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Informatics Architecture Use Cases

# Unstable Angina with ST-Elevation Myocardial Infarction

Angina 1

## Introduction

1. This use case was created to evaluate the ontology created by the VistA Evolution GUI Research project. It includes common assessments, observations, interventions, and cognitive goals that arise while caring for a patient in this scenario to ensure that the ontology can accommodate these concepts.
2. All clinical data in this use case is synthetic. Data was created to support the flow of this use case and provide examples of clinical observations that are documented throughout the interaction.
3. Clinical decision making in this use case is based, primarily, on VA/DoD Clinical Practice Guidelines for the Management of Ischemic Heart Disease, available at: <http://www.healthquality.va.gov/guidelines/CD/ihd/>
4. Additional clinical resources are listed below in the Reference section.
5. The intent of this use case is to capture actions that commonly occur when a patient presents with unstable angina. Many of the steps in this use case occur concurrently in an emergent case. In similar scenarios, the same actions may occur in slightly different order.
6. Cognitive goals are included in some ‘Actions’ to provide insight on the Provider or healthcare professional’s mental process at that point of the encounter.
7. Hyperlinks present in the Appendix column are included to provide examples of the data fields and values that may be entered by the EHR user during this step of the use case.

Hyperlinks present in the Standards column suggest standardized terminologies that may be used to capture data in this step of the use case.

## Actors

**Patient:** a person receiving or registered to receive medical treatment

**Provider:** Physician, physician assistant (PA), or nurse practitioner (NP). All are skilled health-care professionals trained and licensed to diagnose and treat patients within their defined scope of practice.

**Registration Clerk (Reg. Clerk):** a hospital employee that collects demographic, insurance and “reason for visit” information from a new patient and enters this information in to the Admission/Discharge/Transfer (ADT) system and/or the electronic health record (EHR).

**Triage Nurse (Triage RN):** A licensed nurse that assesses symptoms, health-related complaints, and vital signs to determine the degree of urgency for care.

**Unit Clerk (UC):** a hospital employee that performs administrative duties to facilitate workflow and patient care in the emergency department (ED) or a nursing unit.

**Emergency Department Technician (ED Tech):** a hospital employee that is trained to provide basic tasks such as vital signs and laboratory draws under the supervision of an RN or Provider.

**Registered Nurse (RN):** a licensed healthcare professional that is trained to provide nursing care to patients in inpatient and outpatient settings, within their defined scope of practice.

**Licensed Social Worker (LSW):** a licensed healthcare professional that assists patients to improve their quality of life and social needs, and facilitates care after discharge.

**Interventional Cardiologist**: A board-certified cardiologist that is credentialed to perform percutaneous coronary interventions via cardiac catheterization.

**Nurse’s Aide/Assistant (NA):** a trained healthcare worker that provides assistance with patient care, under the supervision of an RN.

**Clinical Pharmacist** – a licensed healthcare professional that often collaborates with physicians and other healthcare professionals to coordinate pharmaceutical interventions and promote health and disease prevention within their scope of practice.

**Dispensing Pharmacist** – a licensed healthcare professional that dispenses medications, monitors medication parameters and potential drug interactions, and provides information about medications, within their scope of practice.

**Radiology Technician (Rad Tech)** – a licensed radiography professional that performs diagnostic imaging exams on patients to help physicians assess illness and injury.

**Radiologist** - a licensed physician that specializes in diagnosing and treating diseases and injuries by using medical imaging.

**EKG Technician (EKG Tech)** – a cardiology technologist that administers basic electrocardiogram tests to patients. The results are then read by a cardiologist or other licensed physician.

**Respiratory Therapist (RT)** – a licensed healthcare practitioner that provides care and treatment to patients requiring breathing and oxygenation support.

**Charge RN** – a registered nurse that is responsible for the efficient management of a nursing unit or department, including admissions, discharges, and the oversight of all nursing and support staff.

## Description

53-year-old white male presents to the ED with chest pain and is diagnosed as having a ST-elevation myocardial infarction (STEMI)

## Trigger

1. Patient is brought to the ED by their family member
2. Patient is experiencing crushing chest pain (radiating to their jaw and neck), shortness of breath (dyspnea), nausea, and sweating (diaphoresis) after attempting to shovel their front walkway.

## Preconditions

1. Patient has a history of stable angina that is usually relieved by rest, however the above symptoms worsened with rest.
2. Patient has taken one sublingual (SL) nitroglycerin (NTG) tablet, without relief.

## Postconditions

Minimal guarantees:

1. Data fields required to support this clinical workflow will be present in the EHR.
2. Data entered will be stored utilizing the appropriate clinical vocabulary.

Success guarantees:

1. EHR supports patient-centered care, guided by goals set by the patient.
2. Patient receives evidence-based care based on the health concerns that are noted during the outpatient visit.
3. Patient will achieve improved outcomes and satisfaction as a result of care facilitated by EHR functionality.

