

# **Endocrinology: Hypoglycemia Documentation Template**

## **Documentation Tem- plate: Conceptual Structure**

**Contract: VA118-16-D-1008, Task Order (TO): VA-118-16-F-1008-0007, CLIN0005AF**

**Department of Veterans Affairs (VA)**



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

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

Publication date 05/25/2018

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# Preface

**Table 1. Revision History**

Date	Life Cycle Event
May 25, 2018	Published
May 25, 2018	Reviewed
April 20, 2018	Pre-published
April 20, 2018	Created

**Table 2. Clinical White Paper Contributors**

Name	Role	Affiliation
Leonard Pogach, MD	Author	National Director Medicine VA Central Office (VACO), 810 Vermont Ave. NW, Room 662 Washington, DC 20420
Paul Conlin, MD	Author	Endocrinologist; Chief of Medicine, Boston VA Medical Center (VAMC); Chair of the Field Advisory Committee for Diabetes/Endocrinology, 1400 Veterans of Foreign Wars (VFW) Parkway, Boston, MA 02132

**Table 3. Artifact Identifier**

Domain	Artifact ID	Name
urn:va.gov:kbs:knart:artifact:r1	a3d8ea14-b1d9-56ec-9774-239ba16e16e4	B45

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# Artifact Applicability

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

Focus	Description	Code System	Code	Value Set	Value Set Version
TargetUser	Clinical Providers			N/A	N/A
PatientAgeGroup	Adult outpatient with an active problem of either diabetes mellitus, type 1 or type 2	SNOMED CT	133936004  Adult (person)	N/A	N/A
WorkflowSetting	Emergency Department (ED), inpatient hospital, urgent care, or ambulatory care clinic			N/A	N/A
WorkflowTask	Care and Management of the Diabetic Patient			N/A	N/A

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# Models

**Table 5. Model References**

Referenced Model	Description
urn:solor.io:anf-model:1.0	VA Analysis Normal Form Model

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# Chapter 1. External Data Definitions

## Definitions

**Table 1.1. creatinine**

Expression: type=elm:SingletonFrom Annotation: Codes: elm:value[elm:Code]: [398166005  Performed (qualifier value)]elm:value[elm:Code]: [70901006  Creatinine measurement (procedure)]
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**Table 1.2. glomerular filtration rate**

Expression: type=elm:SingletonFrom Annotation: Codes: elm:value[elm:Code]: [398166005  Performed (qualifier value)]elm:value[elm:Code]: [167181009  Measurement of renal clearance of creatinine (procedure)]
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**Table 1.3. albumin-to-creatinine ratio**

Expression: type=elm:SingletonFrom Annotation: Codes: elm:value[elm:Code]: [398166005  Performed (qualifier value)]elm:value[elm:Code]: [271075006  Urine albumin/creatinine ratio measurement (procedure)]
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## Triggers

No trigger definitions are present.



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# Chapter 2. Expression Definitions

No expression definitions are present.

# Chapter 3. History of Present Illness

## Reason for Evaluation

◆ Select

prompt:

response: Code (Single)

response EnumerationConstraint (List)

range:

item: Recent hypoglycemic episode([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[317006 |Reactive hypoglycemia (disorder)])

item: At risk for hypoglycemia without recent episode([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[b91c7da2-cb27-42e5-8ae9-3b7dacecbb7f |At risk for hypoglycemia (disorder)])

item: Other reason

◆ Provide details of other reason for evaluation

prompt:

response: String (Single)

## Diabetes Control Status

☐ prompt: Type of Diabetes

response: Code (Single)

response EnumerationConstraint (List)

range:

item: Type I Diabetes([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[46635009 |Diabetes mellitus type 1 (disorder)])

item: Type II Diabetes([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[44054006 |Diabetes mellitus type 2 (disorder)])

☐ prompt: Glycated Hemoglobin (HbA1c) goal

itemCode: [225294001 |Identifying goals (procedure)]- ->(363702006 |Has focus (attribute))->[243860001 |Diabetic monitoring status (finding)]- ->(363714003 |Interprets (attribute))->[408591000 |Hemoglobin A1c target (observable entity)]

response: Real (Single)

☐

⊗ prompt: Most recent HbA1c (%)

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[43396009 |Hemoglobin A1c measurement (procedure)]

response: Ratio (Single)

⊗ prompt: Date

response: Timestamp (Single)

