient department (environment)|	N/A	N/A
WorkflowSetting	Primary Care			N/A	N/A
WorkflowTask	Traumatic Brain Injury screening			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. Head CT Image

> Expression: type=elm:Query
>
> Annotation:
>
> Codes: elm:value[elm:Code]: [398166005 |Performed (qualifier value)|]elm:value[elm:Code]: [303653007 |Computed tomography of head (procedure)|]

Table 1.2. Head CT Interpretation

> Expression: type=elm:Query
>
> Annotation:
>
> Codes: elm:value[elm:Code]: [398166005 |Performed (qualifier value)|]elm:value[elm:Code]: [[370851004 |Evaluation of diagnostic study results (procedure)] ->(363702006 |Has focus (attribute))->[303653007 |Computed tomography of head (procedure)]]

Table 1.3. Head MRI Image

> Expression: type=elm:Query
>
> Annotation:
>
> Codes: elm:value[elm:Code]: [398166005 |Performed (qualifier value)|]elm:value[elm:Code]: [241601008 |Magnetic resonance imaging of head (procedure)|]

Table 1.4. Head MRI Interpretation

> Expression: type=elm:Query
>
> Annotation:
>
> Codes: elm:value[elm:Code]: [398166005 |Performed (qualifier value)|]elm:value[elm:Code]: [[370851004 |Evaluation of diagnostic study results (procedure)] ->(363702006 |Has focus (attribute))->[241601008 |Magnetic resonance imaging of head (procedure)]]

Table 1.5. Electroencephalogram Tracing

> Expression: type=elm:Query
>
> Annotation:
>
> Codes: elm:value[elm:Code]: [398166005 |Performed (qualifier value)|]elm:value[elm:Code]: [54550000 |Electroencephalogram (procedure)|]

Table 1.6. Electroencephalogram Interpretation

> Expression: type=elm:Query
>
> Annotation:
>
> Codes: elm:value[elm:Code]: [398166005 |Performed (qualifier value)|]elm:value[elm:Code]: [[370851004 |Evaluation of diagnostic study results (procedure)] ->(363702006 |Has focus (attribute))->[54550000 |Electroencephalogram (procedure)]]

Triggers

No trigger definitions are present.

Chapter 2. Expression Definitions

No expression definitions are present.

Chapter 3. Reason for Presentation

prompt: Chief Complaint
response: String (Single)

Chapter 4. History of Present Illness

Describe each instance of mild traumatic brain injury with symptomatology in chronological order.

prompt: Date

response: Timestamp (Single)

prompt: Loss of consciousness?

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 | Has focus (attribute))->[419045004 |Loss of consciousness (finding)]

response: Integer (Single)

response range: EnumerationConstraint (List)

item: Yes

item: No

item: Unknown

responseBinding: Property ("Loss of consciousness")

Condition:elm:Property

prompt: If loss of consciousness occurred (= Yes), record duration

response: Real (Single)

prompt: Alteration in consciousness?

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 | Has focus (attribute))->[3006004 |Disturbance of consciousness (finding)]

response: Integer (Single)

response range: EnumerationConstraint (List)

item: Yes

item: No

item: Unknown

responseBinding: Property ("Alteration in consciousness")

Condition:elm:Property

prompt: If alteration of consciousness occurred (= Yes), record duration

response: Real (Single)

prompt: Alteration in mental state?

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 | Has focus (attribute))->[419284004 |Altered mental status (finding)]

response: Integer (Single)

response range: EnumerationConstraint (List)

item: Yes

item: No

item: Unknown

   responseBinding: Property ("Alteration in mental state")

> **Condition:**elm:Property
>
>   prompt: If alteration of mental state occurred (= Yes), record duration
>
> response: Real (Single)

prompt: Amnesia?