## Assumptions

1. Emergency Department (ED) can provide assessment and initial treatment of life-threatening conditions.
2. ED utilizes a trained healthcare professional to triage (prioritize the care of patients based on clinical need) patients presenting to the ER.
3. ED utilizes the following triage levels:
   1. Resuscitation – immediate threat to life (i.e. cardiac or respiratory arrest, major trauma, shock, etc.)
   2. Emergent – potential threat to life (i.e. chest pain with cardiac suspicion, severe respiratory distress, decreased level of consciousness (LOC), etc.)
   3. Urgent – condition with significant distress (i.e. mild to moderate respiratory distress, head injury without decrease in LOC but with vomiting, etc.)
   4. Less urgent – conditions with mild to moderate discomfort (i.e. head injury –alert without vomiting, depression without suicidal attempt)
   5. Non-urgent – conditions are minor and treatment can be delayed (i.e. skin lacerations, sore throat, etc.)
4. All RNs, PAs, NPs, and physicians are certified in Advance Cardiac Life Support (ACLS).
5. Hospital is a Level 1 trauma center that is equipped to handle patients who present with any and all levels of medical severity.
6. Hospital has a full service Cardiac Catheterization Laboratory that has an Accreditation for Cardiovascular Excellence (ACE) and is credentialed to provide percutaneous cardiac interventions (PCI), including the placement of cardiac stents.
7. Hospital has an Interventional Cardiologist on call, who is present in the hospital and available to do an emergent PCI.
8. The Cardiac Catheterization unit has a room and staff available to support an emergent PCI case.
9. EHR is able to send notifications to healthcare providers when a task has been added to their work list (i.e. Radiology Technician receives notification when an X-ray has been added to his/her work list).
10. EHR is integrated with Picture Archiving Communication System (PACS).
11. EHR has computerized physician order entry (CPOE) functionality.
12. Medications ordered via CPOE system automatically populate the electronic Medication Administration Record (eMAR).
    1. Status of medication administration is documented on the eMAR (i.e. ‘G’ for Given, ‘R’ for Refused by Patient, etc.), along with the healthcare professional’s electronic signature and any pertinent information (i.e. heart rate when administering a beta-blocker, or the reason for patient refusal when entering ‘R’ for Refused by Patient)
13. Facility uses Bar Code Medication Administration (BCMA) system to validate administration of medication to all ED and inpatients.
14. BCMA system is integrated with the EHR.
15. EHR can manage the transition from Triage to Provider (e.g., move from one work list to another), ED to inpatient, etc.
16. EHR can generate referral request as entered by Provider.
17. Standard vocabularies utilized by the organization include: ICD10 for diagnosis, RxNorm for medications, SNOMED-CT for clinical assessments, care that is provided and lab results, and LOINC for laboratory tests.