☐ prompt: Preprandial blood glucose target range (goal)

itemCode: [225294001  Identifying goals (procedure)]- -(363702006  Has focus (attribute))->[243860001  Diabetic monitoring status (finding)]- -(363714003  Interprets (attribute))->[787bb747-3d69-4383-b69d-68937ad61f24  Fasting blood glucose target (observable entity)] response: IntegerInterval (Single) <input type="checkbox"/> prompt: Preprandial blood glucose target range (actual) itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] ->(363702006  Has focus (attribute))->[271062006  Fasting blood glucose measurement (procedure)] response: IntegerInterval (Single)	❖ Medication Reconciliation: Potential medication interactions with antihyperglycemic agents and/or medication impact on hypoglycemic awareness
<input type="checkbox"/> prompt: Description of reaction/interactions response: String (Single)	
♦ Prior Hypoglycemic Episodes? prompt: item- [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] -(363702006  Has Code: focus (attribute))->[317006  Reactive hypoglycemia (disorder)] re- Boolean (Single) sponse: re- EnumerationConstraint (List) sponse range: item: No item: Yes <b>responseBinding:</b> Property ("hasPriorHypoglycemicEpisodes")	

**Condition:**elm:Property

Collect details about hypoglycemic episode(s)

	Episode type(s)
	<input type="checkbox"/> prompt: Hypoglycemia requiring paramedics, emergency department evaluation, or hospitalization itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)]- -(363702006  Has focus (attribute))->[401082004  Hypoglycemic attack requiring third party assistance (finding)]- -(363714003  Interprets (attribute))->acd5c50a-e40a-47cd-bf34-d02bdb9f0342  Frequency of emergency department treated hypoglycemia attack (observable entity)]; itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)]- -(363702006  Has focus (attribute))->[401082004  Hypoglycemic attack requiring third party assistance (finding)]- -(363714003  Interprets (attribute))->[712660009  Frequency of hospital-treated hypoglycemia attack (observable entity)]; response: Boolean (Single)
	<input type="checkbox"/>
	<input type="checkbox"/> prompt: Number of episodes since last visit

	<p>response: Integer (Single)</p> <p><input type="checkbox"/> prompt: Number of episodes during past year</p> <p>response: Integer (Single)</p> <p><input type="checkbox"/> prompt: Hypoglycemia requiring bystander intervention</p> <p>itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)]- -(363702006  Has focus (attribute))-&gt;[401082004  Hypoglycemic attack requiring third party assistance (finding)]- -(363714003  Interprets (attribute))-&gt;[06cf6868-d29b-4586-9e30-fabe9594642e  Frequency of bystander assisted hypoglycemia attack (observable entity)];</p> <p>response: Boolean (Single)</p> <p><input type="checkbox"/></p>
	<p><input type="checkbox"/> prompt: Number of episodes since last visit</p> <p>response: Integer (Single)</p> <p><input type="checkbox"/> prompt: Number of episodes during past year</p> <p>response: Integer (Single)</p> <p><input type="checkbox"/> prompt: Self-managed hypoglycemic episode</p> <p>itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)]- -(363702006  Has focus (attribute))-&gt;[317006  Reactive hypoglycemia (disorder)]- -(363714003  Interprets (attribute))-&gt;[1b7c2726-74d4-48e7-a5b6-be5992196203  Frequency of self-managed hypoglycemia attack (observable entity)];</p> <p>response: Boolean (Single)</p> <p><input type="checkbox"/></p>
	<p><input type="checkbox"/> prompt: Number of episodes since last visit</p> <p>response: Integer (Single)</p> <p><input type="checkbox"/> prompt: Number of episodes during past year</p> <p>response: Integer (Single)</p> <p><input type="checkbox"/> prompt: Typical number of hypoglycemic episodes per week</p> <p>response: Integer (Single)</p> <p>Methods Used to Treat Hypoglycemia</p>
	<p><input type="checkbox"/> prompt: Carbohydrate-rich snacks or drinks</p> <p>itemCode: [381be1bc-0c9d-4dc2-aa6f-56183c4123bd  Self-administration of substance (procedure)] -(260686004  Method (attribute))-&gt;[129445006  Administration - action (qualifier value)] -(363701004  Direct substance (attribute))-&gt;[99ca8d24-6e83-4619-863b-1e2378229ff6  Carbohydrate-rich snack (substance)]</p> <p>response: Boolean (Single)</p> <p><input type="checkbox"/> prompt: Glucose tablets, gels, or drinks</p> <p>itemCode: [225425006  Self-administration of medication (procedure)] -(260686004  Method (attribute))-&gt;[129445006  Administration - action (qualifier value)] -(363701004  Direct substance (attribute))-&gt;[Rx;1165824  Glucose Pill]</p> <p>itemCode: [225425006  Self-administration of medication (procedure)] -(260686004  Method (attribute))-&gt;[129445006  Administration - action (qualifier value)]</p>