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 | Has focus (attribute))->[48167000 |Amnesia (finding)]

response: Integer (Single)

response EnumerationConstraint (List)
  range:

  item: Yes

  item: No

  item: Unknown

   responseBinding: Property ("Amnesia")

> **Condition:**elm:Property
>
>   prompt: If amnesia occurred (= Yes), record duration
>
> response: Real (Single)

prompt: Best Glasgow Coma Score in First 24 Hours

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)]- ->(363702006 |Has focus (attribute))->[365856005 |Screening finding (finding)]- (363714003 |Interprets (attribute))->[248241002 |Glasgow coma score (observable entity)];

response: Integer (Single)

prompt: Treatment (Including Any Surgery and/or Rehabilitation Therapy)

response: String (Single)

prompt: Additional Details

response: String (Single)

prompt: Additional Mild Traumatic Brain Injury Event(s)?

response: Boolean (Single)

prompt: Persistent Symptoms

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)]- ->(363702006 | Has focus (attribute))->[[308921004 |Neurological symptom (finding)]- ->(263502005 |Clinical course (attribute))->[62459000 |Chronic persistent (qualifier value)];

response: Code (Multiple)

response EnumerationConstraint (List)
  range:

  item: Headache([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[25064002 |Headache (finding)])

  item: Dizziness([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[404640003 |Dizziness (finding)])

item: Balance Disorder([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[387603000 |Impairment of balance (finding)])

item: Nausea([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[422587007 |Nausea (finding)])

item: Sleep Disturbance([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[44186003 |Dyssomnia (disorder)])

item: Vision Changes([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[63102001 |Visual disturbance (disorder)])

item: Light Sensitivity([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[246622003 |Eyes sensitive to light (finding)])

item: Tinnitus([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[60862001 |Tinnitus (finding)])

item: Numbness([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[44077006 |Numbness (finding)])

item: Tingling([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[62507009 |Pins and needles (finding)])

item: Memory Problems([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[386807006 |Memory impairment (finding)])

item: Cognitive Problems([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[386806002 |Impaired cognition (finding)])

item: Behavioral Changes([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[417350008 |Altered behavior (finding)])

prompt:	Additional details for any of the above Persistant Symptoms
response:	String (Single)

prompt:	Do Symptoms Impact Function?
response:	Integer (Single)
response range:	EnumerationConstraint (List)
item:	Yes
item:	No
item:	Unknown

prompt:	Obtain Details (= Yes)
response:	String (Single)

Chapter 5. Neuropsychological Testing

prompt: Neuropsychological Testing Done?

response: Integer (Single)

response EnumerationConstraint (List)
range:

item: Yes

item: No

item: Unknown

responseBinding: Property ("Neuropsychological Testing Done")

> **Condition:** elm:Property
>
> prompt: If neuropsychological testing done (= Yes), record type of test
>
> response: String (Single)
>
> **responseBinding:** Property ("Neuropsychological Testing Done")
>
> prompt: If neuropsychological testing done (= Yes), record date
>
> response: Timestamp (Single)
>
> prompt: If neuropsychological testing done (= Yes), record additional details
>
> response: String (Single)

prompt: Additional Neuropsychological Testing?

response: Boolean (Single)

Chapter 6. Imaging and Electroencephalogram

prompt: Head Computed Tomography (CT)?

itemCode: 303653007 |Computed tomography of head (procedure)|

response: Integer (Single)

response EnumerationConstraint (List)
range:

  item: Yes

  item: No

  item: Unknown

responseBinding: Property ("Head Computed Tomography")

Condition: elm:Property
prompt: If patient had head CT, record date
response: Timestamp (Single)
prompt: If patient had head CT, record interpretation
response: String (Single)

initalValue: Head CT Interpretation

Link to Full Report and Images: Head CT
prompt: Head CT Image and Interpretation
response: Tuple (Multiple)

initalValue: Head CT Image

prompt: Additional head CT?

response: Boolean (Single)

prompt: Head Magnetic Resonance Imaging (MRI)?

itemCode: 241601008 |Magnetic resonance imaging of head (procedure)|

response: Integer (Single)

response EnumerationConstraint (List)
range:

  item: Yes

  item: No

  item: Unknown

responseBinding: Property ("MRI")