## Normal Flow

| **Step** | **Component** | **Narrative** |
| --- | --- | --- |
| 1. | **Action** | Patient’s family member (wife) pulls up to ED entrance, runs in to waiting area and calls for help |
| Actors | Patient’s family member  Patient  Triage RN  ED Tech |
| Action breakdown | ED Tech and Triage RN run to the car (bringing a stretcher), assist patient on to stretcher and wheel the patient in to the Triage area. |
| 2. | Action: | Triage RN completes a brief assessment to determine the patient’s condition and the urgency of required care. |
| *Cognitive Goal:* | *Rapid assessment of patient condition.* |
| Actors | Patient  Triage RN  ED Tech  Family member |
| Action breakdown | Chief Complaint: Crushing chest pain (8 out of 10), unrelieved by rest and 1 sub-lingual nitroglycerin (SL-NTG) tablet.  PMH: Stable angina, dyslipidemia, hypertension (HTN)  Allergies: NKDA  Current medications:   1. SL-NTG as needed. One taken 10 minutes ago. 2. Lovastatin 40 mg once daily – taken last night 3. HCTZ 12.5 mg daily – taken this morning 4. Lisinopril 10 mg daily – taken this morning 5. High level assessment: 6. LOC: Alert and fully oriented 7. Temp: 99 F 8. BP: 169/98 9. HR: 106 and slightly irregular 10. Cardiac rhythm by ECG monitor: Sinus tachycardia (ST) with rare pre-mature ventricular contractions (PVCs) 11. Resp: 24 and shallow 12. Pulse Oximetry: 94% on room air   Skin: pale and diaphoretic |
| Technology | EHR Data Entry |
| Applicable Standards | SNOMED, LOINC |
| Appendix | Sample Triage Assessment Form |
| 3 | Action | Triage RN determines that patient has a severity index of ‘2’ requiring immediate emergency nursing care. *Note: Steps 2 and 3 often occur concurrently.* |
| *Cognitive Goal* | *Assessment of severity of condition. Is the patient’s condition life threatening?* |
| Actors | Triage RN  Patient  ED Charge RN  ED Physician  ED RN |
| Action breakdown | Triage RN does the following:   1. Moves the patient via stretcher to the ‘Emergent’ section of the ED 2. Notifies the ED charge nurse and ED attending physician of the new ED patient and their condition. 3. Flags the patient as requiring Emergent care by an RN in the HER 4. Provides transition of care report to the ED RN that will be caring for the patient |
| Technology | EHR   1. Status entry 2. Data visualization for report |
| Appendix | Refer to  [Emergency Severity Index Triage Tool for EDs](http://www.ahrq.gov/professionals/systems/hospital/esi/esi1.html)  Sidebar B [Initial Evaluation of Ischemic Heart Disease/ VHA Clinical Guidelines](http://www.healthquality.va.gov/guidelines/CD/ihd/ihd_poc_combined.pdf) |
| 4 | Action | ED RN initiates standing orders for emergency interventions that are indicated in the management of ischemic heart disease. |
|  | *Cognitive Goal:* | *Rapid assessment of patient condition.* |
|  | Actors | ED RN  ED Tech  Patient |
|  | Action Breakdown | ED RN does the following (unless noted as being delegated to the ED Tech):   1. Places the patient on a cardiac monitor (patient is still in ST with rare PVCs) 2. Obtains updated set of vital signs (BP: 158/90, HR: 102, RR: 22) 3. Places the patient on 2L of oxygen via nasal cannula (NC) 4. Evaluates chest pain (still 8 out of 10, crushing, radiating to jaw) 5. Obtains 12 lead electrocardiogram (ECG)    1. ST-elevation is noted on the ECG    2. ECG interpretation **(by machine):** Anterior wall MI       * 1. ED Provider is notified 6. Starts a peripheral intravenous (IV) line *– performed by EDT* 7. Sends blood sample for Chem 7, CBC, cardiac enzymes (troponin, CK, and CK-MB), Lipid profile, PT/PTT *– orders for labs entered by RN, blood drawn and sent by EDT* 8. Administers medications    1. 325 mg chewable aspirin       1. Highlights the medication in the eMAR, scans the medication, next scans the patient, then administers the medication after receiving BCMA verification of appropriate administration    2. 2 mg Morphine Sulfate IV       1. Follows process noted above for aspirin administration. Enters pain level of 8 out of 10 when prompted by BCMA system since administration of a pain medication requires documentation of the patient’s pain level.    3. 1 tablet of .4 mg SL-NTG (Note: this is the second dose that the patient has received)       1. Follows process noted above for aspirin administration. Enters BP: 158/90, when prompted by BCMA system since administration of a SL-NTG should be held if SBP < 100. 9. Orders Chest X-ray (CXR)- PA and Lateral views   *Note: Each of these interventions is ‘ordered’ by activating the “Standard ED Order Set for Chest Pain.” The ED RN enters the orders as verbal orders, which are then “signed off” by the Provider.*  *Note: RN specifies ‘Nurse draw’ when entering order for lab work. EHR integrates with department printer, which prints labels for blood tubes. If the RN had specified ‘Lab draw’ the blood draw would have been added to a Laboratory Technician’s work list.* |
|  | Technology | EHR   1. Biomedical device integration to record VS and pulse oximetry 2. Data entry of care performed 3. Activation of standing order set for chest pain via CPOE by RN 4. Documents medications that were administered in the Medication Administration Record (MAR) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix | Refer to  [Standard ED Order Set for Chest Pain](http://www.methodistmd.org/dotAsset/5f69e994-056b-445f-8eda-df8b529cbfb8.pdf)  [MAR Sample](http://pharmacyprime.ie/PDF/MARS_CHART_EXAMPLE.PDF)  [VA Clinical Practice Guidelines for the Management of Ischemic Heart Disease](http://www.healthquality.va.gov/guidelines/CD/ihd/ihd_sum_combined.pdf) |
| 5 | Action | Provider receives notification that a verbal order has been placed in his/her name |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider |
|  | Action Breakdown | Provider opens notification and views the task listed in their work queue   1. Provider opens patient record in EHR and views data entered to date 2. Provider enters ED room to assess patient (assessment results are documented in Step 13) |
|  | Technology | EHR   1. Notification system 2. Data visualization |
|  | Standard |  |
|  | Appendix |  |
| 6 | Action | Registration clerk enters insurance and demographic information in to the EHR system via tablet as verified by the patient’s wife. |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Registration Clerk  Family member |
|  | Action Breakdown | Registration Clerk enters the following information in to the system:   1. Demographic information 2. Primary and Secondary Insurance information: Tricare, member #: xxx-xx, etc. 3. Next of Kin contact information 4. Religious preference |
|  | Technology | EHR Registration System   1. Data entry |
|  | Standard | 1. [Address](http://pe.usps.gov/cpim/ftp/pubs/Pub28/pub28.pdf) 2. [Sex](http://phinvads.cdc.gov/vads/ViewValueSet.action?oid=2.16.840.1.114222.4.11.1038) 3. [Ethnicity](http://www.whitehouse.gov/omb/fedreg_1997standards) 4. [Race](http://www.cdc.gov/minorityhealth/populations/REMP/definitions.html) |
|  | Appendix | [Hospital Registration Form](http://www.saintpetershcs.com/uploadedFiles/preadmission%202010.pdf) |
| 7 | Action | ED RN evaluates status of chest pain and vital signs |
|  | *Cognitive Goal:* | *Evaluate effectiveness of interventions and need for escalation of therapy* |
|  | Actor(s) | ED RN  Patient |
|  | Action Breakdown | 1. Patient reports pain is a 5 out of 10 2. VS: BP 150/90, HR 95, RR 20, Pulse Ox: 98% on 2LNC 3. ED RN administers 1 tablet of .4 mg SL-NTG *(Note: this is the third dose that the patient has received. Standing orders cover up to 3 administrations of SL-NTG. BCMA is used to record this administration.)* |