	<p>ue)] -(363701004  Direct substance (attribute))-[Rx;377980 Glucose Oral Gel]</p> <p>itemCode: [225425006  Self-administration of medication (procedure)] -(260686004  Method (attribute))-[129445006  Administration - action (qualifier value)] -(363701004  Direct substance (attribute))-[Rx;1165822 Glucose Oral Liquid Product]</p> <p>response: Boolean (Single)</p> <p><input type="checkbox"/></p> <p>    ⊙ prompt: Glucagon injections</p> <p>    itemCode: [225425006  Self-administration of medication (procedure)] -(260686004  Method (attribute))-[129445006  Administration - action (qualifier value)] -(363701004  Direct substance (attribute))-[Rx;1165209 Glucagon Injectable Product]</p> <p>    response: Boolean (Single)</p> <p>    ⊙ prompt: Number of injections since last visit</p> <p>    response: Integer (Single)</p> <p>    ⊙ prompt: Number of injections during past year</p> <p>    response: Integer (Single)</p> <p>How good is your ability to recognize your hypoglycemia symptoms?</p> <p><input type="checkbox"/> prompt: How good is your ability to recognize your hypoglycemia symptoms?</p> <p>itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] -(363702006  Has focus (attribute))-[719732004  Able to recognize own symptoms (finding)]</p> <p>response: String (Single)</p> <p>response EnumerationConstraint (List)</p> <p>range:</p> <p>    item: None</p> <p>    item: Poor</p> <p>    item: Good</p> <p><input type="checkbox"/> prompt: Hypoglycemic symptoms</p> <p>response: String (Single)</p> <p><input type="checkbox"/> prompt: Most common cause(s)</p> <p>response: String (Single)</p> <p>Hypoglycemic Assessment and Risk Factors</p> <p><input type="checkbox"/> prompt: Age</p> <p>itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] -(363702006  Has focus (attribute))-[105726004  Age AND/OR growth finding (finding)]</p> <p>response: Integer (Single)</p> <p><input type="checkbox"/> prompt: Life Expectancy</p> <p>itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] -(363702006  Has focus (attribute))-[729d3508-98ba-4a1d-8334-9e024a0a760e  Prognosis of life expectancy (finding)]</p>
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response: Integer (Single)

☐ prompt: Cognitive Impairment/Dementia

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

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[52448006 |Dementia (disorder)]

response: Boolean (Single)

☐

⊗ prompt: Major neurologic disorder

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[118940003 |Disorder of nervous system (disorder)]

response: Boolean (Single)

⊗ prompt: Description

response: String (Single)

☐

⊗ prompt: Major Depression

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[370143000 |Major depressive disorder (disorder)]

response: Boolean (Single)

⊗ prompt: Description

response: String (Single)

☐

☐ prompt: Cardiovascular Disease

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[49601007 |Disorder of cardiovascular system (disorder)]

response: Boolean (Single)

☐ prompt: Description

response: String (Single)

☐

☐ prompt: Chronic Kidney Disease

itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |Has focus (attribute))->[709044004 |Chronic kidney disease (disorder)]

response: Boolean (Single)

☐ prompt: Description

response: String (Single)

☐

☐ prompt: Most recent creatinine (mg/dL)

itemCode: 70901006 |Creatinine measurement (procedure)]

		<p>response: Tuple (Single)</p> <p><b>initialValue:</b> creatinine</p> <p><input type="checkbox"/> prompt: Date</p> <p>response: Timestamp (Single)</p>
<input type="checkbox"/>		<p><input type="checkbox"/> prompt: Most recent glomerular filtration rate (GFR) (mL/min/1.73 m<sup>2</sup>)</p> <p>itemCode: 167181009  Measurement of renal clearance of creatinine (procedure) </p> <p>response: Real (Single)</p> <p><b>initialValue:</b> glomerular filtration rate</p> <p><input type="checkbox"/> prompt: Date</p> <p>response: Timestamp (Single)</p>
<input type="checkbox"/>		<p><input type="checkbox"/> prompt: Most recent urinary albumin-to-creatinine ratio (mg/g)</p> <p>itemCode: 271075006  Urine albumin/creatinine ratio measurement (procedure) </p> <p>response: Ratio (Single)</p> <p><b>initialValue:</b> albumin-to-creatinine ratio</p> <p><input type="checkbox"/> prompt: Date</p> <p>response: Timestamp (Single)</p>
<input type="checkbox"/>		<p><input type="checkbox"/> prompt: Fall history or risk</p> <p>itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] -&gt;(363702006  Has focus (attribute))-&gt;[161898004  Falls (finding)]</p> <p>itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] -&gt;(363702006  Has focus (attribute))-&gt;[129839007  At risk for falls (finding)]</p> <p>response: Boolean (Single)</p>
<input type="checkbox"/>		<p><input type="checkbox"/> prompt: Potential Self-Management Difficulties</p> <p>response: Boolean (Single)</p>
<input type="checkbox"/>		<p><input type="checkbox"/> prompt: Poor manual dexterity</p> <p>itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] -&gt;(363702006  Has focus (attribute))-&gt;[306741005  Poor manual dexterity (finding)]</p> <p>response: Boolean (Single)</p>
		<p><input type="checkbox"/> prompt: Active mental health diagnosis</p> <p>itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] -&gt;(363702006  Has focus (attribute))-&gt;[413307004  Mental health problem (finding)]</p> <p>response: Boolean (Single)</p>
		<p><input type="checkbox"/> prompt: Advanced eye disease, including but not limited to visual loss and retinopathy</p>

		itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] ->(363702006  Has focus (attribute))->[371405004  Disorder of eye proper (disorder)] response: Boolean (Single) <input type="checkbox"/> prompt: Food insufficiency itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] ->(363702006  Has focus (attribute))->[706875005  Insufficient food supply (finding)] response: Boolean (Single) <input type="checkbox"/> prompt: Other response: Boolean (Single) <input type="checkbox"/>
		<input type="checkbox"/> prompt: Description response: String (Single)
<input type="checkbox"/> prompt: Social Risk Factors	<input type="checkbox"/>	response: Boolean (Single)
		<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/> prompt: Alcoholism/Substance Abuse itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] ->(363702006  Has focus (attribute))->[7200002  Alcoholism (disorder)] itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] ->(363702006  Has focus (attribute))->[66214007  Substance abuse (disorder)] response: Boolean (Single) <input type="checkbox"/> prompt: Description response: String (Single)
		<input type="checkbox"/> prompt: Homelessness itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] ->(363702006  Has focus (attribute))->[32911000  Homeless (finding)] response: Boolean (Single) <input type="checkbox"/> prompt: Living alone itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] ->(363702006  Has focus (attribute))->[105529008  Lives alone (finding)] response: Boolean (Single) <input type="checkbox"/> prompt: Social isolation itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] ->(363702006  Has focus (attribute))->[422650009  Social isolation (finding)] response: Boolean (Single)



	<div><input type="checkbox"/></div> <div> <div><input type="checkbox"/> prompt: Other</div> <div>response: Boolean (Single)</div> <div><input type="checkbox"/> prompt: Description</div> <div>response: String (Single)</div> </div>
<div><input type="checkbox"/></div>	<div> <div><input type="checkbox"/> prompt: Patient has fears or concerns regarding their diabetes management</div> <div>itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)]- -(363702006  Has focus (attribute))-&gt;[247808006  Anxiety about body function or health (finding)]- -(363714003  Interprets (attribute))-&gt;[405096004  Diabetes self-management behavior (observable entity)]</div> <div>response: Boolean (Single)</div> <div><input type="checkbox"/> prompt: Description</div> <div>response: String (Single)</div> </div>
<div><input type="checkbox"/></div>	<div> <div><input type="checkbox"/> prompt: Other</div> <div>response: Boolean (Single)</div> <div><input type="checkbox"/> prompt: Description</div> <div>response: String (Single)</div> </div>

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## Chapter 4. Past Medical History

History of microvascular disease?

○ prompt: History of microvascular disease

response: Code (Single)

response range: EnumerationConstraint (List)

item: None(TSR-NoCode)

item: Mild (microalbuminuria, background retinopathy, and/or mild nephropathy)([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)]- ->(363702006 |Has focus (attribute))->[58729003 |Disorder of capillaries (disorder)]- ->(246112005 |Severity (attribute))->[255604002 |Mild (qualifier value)]);)

item: Moderate (persistent, fixed proteinuria; pre-proliferative retinopathy; and/or peripheral neuropathy with sensory loss)([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)]- ->(363702006 |Has focus (attribute))->[58729003 |Disorder of capillaries (disorder)]- ->(246112005 |Severity (attribute))->[6736007 |Moderate (severity modifier) (qualifier value)]);)

item: Advanced (renal insufficiency, proliferative retinopathy/prior laser treatment; peripheral neuropathy with insensate extremities, and/or autonomic neuropathy)([a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)]- ->(363702006 |Has focus (attribute))->[58729003 |Disorder of capillaries (disorder)]- ->(246112005 |Severity (attribute))->[24484000 |Severe (severity modifier) (qualifier value)]);)

□ prompt: Functional status

response: String (Single)

□ prompt: Other relevant Past Medical History

response: String (Single)