Condition: elm:Property
prompt: If patient had head MRI, record date
response: Timestamp (Single)
prompt: If patient had head MRI, record interpretation
response: String (Single)

initalValue: Head MRI Interpretation

Link to Full Report and Images: Head MRI

> prompt: Head MRI Image and Interpretation
>
> response: Tuple (Multiple)

initalValue: Head MRI Image

prompt: Additional head MRI?

response: Boolean (Single)

prompt: Other relevant imaging?

response: Integer (Single)

response EnumerationConstraint (List)
range:

item: Yes

item: No

item: Unknown

responseBinding: Property ("Other relevant imaging")

> **Condition:** elm:Property
>
> > prompt: If patient had other relevant imaging, record type of study
> >
> > response: String (Single)
> >
> > prompt: If patient had other relevant imaging, record date
> >
> > response: Timestamp (Single)
> >
> > prompt: If patient had other relevant imaging, record interpretation
> >
> > response: String (Single)

Link to Full Report and Images: Other Relevant Imaging

> prompt: Other Relevant Imaging
>
> response: Tuple (Multiple)

prompt: Additional relevant imaging study done?

response: Boolean (Single)

prompt: Electroencephalogram Done?

itemCode: 54550000 |Electroencephalogram (procedure)|

response: Integer (Single)

response EnumerationConstraint (List)
range:

item: Yes

item: No

item: Unknown

responseBinding: Property ("Electroencephalogram Done")

> **Condition:** elm:Property
>
> > prompt: If patient had electroencephalogram, record date
> >
> > response: Timestamp (Single)
> >
> > prompt: If patient had electroencephalogram, record interpretation
> >
> > response: String (Single)

initalValue: Electroencephalogram Interpretation

Link to Full Report: Electroencephalogram

prompt: Electroencephalogram Tracing and Interpretation

response: Tuple (Multiple)

initalValue: Electroencephalogram Tracing

prompt: Additional electroencephalogram done?

response: Boolean (Single)

Chapter 7. Comorbid Conditions

prompt: Check all that apply

response: Code (Multiple)

response range: EnumerationConstraint (List)

item: Depression([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[35489007 |Depressive disorder (disorder)])

item: Anxiety([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[197480006 |Anxiety disorder (disorder)])

item: Pain([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[22253000 |Pain (finding)])

item: Posttraumatic Stress Disorder([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[47505003 |Posttraumatic stress disorder (disorder)])

item: Sleep Disorder([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[39898005 |Sleep disorder (disorder)])

item: Substance Use Disorder([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[66214007 |Substance abuse (disorder)])

item: Suicidal Ideations([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[6471006 |Suicidal thoughts (finding)])

prompt: Additional details for any of the above Comorbidities

response: String (Single)

Chapter 8. Deployment History

prompt: Did the veteran serve in Operation Iraqi Freedom (OIF) or in Operation Enduring Freedom (OEF), either on the ground, in nearby coastal waters, or in the air above, after September 11, 2001? (Consider most recent OIF/OEF deployment only.)

response: Boolean (Single)

response range: EnumerationConstraint (List)

  item: Yes

  item: No

responseBinding: Property ("Operation Iraqi Freedom")

Condition: elm:Property	
prompt:	If patient was deployed in either OIF or OEF, provide deployment history
response:	String (Single)

Chapter 9. Psychosocial History

prompt: Spouse/Caregiver in the home?

response: Boolean (Single)

response EnumerationConstraint (List)
range:

  item: Yes

  item: No

> prompt: If patient has spouse and/or caregiver in the home, provide details
>
> response: String (Single)

prompt: Children in the home?

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 | Has focus (attribute))->[224134001 |Lives with children (finding)]

response: Boolean (Single)

response EnumerationConstraint (List)
range:

  item: Yes

  item: No

responseBinding: Property ("Children in the home")

> **Condition:** elm:Property
>
> prompt: If patient has children in the home, provide details
>
> response: String (Single)

prompt: Homeless?