|  | Technology | EHR   1. Biomedical device integration to record VS and pulse oximetry 2. Data entry of care performedDocuments medications that were administered in the electronic Medication Administration Record (eMAR) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |
| 8 | Action | Radiology Technician (Rad Tech) receives notification that a diagnostic X-ray for an Emergent ED patient has been added to his/her work list |
|  | *Cognitive Goal:* | *Management of work queue. Ensure the proper diagnostic test is performed on the proper patient* |
|  | Actor(s) | Rad Tech  Patient |
|  | Action Breakdown | Rad Tech receives notification that a task has been added to his/her work list for an Emergent ED patient.   1. Rad Tech checks work list in EHR, completes the procedure as ordered and documents completion. 2. Rad Tech flags the CXR as ‘ready for interpretation’ by Radiologist |
|  | Technology | EHR   1. Integration with Notification system 2. Data entry 3. Status entry |
|  | Standard | [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix |  |
| 9 | Action | Radiologist receives notification that a CXR is ready for interpretation for an Emergent ED patient |
|  | *Cognitive Goal*: | *Accurate evaluation of CXR (taking reason for CXR and old films in to consideration)* |
|  | Actor(s) | Radiologist |
|  | Action Breakdown | Radiologist receives notification that a chest film is ready for interpretation.   1. Radiologist checks work list in EHR, views the indicated CXR and enters the CXR results and interpretation. 2. Radiologist flags the CXR as ‘Resulted’ |
|  | Technology | EHR integration with PACS and Notification system   1. Image visualization 2. Data entry 3. Status entry |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix | [CXR Result Format](http://radreport.org/template/0000102) |
| 10 | Action | Provider receives notification that the CXR results are available |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider |
|  | Action Breakdown | Provider receives notification that a CXR ordered in their name has been ‘resulted’.   1. Provider pulls up results via hospital issued cellphone. 2. Provider utilizes EHR to view chest film to compare against previous images (if available). |
|  | Technology | EHR integration with PACS and Notification system   1. Image visualization 2. Data visualization |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix | [CXR Result Format](http://radreport.org/template/0000102) |
| 11 | Action | Registration clerk (Reg. Clerk) obtains Advance Directive and Authorization for Disclosure of Personal Health Information (PHI) from patient |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Reg. Clerk  Patient |
|  | Action Breakdown | Reg. Clerk provides tablet with Advance Directive and Authorization for Disclosure of PHI information of forms.   1. Patient completes Advance Directive form 2. Patient waives Authorization for Disclosure of PHI at this time. |
|  | Technology | EHR (integration with hand held tablets) |
|  | Standard |  |
|  | Appendix | [Advance Directives Form](http://www.saintpetershcs.com/uploadedFiles/Advancedirective.pdf)  [Authorization for Disclosure of Protected Health Information](http://www.saintpetershcs.com/uploadedFiles/Policy%20768-7%20-%20Attachment%20-%20Authorization%20-%20For%20Release%20of%20Health%20Information%20REVISED%2003-25-10.pdf) |
| 12 | Action | ED RN receives notification that diagnostic results have been returned for this patient |
|  | *Cognitive Goal:* | *Ensure results are not life threatening or will affect indicated treatment. Evaluate initial of cardiac enzymes for ischemic indications.* |
|  | Actor(s) | ED RN |
|  | Action Breakdown | ED RN receives alert that lab and CXR results have been returned. He/she accesses lab results in the EHR. Relevant lab values include:   1. Troponin: 0.1 mcg/ml 2. CK: 150 ng/ml 3. CK-MB: 3 ng/ml 4. K+: 4.1 5. Hgb: 15 g/dl 6. Hct: 45% 7. PT: 12 seconds 8. PTT: 63 seconds 9. Cholesterol, total: 180 10. HDL: 50 mg/dl 11. LDL: 170 12. Triglycerides: 190 13. CXR: Normal. No mediastinal widening, valve disease, or CHF |
|  | Technology | EHR (Visualization of lab and diagnostic reports) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix |  |
| 13 | Action | Provider assesses patient |
|  | *Cognitive Goal:* | *Expedite History and Physical. Formulate differential diagnosis (i.e. Acute Coronary Syndrome vs. STEMI). Determine if patient is a candidate for emergency reperfusion.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | 1. Confirms past medical history (PMH) and enters active conditions to the Problem List (Stable Angina, HTN, Dyslipidemia) 2. Confirms allergies: NKDA 3. Confirms current medications:    1. Lovastatin 40 mg once daily – taken last night    2. HCTZ 12.5 mg daily – taken this morning    3. Lisinopril 10 mg daily – taken this morning 4. Smoking history: No tobacco use 5. Completes physical assessment    1. Neuro: Alert and fully oriented    2. CV: Chest pressure 5 out of 10 after 3 SL-NTG tablets, S1S2, No murmurs or gallop    3. Resp: 20 and slightly shallow. Lungs clear    4. GI: Abdomen soft, flat with bowel sounds in all quadrants.    5. GU: Verbalizes no problems with voiding    6. Skin: Slightly pale. Diaphoretic. Warm and intact.    7. Psych: Calm and cooperative with wife present |
|  | Technology | EHR   1. Data entry to Problem List, Allergies and Current Medication 2. Visualization of lab and diagnostic reports 3. Data entry of assessment |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) 3. [LOINC](http://search.loinc.org/search.zul?query=BMI) 4. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix | [Adult Health History](http://georgetownmedical.com/util/documents/hx-physical-form.pdf)  [Head to Toe Physical Assessment Components](http://www.bing.com/images/search?q=physical+assessment+form&id=93FC06872326E1C4EFD077EA45F90F9AD366E450&FORM=IQFRBA#view=detail&id=4191BD83AAE82EDC8CB7989873FC8912998DE1B1&selectedIndex=26) |
| 14 | Action | Provider discusses clinical findings and treatment options with patient |
|  | *Cognitive Goal:* | *Engage and educate patient. Assess patient understanding to facilitate informed decisions.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | 1. New diagnosis confirmed by ECG: Anterior Wall Myocardial Infarction    1. This diagnosis is added to the Problem List 2. Since chest pain started 45 minutes ago, it is too early to see any elevation in cardiac enzymes (Troponin, CK-MB) 3. Recommend emergent revascularization of coronary artery with cardiac catheterization and possible balloon inflation and/or stent placement based on clinical studies showing the best outcomes for this scenario. A referral to an Interventional Cardiologist can be placed immediately.    1. Alternative treatment is intravenous thrombolytic therapy    2. Pros and cons of each treatment discussed with patient    3. Provider can access Clinical Care Guidelines, American Cardiology Recommendations, and Risk Evaluation Following a MI resources via hyperlink or Infobutton, as needed 4. Continued chest pain after administration of 3 SL-NTG tablets and elevated blood pressure indicate need for intravenous nitroglycerin (IV NTG) 5. Beta-blocker medication is indicated for ischemic heart disease |
|  | Technology | EHR (Data entry to Problem List) |
|  | Standard |  |
|  | Appendix |  |
| 15 | Action | Patient conveys their Goal, in relation to their new diagnosis |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Patient  Provider |
|  | Action Breakdown | Patient states that they, “Want to do whatever is necessary to maintain optimal heart function so that they can live a full life. That includes having a catheter placed in my heart.” |
|  | Technology | EHR (Data entry of Patient Goal) |