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# Chapter 5. Medications

<input type="checkbox"/>	<p>⊙ prompt: Insulin</p> <p>itemCode: [416118004  Administration (procedure)] -&gt;(260686004  Method (attribute))-&gt;[129445006  Administration - action (qualifier value)] -&gt;(363701004  Direct substance (attribute))-&gt;[126210001  Human insulin product (product)]</p> <p>response: Boolean (Single)</p> <p>⊙ prompt: Details of current prescription</p> <p>response: String (Single)</p> <p>⊙ prompt: Adverse effects to taking medication</p> <p>response: String (Single)</p>
<input type="checkbox"/>	<p>⊙ prompt: Sulfonylureas</p> <p>itemCode: [416118004  Administration (procedure)] -&gt;(260686004  Method (attribute))-&gt;[129445006  Administration - action (qualifier value)] -&gt;(363701004  Direct substance (attribute))-&gt;[34012005  Product containing sulfonylurea (medicinal product)]</p> <p>response: Boolean (Single)</p> <p>⊙ prompt: Details of current prescription</p> <p>response: String (Single)</p> <p>⊙ prompt: Adverse effects to taking medication</p> <p>response: String (Single)</p>
<input type="checkbox"/>	<p><input type="checkbox"/> prompt: Other glucose-lowering agents</p> <p>itemCode: [416118004  Administration (procedure)] -&gt;(260686004  Method (attribute))-&gt;[129445006  Administration - action (qualifier value)] -&gt;(363701004  Direct substance (attribute))-&gt;[312064005  Hypoglycemic agent (product)]</p> <p>response: Boolean (Single)</p> <p><input type="checkbox"/> prompt: Details of current prescription</p> <p>response: String (Single)</p> <p><input type="checkbox"/> prompt: Adverse effects to taking medication</p> <p>response: String (Single)</p>

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# Chapter 6. Lifestyle

☐ Typical diet

prompt:

item- [a997cc03-3e99-40eb-833a-6374c7750a3a |Observation procedure (procedure)] ->(363702006 |  
Code: Has focus (attribute))->[36823005 |Normal diet (finding)]

re- String (Single)

sponse:

☐ Exercise

prompt:

item- 226029000 |Exercises (regime/therapy)|  
Code:

re- String (Single)

sponse:

<input type="checkbox"/>	<div><div><input type="checkbox"/> prompt: Tobacco, alcohol, or other substance use</div><div>itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] -&gt;(363702006  Has focus (attribute))-&gt;[110483000  Tobacco user (finding)]</div><div>itemCode: [a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] -&gt;(363702006  Has focus (attribute))-&gt;[219006  Current drinker of alcohol (finding)]</div><div>response: String (Single)</div><div><input type="checkbox"/> prompt: Description</div><div>response: String (Single)</div></div>
<input type="checkbox"/>	<div><div><input type="checkbox"/> prompt: Other</div><div>response: Boolean (Single)</div><div><input type="checkbox"/> prompt: Description</div><div>response: String (Single)</div></div>

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# Chapter 7. Patient Preferences

☐ Patient preference for glucose-lowering agent assessed

prompt:

re- Boolean (Single)

sponse:

---

<input type="checkbox"/>
--------------------------

<input type="checkbox"/> prompt: Patient preferences for glucose-lowering agents
----------------------------------------------------------------------------------

response: String (Single)
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# Chapter 8. Plan

## HbA1c Target Range

- prompt: 6.0% to 7.0% (Recommended for those with absent or mild microvascular disease, no major comorbidity, and life expectancy greater than 10 years)  
response: Boolean (Single)
- prompt: 7.0% to 8.0% (Recommended for those with moderate microvascular disease, no major comorbidity, and life expectancy greater than 10 years or with absent or mild microvascular disease, major comorbidity present but manageable, and life expectancy of 5 to 10 years)  
response: Boolean (Single)
- prompt: 7.5% to 8.5% (Recommended for those with moderate microvascular disease, major comorbidity present but manageable, and life expectancy of 5 to 10 years or with advanced microvascular disease, major comorbidity present and challenging to manage or end-stage, and life expectancy of at least 5 years)  
response: Boolean (Single)
- prompt: 8.0% to 9.0% (Recommended for those with major comorbidity present and challenging to manage or end-stage and life expectancy less than 5 years)  
response: Boolean (Single)
- prompt: Other  
response: Boolean (Single)
  - |                                                    |
|----------------------------------------------------|
| ○ prompt: Description<br>response: String (Single) |
|----------------------------------------------------|
- prompt: Preprandial blood glucose target range  
response: IntegerInterval (Single)



prompt: Self-management plan changes  
response: String (Single)



prompt: Recommended lifestyle changes  
response: String (Single)



prompt: Consultations  
response: String (Single)  
prompt: Other  
response: String (Single)