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 | Has focus (attribute))->[32911000 |Homeless (finding)]

response: Boolean (Single)

response EnumerationConstraint (List)
range:

  item: Yes

  item: No

responseBinding: Property ("Homeless")

> **Condition:** elm:Property
>
> prompt: If patient is homeless, provide details
>
> response: String (Single)

prompt: Other Social, Living Situation, or Support Instability?

response: Boolean (Single)

response EnumerationConstraint (List)
range:

  item: Yes

  item: No

> prompt: If patient has other social, living situation or support instability, provide details
>
> response: String (Single)

prompt: Currently Employed?

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 | Has focus (attribute))->[224363007 |Employed (finding)]

response: Boolean (Single)

response range: EnumerationConstraint (List)

  item: Yes

  item: No

responseBinding: Property ("Currently Employed")

> **Condition:**elm:Property
>
> > prompt: If patient is currently employed, provide details
> >
> > response: String (Single)

prompt: Currently Attending School?

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 | Has focus (attribute))->[224305003 |Attending school (finding)]

response: EntityName (Single)

response range: EnumerationConstraint (List)

  item: Yes

  item: No

responseBinding: Property ("Attending School")

> **Condition:**elm:Property
>
> > prompt: If patient is currently attending school, provide details
> >
> > response: String (Single)

prompt: Highest Level of Education Completed/Degree Attained

response: Code (Single)

response range: EnumerationConstraint (List)

  item: High School Graduate([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[224297003 |Educated to secondary school level (finding)])

  item: General Equivalency Development (GED) or Equivalent([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[5251000175109 |Received certificate of high school equivalency (finding)])

  item: Some College, No Degree([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[224299000 |Received higher education (finding)])

item: Associate Degree: Occupational Program([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))-> [9fd4b37f-4804-43fc-844e-58bd5a50e2ff |Received occupational training (finding)])

item: Associate Degree: Technical Program([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[722465008 |Received education at technical college (finding)])

item: Associate Degree: Vocational Program([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[440586004 |Received vocational training (finding)])

item: Associate Degree: Academic Program([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[224302000 |Received higher education college education (finding)])

item: Bachelor's Degree (e.g., BA, AB, BS)([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[224302000 |Received higher education college education (finding)])

item: Master's Degree (e.g., MA, MS, MEng, MEd, MSW, MBA) ([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 | Has focus (attribute))->[426769009 |Received graduate education (finding)])

item: Professional School Degree (e.g., MD, DDS, DVM, JD) ([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[83116206-a169-4763-bf68-3be40392739f |Received doctoral level professional school education (finding)])

item: Doctoral Degree (e.g., PhD, EdD)([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[440345007 |Received doctorate degree (finding)])

> prompt: If patient has earned a degree, provide relevant details (e.g. school, focus subject, etc.)
>
> response: String (Single)

prompt: Caffeine Use

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 | Has focus (attribute))->[67961000119106 |Caffeine user (finding)]

response: Boolean (Single)

responseBinding: Property ("Caffeine Use")

> **Condition:**elm:Property
>
> > prompt: If patient uses caffeine, provide relevant details (cups per day, etc.
> >
> > response: String (Single)

prompt: Alcohol Use

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 | Has focus (attribute))->[219006 |Current drinker of alcohol (finding)]

response: Boolean (Single)

responseBinding: Property ("Alcohol Use")

> **Condition:**elm:Property
>
> > prompt: If patient uses alcohol, provide relevant details (type, drinks per day, etc.
> >
> > response: String (Single)

prompt: Tobacco Use

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 | Has focus (attribute))->[110483000 |Tobacco user (finding)]

response: Boolean (Single)

responseBinding: Property ("Tobacco Use")

Condition:elm:Property
prompt: If patient uses tobacco, provide relevant details (cigarettes vs cigars vs pipe vs oral, amount per day, duration of use etc.
response: String (Single)

prompt: Other Substance Use

response: Boolean (Single)

prompt: If patient uses other substances, provide relevant details (substance type, amount per day, duration of use, adverse reactions, overdoses, etc.
response: String (Single)