|  | Standard |  |
|  | Appendix |  |
| 16 | Action | Patient conveys their treatment preference and agrees to a plan of care |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Care Plan Activities / Targeted Completion:   1. Signs verbal order that ED RN entered to activate ED standing orders for patients presenting with chest pain / Immediately 2. Emergency consultation with Interventional Cardiologist *– initiated by Provider* / Within 1 hour 3. Probable emergent cardiac catheterization (if confirmed by Interventional Cardiologist)    1. Nothing to eat or drink in preparation for procedure / Immediately 4. Start IV NTG to manage chest pain / Immediately 5. Start Beta-blocker (Metoprolol) / Immediately |
|  | Technology | EHR   1. Data entry of Care Plan |
|  | Standard |  |
|  | Appendix |  |
| 17 | Action | Provider utilizes CPOE to enter orders for agreed upon care |
|  | *Cognitive Goal:* | *Determine appropriate orders for this patient with continued chest pain and a potential pending PCI.* |
|  | Actor(s) | Provider |
|  | Action Breakdown | Provider enters the following orders:   1. Interventional Cardiology Consult STAT    1. Reason: Acute Anterior Wall MI. Evaluate for Percutaneous Coronary Intervention (PCI) 2. NPO (Nothing by mouth) for possible cardiac catheterization with PCI 3. IV NTG. Start at 10 mcg/min – increase by 10 mcg/min every 5 minutes until pain free or SBP < 100. Maximum dose 200 mcg/min. 4. Metoprolol 5 mg IV x 3 doses, at 2 minute intervals if HR >50 and SBP > 100. 5. Give Metoprolol 50 mg p.o. 15 minutes after last dose of IV Metroprolol |
|  | Technology | EHR   1. CPOE |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |
| 18 | Action | Provider pages Interventional Cardiologist (IC) |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider  Int. Cardiologist |
|  | Action Breakdown | Provider pages Interventional Cardiologist on call to notify of STAT consult for John Doe, PatientID 233433. Int. Cardiologist accepts consult and will come to the ED to evaluate the patient immediately. |
|  | Technology | N/A |
|  | Standard |  |
|  | Appendix |  |
| 19 | Action | ED RN receives notification of new order for PatientID 233433. |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | ED RN |
|  | Action Breakdown | ED RN receives notification that the provider has ordered IV NTG for the patient.   1. Metoprolol 5 mg IV and IV NTG bag is obtained from the medication Pyxis. IV tubing obtained from the supply cart. |
|  | Technology | EHR integration with Notification system |
|  | Standard |  |
|  | Appendix |  |
| 20 | Action | ED RN administers cardiac medications, as ordered |
|  | *Cognitive Goal:* | *Evaluate chest pain and how BP has been affected by NTG. Safe administration of additional meds to reduce cardiac ischemia.* |
|  | Actor(s) | ED RN  Patient |
|  | Action Breakdown | 1. ED RN evaluates vital signs and chest pain 2. BP: VS: BP 150/88, HR 90, RR 20, Pulse Ox: 98% on 2LNC 3. Patient reports chest pain 4 out of 10, in chest only 4. ED RN opens eMAR for the patient and views the IV NTG order 5. Scans IV NTG bag and then patient’s wristband 6. Enters BP 150/88 when prompted to evaluate patient’s BP. 7. Enters ‘I’ for Infusing in eMAR and rate of 10 mcg/min 8. Primes IV tubing, sets IV pump to infuse 10 mcg/min, and starts infusion 9. ED RN views Metoprolol 5 mg IV (x 3 doses) order in eMAR 10. Scans Metoprolol 5 mg IV ampule (ED RN receives pop up notification to check heart rate prior to administration of Metoprolol. If HR < 50 the medication should be held) 11. Scans patient’s wristband 12. Enters ‘G’ for Given in BCMA and HR 90 13. (Note: ED RN would go on to administer remaining IV and PO doses of Metoprolol as ordered, if well tolerated by patient) |
|  | Technology | EHR   1. Biomedical device integration to record VS and pulse oximetry 2. Data entry of care performed 3. Integration with BCMA System |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |
| 21 | Action | Interventional Cardiologist arrives in ED and enters PatientID in to EHR |
|  | *Cognitive Goal:* | *Form differential diagnosis from information gathered. Identify additional questions or clarifications that need to be answered.* |
|  | Actor(s) | Int. Cardiologist |
|  | Action Breakdown | Interventional Cardiologist views PMH, current medication list, allergies, chief complaint, diagnosis, provider and nursing notes, and diagnostic results (including labs, ECG, and CXR) |
|  | Technology | EHR   1. Query 2. Data visualization |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) 3. [LOINC](http://search.loinc.org/search.zul?query=BMI) 4. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |
| 22 | Action | Interventional Cardiologist enters patient room to evaluate for emergent catheterization |
|  | *Cognitive Goal:* | *Diagnose patient. Determine eligibility for reperfusion therapy. Assess patient understanding of the recommended intervention to obtain informed consent.* |
|  | Actor(s) | Int. Cardiologist  Patient |
|  | Action Breakdown | Interventional Cardiologist:   1. Assesses patient, reviews health history and new diagnosis of acute myocardial infarction. 2. Evaluates for contraindications of reperfusion therapy 3. Confirms recommendation of immediate cardiac catheterization with possible intervention 4. Confirms that the patient has only had a small glass of water earlier that morning to take meds. Last solid food was the evening before. 5. Explains the procedure, along with risks and benefits. |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |
| 23 | Action | Patient provides consent for procedure recommended by the Int. Cardiologist |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Patient  Int. Cardiologist |
|  | Action Breakdown | Patient signs informed consent for Percutaneous Angiogram, Diagnostic Cardiac Catheterization, and possible Percutaneous Coronary Intervention with possible balloon angioplasty and possible stent placement. |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |
| 24 | Action | Interventional Cardiologist enters pre-catheterization orders |
|  | *Cognitive Goal:* | *Determine indicated pre-cath orders for this patient.* |
|  | Actor(s) | Int. Cardiologist |
|  | Action Breakdown | Examples of entered orders:   1. Admit to Cardiac Outpatient Surgery 2. Diagnosis: Acute Anterior Wall Myocardial Infarction 3. Code status: Full 4. Ensure consent for procedure is on chart 5. Prep bilateral femoral sites 6. Start new IV line in left arm    1. Infuse 0.9% Sodium Chloride at 100 cc/hr 7. Pre-op medications:    1. Diphenhydramine 50 mg IV ON CALL    2. Valium 5 mg PO ON CALL |
|  | Technology | EHR   1. CPOE |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix | Refer to:  [Pre-Cardiac Catheterization Orders](http://apps.umchealthsystem.com/forphysicians/medicalorders/Pre-Op%20Cardiac%20Cath.pdf) |
| 25 | Action | ED RN provides transition of care report to the Cath Lab RN that will be caring for the patient |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | ED RN  Cath Lab RN |
|  | Action Breakdown | Report is completed verbally, over the phone. Cath Lab RN enters PatientID in computer, views all documentation entered in ED, along with Pre-Catheterization orders. |
|  | Technology | EHR   1. Query 2. Data visualization |
|  | Standard |  |
|  | Appendix |  |
| 26 | Action | Patient is transferred to ‘Holding’ area of Cath Lab via stretcher |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | ED RN  Patient  Cath Lab RN |
|  | Action Breakdown | Cath Lab RN assumes care of the patient and will complete Pre-Catheterization orders while procedure room is being prepped. |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |