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# Chapter 9. Tabular List

## *Terminology Service Request (TSR) Mappings*

**Table 9.1. Terminology Versions**

Name	Identifier	Version
SNOMED CT	2.16.840.1.113883.6.96	United States Edition 20180301

**Table 9.2. Terminology References**

System	Code	Display Text <sup>a</sup>	References <sup>b</sup>
SNOMED CT	133936004  Adult (person)	Adult outpatient with an active problem of either diabetes mellitus, type 1 or type 2	1
SNOMED CT	167181009  Measurement of renal clearance of creatinine (procedure)	Precoordinated Expression	2
SNOMED CT	226029000  Exercises (regime/therapy)	Postcoordinated Expression	1
SNOMED CT	271075006  Urine albumin/creatinine ratio measurement (procedure)	Precoordinated Expression	2
SNOMED CT	398166005  Performed (qualifier value)	Precoordinated Expression	3
SNOMED CT	70901006  Creatinine measurement (procedure)	Precoordinated Expression	2
SNOMED CT	TSR-NoCode <sup>c</sup>	None	1
SNOMED CT	[225294001  Identifying goals (procedure)]- ->(363702006  Has focus (attribute))->[243860001  Diabetic monitoring status (finding)]- ->(363714003  Interprets (attribute))->[408591000  Hemoglobin A1c target (observable entity)]	Postcoordinated Expression	1
SNOMED CT	[225294001  Identifying goals (procedure)]- ->(363702006  Has focus (attribute))->[243860001  Diabetic monitoring status (finding)]- ->(363714003  Interprets (attribute))->[787bb747-3d69-4383-b69d-68937ad61f24  Fasting blood glucose target (observable entity)]	Postcoordinated Expression	1

System	Code	Display Text <sup>a</sup>	References <sup>b</sup>
SNOMED CT	[225425006  Self-administration of medication (procedure)] ->(260686004  Method (attribute))->[129445006  Administration - action (qualifier value)] ->(363701004  Direct substance (attribute))->[Rx;1165209 Glucagon Injectable Product]	Postcoordinated Expression	1
SNOMED CT	[225425006  Self-administration of medication (procedure)] ->(260686004  Method (attribute))->[129445006  Administration - action (qualifier value)] ->(363701004  Direct substance (attribute))->[Rx;1165822 Glucose Oral Liquid Product]	Postcoordinated Expression	1
SNOMED CT	[225425006  Self-administration of medication (procedure)] ->(260686004  Method (attribute))->[129445006  Administration - action (qualifier value)] ->(363701004  Direct substance (attribute))->[Rx;1165824 Glucose Pill]	Postcoordinated Expression	1
SNOMED CT	[225425006  Self-administration of medication (procedure)] ->(260686004  Method (attribute))->[129445006  Administration - action (qualifier value)] ->(363701004  Direct substance (attribute))->[Rx;377980 Glucose Oral Gel]	Postcoordinated Expression	1
SNOMED CT	[381be1bc-0c9d-4dc2-aa6f-56183c4123bd  Self-administration of substance (procedure)] -	Postcoordinated Expression	1



System	Code	Display Text <sup>a</sup>	References <sup>b</sup>
	>(260686004  Method (attribute))->[129445006  Administration - action (qualifier value)] ->(363701004   Direct substance (attribute))->[99ca8d24-6e83-4619-863b-1e2378229ff6  Carbohydrate-rich snack (substance)]		
SNOMED CT	[416118004  Administration (procedure)] - >(260686004  Method (attribute))->[129445006  Administration - action (qualifier value)] ->(363701004   Direct substance (attribute))->[126210001   Human insulin product (product)]	Postcoordinated Expression	1
SNOMED CT	[416118004  Administration (procedure)] - >(260686004  Method (attribute))->[129445006  Administration - action (qualifier value)] ->(363701004   Direct substance (attribute))->[312064005  Hypoglycemic agent (product)]	Postcoordinated Expression	1
SNOMED CT	[416118004  Administration (procedure)] - >(260686004  Method (attribute))->[129445006  Administration - action (qualifier value)] ->(363701004   Direct substance (attribute))->[34012005   Product containing sulfonyleurea (medicinal product)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40eb-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[105529008   Lives alone (finding)]	Postcoordinated Expression	1

System	Code	Display Text <sup>a</sup>	References <sup>b</sup>
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[105726004  Age AND/OR growth finding (finding)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[110483000  Tobacco user (finding)]		1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[118940003  Disorder of nervous system (disorder)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[129839007  At risk for falls (finding)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[161898004  Falls (finding)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[219006  Current drinker of alcohol (finding)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus	Postcoordinated Expression	1