Chapter 10. Additional Medical History

prompt: Additional medical history not captured above that the referring provider feels is important

response: String (Single)

Chapter 11. Additional Surgical History

    prompt: Additional surgical history not captured above that the referring provider feels is important

response: String (Single)

Chapter 12. Additional Treatment History

prompt: Additional treatment history not captured above that the referring provider feels is important

response: String (Single)

Chapter 13. Exam

prompt: Cognitive Examination (e.g., Montreal Cognitive Assessment)

response: String (Single)

prompt: Neurological Findings

response: Code (Multiple)

response range: EnumerationConstraint (List)

item: Aphasia([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[87486003 |Aphasia (finding)])

item: Pupillary Asymmetry([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[13045009 |Anisocoria (disorder)])

item: Vision Loss([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[105597003 |Blindness AND/OR vision impairment level (disorder)])

item: Hearing Loss([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[15188001 |Hearing loss (disorder)])

item: Extraocular Muscle Movement Abnormality([a997cc03-3e99-40eb-833a-6374c7750a3a | Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[128603005 | Disorder of extraocular muscle (disorder)])

item: Muscle Weakness([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[26544005 |Muscle weakness (finding)])

item: Pronator Drift([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[428334004 |Downward drift of outstretched supinated arm (finding)])

item: Spasticity([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[221360009 |Spasticity (finding)])

item: Clasp-Knife Response([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[2581006 |Clasp knife like increase in tone (finding)])

item: Gross Sensory Loss([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[33653009 |Absence of sensation (finding)])

item: Hyperreflexia([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[86854008 |Hyperreflexia (finding)])

item: Babinski Sign([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[366553001 |Plantar reflex finding (finding)])

item: Impaired Balance([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[387603000 |Impairment of balance (finding)])

item: Impaired Coordination([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[302289002 |Coordination problem (finding)])

prompt: Additional Neurological Findings

response: String (Single)

  prompt: Additional non-Neurological Findings

response: String (Single)

Chapter 14. Plan

prompt: Neurological Findings

response: Code (Multiple)

response range: EnumerationConstraint (List)

item: Patient Education([84635008 |Disease process or condition education (procedure)] ->(363702006 |Has focus (attribute))->[127295002 |Traumatic brain injury (disorder)])

item: Family Education([84635008 |Disease process or condition education (procedure)] ->(363702006 |Has focus (attribute))->[127295002 |Traumatic brain injury (disorder)])

item: Symptom Management(713148004 |Symptom management (procedure)|)

item: Polytrauma Rehabilitation Clinic Referral(eecdd596-fe95-4ea3-a8c2-6686cfdae3cb |Referral to polytrauma interdisciplinary rehabilitation clinic (procedure)|)

item: Physical Therapy Referral(444831000124102 |Referral for physical therapy (procedure)|)

item: Occupational Therapy Referral(453581000124100 |Referral for occupational therapy (procedure)|)

item: Speech-Language Pathology Referral(306173009 |Referral to speech and language therapy service (procedure)|)

item: Neurology Referral(183521007 |Referral to neurology service (procedure)|)

item: Mental Health Referral(390866009 |Referral to mental health team (procedure)|)

item: Social Work Referral(306238000 |Referral to Social Services (procedure)|)

item: Integrative Health Consult(d14c1f9a-ce16-49f5-8c25-455a1c298af5 |Integrative health consultation and report (procedure)|)

item: Rehabilitation Medicine Spasticity Clinic(84ecb31f-345c-44f0-8be4-020a657ab6ea |Referral to rehabilitation medicine spasticity clinic (procedure)|)

item: Other

prompt: Provide details

response: String (Single)

Chapter 15. Tabular List

Terminology Service Request (TSR) Mappings

Table 15.1. Terminology Versions

Name	Identifer	Version
SNOMED CT	2.16.840.1.113883.6.96	United States Edition 20180301