## Data fields required

See appendix references as examples/guides

## Notes and Issues

## References for Clinical Management of Ischemic Heart Disease

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# Patient with STEMI, S/P stent placement is admitted to Telemetry Unit

Angina 2

## Introduction

1. This use case was created to evaluate the ontology created by the VistA Evolution GUI Research project. It includes common assessments, observations, interventions, and cognitive goals that arise while caring for a patient in this scenario to ensure that the ontology can accommodate these concepts.
2. All clinical data in this use case is synthetic. Data was created to support the flow of this use case and provide examples of clinical observations that are documented throughout the interaction.
3. Clinical decision making in this use case is based, primarily, on VA/DoD Clinical Practice Guidelines for the Management of Ischemic Heart Disease, available at: http://www.healthquality.va.gov/guidelines/CD/ihd/
4. Additional clinical resources are listed below in the Reference section.
5. This use case demonstrates actions that commonly occur over the course of a patient’s post-revascularization stay in a Telemetry unit. It is not intended to include every action over the course of their stay. In similar scenarios, the sequence of events/actions may be slightly different.
6. Cognitive goals are included in some ‘Actions’ to provide insight on the Provider or healthcare professional’s mental process at that point of the encounter.
7. Hyperlinks present in the Appendix column are included to provide examples of the data fields and values that may be entered by the EHR user during this step of the use case.
8. Hyperlinks present in the Standards column suggest standardized terminologies that may be used to capture data in this step of the use case.

## Actors

**Patient**: a person receiving or registered to receive medical treatment

**Interventional Cardiologist**: A board-certified cardiologist that is credentialed to perform percutaneous coronary interventions via cardiac catheterization.

**Provider**: Physician, physician assistant (PA), or nurse practitioner (NP). All are skilled health-care professionals trained and licensed to diagnose and treat patients within their defined scope of practice.

**Unit Clerk (UC)**: a hospital employee that performs administrative duties to facilitate workflow and patient care in the emergency department (ED) or a nursing unit.

**Registered Nurse (RN):** a licensed healthcare professional that is trained to provide nursing care to patients in inpatient and outpatient settings, within their defined scope of practice.

**Licensed Social Worker (LSW):** a licensed healthcare professional that assists patients to improve their quality of life and social needs, and facilitates care after discharge.

**Nurse’s Aide/Assistant (NA)**: a trained healthcare worker that provides assistance with patient care, under the supervision of an RN.

**Sonographer** – a skilled technologist that is trained to operate special imaging equipment utilized in diagnostic tests (i.e. ultrasound machine for echocardiograms)

**Patient Transporter** – a hospital employee that assists with the transfer of patients to and from procedures, and throughout the hospital as requested

**Clinical Pharmacist** – a licensed healthcare professional that often collaborates with physicians and other healthcare professionals to coordinate pharmaceutical interventions and promote health and disease prevention within their scope of practice.

**Dispensing Pharmacist** – a licensed healthcare professional that dispenses medications, monitors medication parameters and potential drug interactions, and provides information about medications, within their scope of practice.

**EKG Technician (EKG Tech)** – a cardiology technologist that administers basic electrocardiogram tests to patients. The results are then read by a cardiologist or other licensed physician.

**Charge RN** – a registered nurse that is responsible for the efficient management of a nursing unit or department, including admissions, discharges, and the oversight of all nursing and support staff

## Description

A 53 year old white male status post stent placement via cardiac catheterization for Acute Myocardial Infarction (AMI) is admitted to a Telemetry unit for monitoring

## Trigger

Patient has been cleared to leave the post-interventional cardiology recovery room (ICRR) and be admitted to the facility’s Telemetry Unit for monitoring.