System	Code	Display Text <sup>a</sup>	References <sup>b</sup>
	(attribute))->[271062006  Fasting blood glucose measurement (procedure)]		
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[306741005  Poor manual dexterity (finding)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[317006  Reactive hypoglycemia (disorder)]	Recent hypoglycemic episode	2
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[32911000  Homeless (finding)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[36823005  Normal diet (finding)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[370143000  Major depressive disorder (disorder)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[371405004  Disorder of eye proper (disorder)]	Postcoordinated Expression	1

System	Code	Display Text <sup>a</sup>	References <sup>b</sup>
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[386806002   Impaired cognition (finding)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[413307004  Mental health problem (finding)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[422650009   Social isolation (finding)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[43396009   Hemoglobin A1c measurement (procedure)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[44054006   Diabetes mellitus type 2 (disorder)]	Type II Diabetes	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] - >(363702006  Has focus (attribute))->[46635009   Diabetes mellitus type 1 (disorder)]	Type I Diabetes	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation proce-	Postcoordinated Expression	1

System	Code	Display Text <sup>a</sup>	References <sup>b</sup>
	dure (procedure)] - >(363702006  Has focus (attribute))->[49601007   Disorder of cardiovascular system (disorder)]		
SNOMED CT	[a997cc03-3e99-40e- b-833a-6374c7750a3a  Observation proce- dure (procedure)] - >(363702006  Has focus (attribute))->[52448006   Dementia (disorder)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e- b-833a-6374c7750a3a  Observation proce- dure (procedure)] - >(363702006  Has focus (attribute))->[66214007   Substance abuse (disor- der)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e- b-833a-6374c7750a3a  Observation proce- dure (procedure)] - >(363702006  Has focus (attribute))->[706875005  Insufficient food supply (finding)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e- b-833a-6374c7750a3a  Observation proce- dure (procedure)] - >(363702006  Has focus (attribute))->[709044004  Chronic kidney disease (disorder)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e- b-833a-6374c7750a3a  Observation proce- dure (procedure)] - >(363702006  Has focus (attribute))->[719732004  Able to recognize own symptoms (finding)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e- b-833a-6374c7750a3a  Observation proce- dure (procedure)] - >(363702006  Has focus	Postcoordinated Expression	1

System	Code	Display Text <sup>a</sup>	References <sup>b</sup>
	(attribute))>[7200002  Alcoholism (disorder)]		
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] ->(363702006  Has focus (attribute))>[729d3508-98ba-4a1d-8334-9e024a0a760e  Prognosis of life expectancy (finding)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)] ->(363702006  Has focus (attribute))>[b91c7da2-cb27-42e5-8ae9-3b7dacecb7f  At risk for hypoglycemia (disorder)]	At risk for hypoglycemia without recent episode	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)]- ->(363702006  Has focus (attribute))>[247808006  Anxiety about body function or health (finding)]- ->(363714003  Interprets (attribute))>[405096004  Diabetes self-management behavior (observable entity)]	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)]- ->(363702006  Has focus (attribute))>[317006  Reactive hypoglycemia (disorder)]- ->(363714003  Interprets (attribute))>[1b7c2726-74d4-48e7-a5b6-be5992196203  Frequency of self-managed hypoglycemia attack (observable entity)];	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)]- -	Postcoordinated Expression	1

System	Code	Display Text <sup>a</sup>	References <sup>b</sup>
	>(363702006  Has focus (attribute))->[401082004  Hypoglycemic attack requiring third party assistance (finding)]- - >(363714003  Interprets (attribute))->[06cf6868-d29b-4586-9e30-fabe9594642e  Frequency of bystander assisted hypoglycemia attack (observable entity)];		
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)]- - >(363702006  Has focus (attribute))->[401082004  Hypoglycemic attack requiring third party assistance (finding)]- - >(363714003  Interprets (attribute))->[712660009  Frequency of hospital-treated hypoglycemia attack (observable entity)];	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)]- - >(363702006  Has focus (attribute))->[401082004  Hypoglycemic attack requiring third party assistance (finding)]- - >(363714003  Interprets (attribute))->acd5c50a-e40a-47cd-bf34-d02bd-b9f0342  Frequency of emergency department treated hypoglycemia attack (observable entity)];	Postcoordinated Expression	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)]- - >(363702006  Has focus (attribute))->[58729003  Disorder of capillaries (disorder)]- - >(246112005  Severity (at-	Advanced (renal insufficiency, proliferative retinopathy/prior laser treatment; peripheral neuropathy with insensate extremities, and/or autonomic neuropathy)	1