Table 15.2. Terminology References

System	Code	Display Text[a]	References[b]
SNOMED CT	133936004 |Adult (person)|	Adult patients	1
SNOMED CT	183521007 |Referral to neurology service (procedure)|	Neurology Referral	1
SNOMED CT	241601008 |Magnetic resonance imaging of head (procedure)|	Precoordinated Expression	2
SNOMED CT	303653007 |Computed tomography of head (procedure)|	Precoordinated Expression	2
SNOMED CT	306173009 |Referral to speech and language therapy service (procedure)|	Speech-Language Pathology Referral	1
SNOMED CT	306238000 |Referral to Social Services (procedure)|	Social Work Referral	1
SNOMED CT	33022008 |Hospital-based outpatient department (environment)|	Outpatient	1
SNOMED CT	390866009 |Referral to mental health team (procedure)|	Mental Health Referral	1
SNOMED CT	398166005 |Performed (qualifier value)|	Precoordinated Expression	6
SNOMED CT	444831000124102	Referral for physical therapy (procedure)|	Physical Therapy Referral	1
SNOMED CT	453581000124100	Referral for occupational therapy (procedure)|	Occupational Therapy Referral	1
SNOMED CT	5351000124100 |Primary care clinic (environment)|	Primary Care	1

System	Code	Display Text[a]	References[b]
SNOMED CT	54550000 | Electroencephalogram (procedure)|	Precoordinated Expression	2
SNOMED CT	713148004 |Symptom management (procedure)|	Symptom Management	1
SNOMED CT	84ecb31f-345c-44f0-8be4-0... |Referral to rehabilitation medicine spasticity clinic (procedure)|	Rehabilitation Medicine Spasticity Clinic	1
SNOMED CT	[370851004 |Evaluation of diagnostic study results (procedure)] ->(363702006 |Has focus (attribute))->[241601008 |Magnetic resonance imaging of head (procedure)]	Postcoordinated Expression	1
SNOMED CT	[370851004 |Evaluation of diagnostic study results (procedure)] ->(363702006 |Has focus (attribute))->[303653007 |Computed tomography of head (procedure)]	Postcoordinated Expression	1
SNOMED CT	[370851004 |Evaluation of diagnostic study results (procedure)] ->(363702006 |Has focus (attribute))->[54550000 |Electroencephalogram (procedure)]	Postcoordinated Expression	1
SNOMED CT	[84635008 |Disease process or condition education (procedure)] ->(363702006 |Has focus (attribute))->[127295002 |Traumatic brain injury (disorder)]	Patient Education	2
SNOMED CT	[a997cc03-3e99-40eb-833a-6... |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))-> [9fd4b37f-4804-43fc-844e-58bd5a50e2ff |Received occupational training (finding)]	Associate Degree: Occupational Program	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6... |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[128603005 |Disorder	Extraocular Muscle Movement Abnormality	1

System	Code	Display Text[a]	References[b]
	of extraocular muscle (disorder)]		
SNOMED CT	[a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[105597003 |Blindness AND/OR vision impairment level (disorder)]	Vision Loss	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[110483000 |Tobacco user (finding)]	Coordinated Expression	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[13045009 |Anisocoria (disorder)]	Pupillary Asymmetry	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[15188001 |Hearing loss (disorder)]	Hearing Loss	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[197480006 |Anxiety disorder (disorder)]	Anxiety	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[219006 |Current drinker of alcohol (finding)]	Coordinated Expression	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[221360009 |Spasticity (finding)]	Spasticity	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006		1

System	Code	Display Text[a]	References[b]
	|Has focus (attribute))->[22253000 |Pain (finding)]		
SNOMED CT	[a997cc03-3e99-40eb-833a-a997cc7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[224134001 |Lives with children (finding)]	Coordinated Expression	1
SNOMED CT	[a997cc03-3e99-40eb-833a-a997cc7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[224297003 |Educated to secondary school level (finding)]	High School Graduate	1
SNOMED CT	[a997cc03-3e99-40eb-833a-a997cc7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[224299000 |Received higher education (finding)]	Some College, No Degree	1
SNOMED CT	[a997cc03-3e99-40eb-833a-a997cc7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[224302000 |Received higher education college education (finding)]	Associate Degree: Academic Program	2
SNOMED CT	[a997cc03-3e99-40eb-833a-a997cc7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[224305003 |Attending school (finding)]	Coordinated Expression	1
SNOMED CT	[a997cc03-3e99-40eb-833a-a997cc7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[224363007 |Employed (finding)]	Coordinated Expression	1
SNOMED CT	[a997cc03-3e99-40eb-833a-a997cc7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[246622003 |Eyes sensitive to light (finding)]	Light Sensitivity	1
SNOMED CT	[a997cc03-3e99-40eb-833a-a997cc7750a3a |Observation procedure	Headache	1