## Preconditions

1. Patient presented to the ED with unstable angina, was diagnosed with an Anterior Wall Myocardial Infarction, and underwent percutaneous coronary intervention (PCI) and stent placement within 60 minutes of presentation and 85 min of chest pain onset
2. PCI was successful and the blocked artery is fully patent after the procedure
3. Patient is pain-free after the procedure and there is no further evidence of active MI on post-catheterization ECG
4. Patient received post-catheterization care in the post-interventional cardiology recovery room (ICRR), is over the acute recovery of the procedure, and has been cleared for transfer to the Telemetry Unit by the Interventional Cardiologist.
5. Right femoral site was used for catheterization access
   1. Sheath was pulled in the Cath Lab and femoral site is benign

## Postconditions

Minimal guarantees:

1. Data fields required to support this clinical workflow will be present in the EHR.
2. Data entered will be stored utilizing the appropriate clinical vocabulary.

Success guarantees:

1. EHR supports patient-centered care, guided by goals set by the patient.
2. Patient receives evidence-based care based on the health concerns that are noted during the outpatient visit.
3. Patient will achieve improved outcomes and satisfaction as a result of care facilitated by EHR functionality.

## Assumptions

1. EHR is able to send notifications to healthcare providers when a task has been added to their work list (i.e. Radiology Technician receives notification when an X-ray has been added to his/her work queue).
2. EHR is integrated with Picture Archiving Communication System (PACS).
3. EHR is integrated with information systems in the following departments: Pharmacy, Laboratory, Radiology, Cardiology, Dietary, Rehabilitation
4. EHR has computerized physician order entry (CPOE) functionality
5. Orders entered via CPOE are automatically implemented and assigned to the appropriate work queue (i.e. CBC in a.m. is automatically assigned to the Laboratory work queue)
6. Medications ordered via CPOE system automatically populate the electronic Medication Administration Record (eMAR).
7. EHR system allows the Provider to select existing active medication to pre-populate discharge medication orders. Provider can then de-select any carried over medication, if desired.
8. Orders for discharge medications entered via CPOE are sent directly to the outpatient pharmacy that is designated by the patient.
9. Facility uses Bar Code Medication Administration (BCMA) system to document administration of medication to all ED and inpatients.
10. BCMA system is integrated with the EHR.
11. EHR A/D/T system allows user to tentatively hold a bed, pending formal orders from Provider (e.g. ICU or Telemetry bed post-PCI while patient is recovering from the procedure)
12. EHR can manage the transition of tasks (e.g., move tasks from one work queue to another)
13. PatientID is a unique ID assigned to a specific patient for each unique hospital stay
14. Standard vocabularies utilized by the organization include: ICD10 for Diagnosis, RxNorm for medications, SNOMED-CT for clinical assessments, care that is provided and lab results, and LOINC for laboratory tests.