System	Code	Display Text <sup>a</sup>	References <sup>b</sup>
	tribute))>[24484000  Severe (severity modifier) (qualifier value)];		
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)]- ->(363702006  Has focus (attribute))>[58729003  Disorder of capillaries (disorder)]- ->(246112005  Severity (attribute))>[255604002  Mild (qualifier value)];	Mild (microalbuminuria, background retinopathy, and/or mild nephropathy)	1
SNOMED CT	[a997cc03-3e99-40e-b-833a-6374c7750a3a  Observation procedure (procedure)]- ->(363702006  Has focus (attribute))>[58729003  Disorder of capillaries (disorder)]- ->(246112005  Severity (attribute))>[6736007  Moderate (severity modifier) (qualifier value)];	Moderate (persistent, fixed proteinuria; pre-proliferative retinopathy; and/or peripheral neuropathy with sensory loss)	1

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

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

<sup>c</sup>TSR-NoCode is a placeholder indicating a code was requested, but was not provided.



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# Chapter 10. Behavior Symbols

**Table 10.1. 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 10.2. 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 10.3. 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 10.4. 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 10.5. 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 10.6. 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 10.7. Read Only Behavior**

Sym- bol	Name	Definition
☆	true	For a particular action or action group, specifies whether the elements are read only.

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# 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] *Endocrinology: Hypoglycemia Clinical Content White Paper*

[CSD] *Endocrinology: Hypoglycemia Documentation Template Conceptual Structure Document*

[KVRpt] *Endocrinology: Hypoglycemia Documentation Template KNART Validation Report*

## Supporting Evidence

[ADA, 2017] *American Diabetes Association. Diabetes Care. Standards of medical care in diabetes-2017* 2017;40(suppl 1):S1-S135 (link [[http://care.diabetesjournals.org/content/diacare/suppl/2016/12/15/40.Supplement\\_1.D-C1/DC\\_40\\_S1\\_final.pdf](http://care.diabetesjournals.org/content/diacare/suppl/2016/12/15/40.Supplement_1.D-C1/DC_40_S1_final.pdf)])

[O'Neil 2015] *O'Neil G. V1-High Risk for Hypoglycemia. June 4, 2015 VISN 1 hypoglycemia reminder PowerPoint (Linda Wedemeyer, MD, email communication, July 10, 2017)* (link [[V1\\_HIGH RISK FOR HYPOGLYCEMIA.PowerPoint.ppt.](#)])

[Sequist 2013] *Sequist ER, Anderson J, Childs B, et al. Hypoglycemia and diabetes: a report of a workgroup of the American Diabetes Association and the Endocrine Society. Diabetes Care. 2013;36(5):1384-1395* (link [<https://doi.org/10.2337/dc12-2480>])

[NLM 2015a] *U.S. National Library of Medicine. GLIPIZIDE- glipizide tablet (Actavis Pharma, Inc.). DailyMed Website. Revised June 2015* (link [<https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=ad55dfd7-ffb5-478a-aa84-1009fa921e22>])

[NLM 2017a] *U.S. National Library of Medicine. GLUCAGON- glucagon [Eli Lilly and Company]. DailyMed Website. Revised May 2017* (link [<https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=f143db10-e889-41c3-84ed-603a0ab02f61>])

[NLM 2015b] *U.S. National Library of Medicine. LANTUS- insulin glargine injection, solution, LANTUS SOLOSTAR- insulin glargine injection, solution [sanofi-aventis U.S. LLC]. DailyMed Website Revised August 2015* (link [<https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=d5e07a0c-7e14-4756-9152-9fea485d654a>])

[NLM 2015c] *U.S. National Library of Medicine. LEVEMIR- insulin detemir injection, solution [Novo Nordisk]. DailyMed Website Revised February 2015* (link [<https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=d38d65c1-25bf-401d-9c7e-a2c3222da8af>])

[NLM 2017b] *U.S. National Library of Medicine. NOVOLOG- insulin aspart injection, solution [Novo Nordisk]. DailyMed Website. Revised March 2017* (link [<https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=3a1e73a2-3009-40d0-876c-b4cb2be56fc5>])

[VA 5.0-2017] *U.S. Department of Veterans Affairs and U.S. Department of Defense. VA/DoD Clinical Practice Guideline for the Management of Type 2 Diabetes Mellitus in Primary Care, version 5.0—2017. VA/DoD Clinical Practice Guidelines website* (link [<https://www.healthquality.va.gov/guidelines/CD/diabetes/VADoD-DMCPGFinal508.pdf>])