System	Code	Display Text[a]	References[b]
	(procedure)] ->(363702006 |Has focus (attribute))->[25064002 |Headache (finding)]		
SNOMED CT	[a997cc03-3e99-40eb-833a-... |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[2581006 |Clasp knife like increase in tone (finding)]	Clasp Knife Response	1
SNOMED CT	[a997cc03-3e99-40eb-833a-... |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[26544005 |Muscle weakness (finding)]	Muscle Weakness	1
SNOMED CT	[a997cc03-3e99-40eb-833a-... |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[3006004 |Disturbance of consciousness (finding)]	Uncoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40eb-833a-... |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[302289002	Coordination problem (finding)]	Impaired Coordination	1
SNOMED CT	[a997cc03-3e99-40eb-833a-... |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[32911000 |Homeless (finding)]	Uncoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40eb-833a-... |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[33653009 |Absence of sensation (finding)]	Gross Sensory Loss	1
SNOMED CT	[a997cc03-3e99-40eb-833a-... |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[35489007 |Depressive disorder (disorder)]	Depression	1

System	Code	Display Text[a]	References[b]
SNOMED CT	[a997cc03-3e99-40eb-833a- |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[366553001 |Plantar reflex finding (finding)]	Babinski Sign	1
SNOMED CT	[a997cc03-3e99-40eb-833a- |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[386806002 |Impaired cognition (finding)]	Cognitive Problems	1
SNOMED CT	[a997cc03-3e99-40eb-833a- |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[386807006 |Memory impairment (finding)]	Memory Problems	1
SNOMED CT	[a997cc03-3e99-40eb-833a- |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[387603000 |Impairment of balance (finding)]	Balance Disorder	2
SNOMED CT	[a997cc03-3e99-40eb-833a- |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[39898005 |Sleep disorder (disorder)]	Sleep Disorder	1
SNOMED CT	[a997cc03-3e99-40eb-833a- |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[404640003 |Dizziness (finding)]	Dizziness	1
SNOMED CT	[a997cc03-3e99-40eb-833a- |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[417350008 |Altered behavior (finding)]	Behavioral Changes	1
SNOMED CT	[a997cc03-3e99-40eb-833a- |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[419045004 |Loss of consciousness (finding)]	Poorly coordinated Expression	1

System	Code	Display Text[a]	References[b]
SNOMED CT	[a997cc03-3e99-40eb-833a-6374cc75d03a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[419284004 |Altered mental status (finding)]	Coordinated Expression	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6374c750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[422587007 |Nausea (finding)]	Nausea	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6374c750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[426769009 |Received graduate education (finding)]	Master's Degree (e.g., MA, MS, MEng, MEd, MSW, MBA)	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6374a765da3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[428334004 |Downward drift of outstretched supinated arm (finding)]	Raw Data	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6374c750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[440345007 |Received doctorate degree (finding)]	Doctoral Degree (e.g., PhD, EdD)	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6374c750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[440586004 |Received vocational training (finding)]	Associate Degree: Vocational Program	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6374b765a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[44077006 |Numbness (finding)]	Numbness	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6374c750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->	Sleep Disturbance	1

System	Code	Display Text[a]	References[b]
	>[44186003 |Dyssomnia (disorder)]		
SNOMED CT	[a997cc03-3e99-40eb-833a-... |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[47505003 |Posttraumatic stress disorder (disorder)]	Posttraumatic Stress Disorder	1
SNOMED CT	[a997cc03-3e99-40eb-833a-... |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[48167000 |Amnesia (finding)]	Coordinated Expression	1
SNOMED CT	[a997cc03-3e99-40eb-833a-... |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[5251000175109 | Received certificate of high school equivalency (finding)]	General Equivalency Development (GED) or Equivalent	1
SNOMED CT	[a997cc03-3e99-40eb-833a-... |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[60862001 |Tinnitus (finding)]	Auditory	1
SNOMED CT	[a997cc03-3e99-40eb-833a-... |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[62507009 |Pins and needles (finding)]	Tingling	1
SNOMED CT	[a997cc03-3e99-40eb-833a-... |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[63102001 |Visual disturbance (disorder)]	Vision Changes	1
SNOMED CT	[a997cc03-3e99-40eb-833a-... |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[6471006 |Suicidal thoughts (finding)]	Suicidal Ideations	1
SNOMED CT	[a997cc03-3e99-40eb-833a-... |Observation procedure (procedure)] ->(363702006	Substance Use Disorder	1

System	Code	Display Text[a]	References[b]
	|Has focus (attribute))->[66214007 |Substance abuse (disorder)]		
SNOMED CT	[a997cc03-3e99-40eb-833a-6354c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[67961000119106 | Caffeine user (finding)]	Post-coordinated Expression	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6354c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[722465008 |Received education at technical college (finding)]	Associate Degree: Technical Program	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6354c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[83116206-a169-4763-bf68-3be40392739f | Received doctoral level professional school education (finding)]	Professional School Degree (e.g., MD, DDS, DVM, JD)	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6354c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[86854008 |Hyperreflexia (finding)]	Hyperreflexia	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6354c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[87486003 |Aphasia (finding)]	Aphasia	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6354c7750a3a |Observation procedure (procedure)]- ->(363702006 |Has focus (attribute))->[365856005 |Screening finding (finding)]- (363714003 |Interprets (attribute))->[248241002 |Glasgow coma score (observable entity)];	Post-coordinated Expression	1

System	Code	Display Text[a]	References[b]
SNOMED CT	[a997cc03-3e99-40eb-833a-63f4cc7750b3 |Observation procedure (procedure)]- ->(363702006 |Has focus (attribute))->[[308921004 |Neurological symptom (finding)]- ->(263502005 | Clinical course (attribute))->[62459000 |Chronic persistent (qualifier value)];	Post-coordinated Expression	1
SNOMED CT	d14c1f9a-ce16-49f5-8c25-455a1c298af5 |Integrative health consultation and report (procedure)|	Integrative Health Consult	1
SNOMED CT	eecdd596-fe95-4ea3-a8c2-6686cfdae3cb | Referral to polytrauma interdisciplinary rehabilitation clinic (procedure)|	Polytrauma Rehabilitation Clinic Referral	1

[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 16. Behavior Symbols

Table 16.1. 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 16.2. 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 16.3. 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 16.4. 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 16.5. 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 16.6. 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 16.7. 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] *Neurology: Traumatic Brain Injury Screening Clinical Content White Paper*

[CSD] *Neurology: Traumatic Brain Injury (TBI) Screening Documentation Template Conceptual Structure Document*

[KVRpt] *Neurology: Traumatic Brain Injury (TBI) Screening Documentation Template KNART Validation Report*

Supporting Evidence

[AMEDDCS 2017] *Mild Traumatic Brain Injury Rehabilitation Toolkit. Army Medical Department Center and School (AMEDDC&S), U.S. Army Health Readiness Center of Excellence (HRCoE) website. Accessed August 28, 2017* (link [https://doi.org/10.1111/j.1745-7599.2011.00658.x])

[URL] *Management of Concussion-mild Traumatic Brain Injury (mTBI), Version 2.0 – 2016. VA/DoD Clinical Practice Guidelines website. Management of Concussion/mTBI Working Group. Published February 2016* (link [https://www.healthquality.va.gov/guidelines/Rehab/mtbi/mTBICPGFullCPG50821816.pdf])