## Normal Flow

| **Step** | | **Component** | **Narrative** |
| --- | --- | --- | --- |
| 1 | Action | Interventional Cardiologist admits patient to Telemetry Unit for monitoring |
|  | *Cognitive Goal:* | *Determine indicated care and orders for this unique patient post-PCI.* |
|  | Actor(s) | Int. Cardiologist |
|  | Action Breakdown | Utilizes Standard Cardiology Admission Order Set via CPOE and adds additional orders, as needed. For example:   1. Admit to Telemetry Unit 2. Dx: Anterior Wall Myocardial Infarction. S/P PCI and stent placement 3. Allergies: NKDA 4. History of Tobacco use: No 5. Condition: Stable 6. Code Status: Full code 7. VS: Per unit protocol 8. Diet: Low fat, Low cholesterol, Low salt 9. Heparin Lock IV. 10. Activity: BR x 4 hours, then advance as tolerated 11. Labs: CPK, CK-MB, Troponin q 6 hrs x 3 12. CBC/diff, BMP, PT/PTT in a.m. 13. EKG and Echocardiogram in a.m. 14. Cardiac education 15. Medications:     1. HCTZ 12.5 mg po daily – start in a.m.     2. Lisinopril 10 mg po daily – start in a.m.     3. Metoprolol 100 mg po twice daily – start this p.m.     4. ASA 325 mg po daily – start in a.m.     5. Lovastatin 40 mg once daily – start this p.m.     6. Clopidogrel 75 mg po daily – start in a.m.     7. Flush Heparin Lock with 1 cc 0.9% Normal Saline solution every 8 hours. |
|  | Technology | EHR   1. CPOE |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) 4. [ICD10](http://www.icd10data.com/) |
|  | Appendix | Refer to  [Cardiac Admission Orders](http://www.rwjf.org/content/dam/farm/toolkits/toolkits/2008/rwjf27120) |
| 2 | Action | Interventional Cardiology Recovery Room (ICRR) Unit Clerk enters formal bed request in Admission/Discharge /Transfer (ADT) System |
|  | *Cognitive Goal:* | *Implement physician order for appropriate bed assignment (based on severity of illness driving the intensity of service).* |
|  | Actor(s) | ICRR Unit Clerk |
|  | Action Breakdown | ICRR Unit Clerk views available Telemetry beds and selects appropriate bed for patient, as ordered by physician |
|  | Technology | EHR   1. Integration with ADT system |
|  | Standard |  |
|  | Appendix |  |
| 3 | Action | Telemetry Charge RN receives notification that a new patient is being admitted to the Telemetry unit |
|  | *Cognitive Goal:* | *Evaluate and determine patient acuity so proper nursing assignment is made.* |
|  | Actor(s) | Telemetry Charge RN  Telemetry RN |
|  | Action Breakdown | Telemetry Unit Charge RN receives notification that an admission has been given a bed assignment on his/her unit.   1. Charge RN queries EHR to view ED information, Catheterization Report, ICRR Nursing Notes, and admission orders to assess acuity of patient 2. Charge RN assigns an RN to care for the patient, based on current workload and patient acuity and provides the PatientID so that the Telemetry RN can view relevant information in the patient’s record. 3. Charge RN ‘approves’ admission and flags the bed as ‘available to accept transfer’ |
|  | Technology | EHR   1. Query by PatientID 2. Bed assignment within EHR 3. Data visualization 4. Integration with ADT system |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) 4. [ICD10](http://www.icd10data.com/) |
|  | Appendix |  |
| 4 | Action | ICRR RN calls Telemetry RN assigned to care for ‘John Doe’ and provides verbal report, then transfers patient to Telemetry bed |
|  | *Cognitive Goal:* | *Formulate and ask appropriate questions during report to gather information required to properly care for patient* |
|  | Actor(s) | ICRR RN  Telemetry RN |
|  | Action Breakdown | ICRR RN provides transition of care report.   1. Telemetry RN acknowledges patient admission on EHR bed tracker, validates patient with PatientID, and assigns him/herself as the primary care nurse    1. Views Catheterization Report, ICRR Nursing notes, and Telemetry Admission Orders in patient record 2. ICRR RN transfers patient to Telemetry Unit after report is completed |
|  | Technology | EHR   1. Manage patient assignment through EHR bed tracker 2. Query by PatientID 3. Data visualization |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) 4. [ICD10](http://www.icd10data.com/) |
|  | Appendix | Refer to  [Critical Care Nursing Assessment and Flow Sheet](http://www.cantonmercy.org/uploads/File/pdf/6334_24Hr_Critical_Care.pdf) |
| 5 | Action | Telemetry RN assumes care of patient |
|  | *Cognitive Goal:* | *Evaluate baseline assessment. Determine areas of concern and/or observations requiring additional interventions.* |
|  | Actor(s) | Telemetry RN |
|  | Action Breakdown | Telemetry RN:   1. Attaches telemetry box to patient and ensures monitoring is effective    1. Notes cardiac rhythm: Sinus rhythm without ectopy, HR 84 2. Checks vital signs    1. BP 124/78, HR 84, RR 18, Pulse Oximetry on room air: 98% 3. Checks right femoral catheterization site and pedal pulses:    1. Femoral site clean and dry with band-aid    2. Bilateral femoral, popliteal, dorsalis pedis, posterior tibialis pulses +2, feet warm with good color 4. Performs head to toe assessment. Results documented on Telemetry Nursing Flow Sheet |
|  | Technology | EHR   1. Integration with biomedical devices 2. Data entry |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix | Refer to:  [Telemetry Nursing Flow Sheet](http://www.cantonmercy.org/uploads/File/pdf/6395_Step_Down_Telemetry.pdf) |
| 6 | Action | Cardiac Nurse Practitioner assumes care of patient. Documents formal History of Present Illness (HPI) and performs assessment |
|  | *Cognitive Goal:* | *Perform assessment. Validate existing orders and ensure no additional orders are indicated. Determine relevant information to be included in HPI.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Provider:   1. Queries EHR on PatientID and reviews all documentation and diagnostic results from ED and Cath Lab 2. Interviews patient about Chief Complaint, PMH, etc. 3. Performs head to toe assessment. 4. Creates HPI documentation 5. Enters SOAP note 6. Ensures Cardiac Admission Orders address all indicated care (no additional orders are indicated) |
|  | Technology | EHR   1. Data visualization 2. Data entry |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) 4. [ICD10](http://www.icd10data.com/) |
|  | Appendix | Refer to:  [History of Present Illness Documentation](http://r.search.yahoo.com/_ylt=A0LEViP7.KtUJ74AbQAPxQt.;_ylu=X3oDMTByNW1iMWN2BHNlYwNzcgRwb3MDNwRjb2xvA2JmMQR2dGlkAw--/RV=2/RE=1420585339/RO=10/RU=http%3a%2f%2fwww2.sunysuffolk.edu%2fmccabes%2fH%26P%2520guide%2520for%2520pdarev.doc/RK=0/RS=Z7BjPbb7uLomK15w4NcJV6eKkBc-)  [Head to Toe Physical Assessment Components](http://www.bing.com/images/search?q=physical+assessment+form&id=93FC06872326E1C4EFD077EA45F90F9AD366E450&FORM=IQFRBA#view=detail&id=4191BD83AAE82EDC8CB7989873FC8912998DE1B1&selectedIndex=26)  [SOAP Note Explanation and Example](http://nurseone.ca/~/media/nurseone/page-content/pdf-en/soap_documentation_e.pdf) |
| 7 | Action | Cardiac Nurse Practitioner discusses patient’s condition and the indicated plan of care for the coming days |
|  | *Cognitive Goal:* | *Determine recommended plan of care. Engage and educate patient. Assess patient understanding to facilitate informed decision making.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Provider discusses the following with the patient:   1. Admitting diagnosis: Anterior Wall Myocardial Infarction 2. Procedure performed: PCI with stent placement and resultant clear blood flow in the left anterior descending coronary artery (LAD) 3. Indicated care post myocardial infarction    1. Aspirin and Clopidigrel for blood thinning    2. Beta-blocker and ACE inhibitor to support cardiac function    3. Lipid lowering medication due to PMH and cardiac risk    4. Echocardiogram to evaluate Left Ventricular Function    5. Serial cardiac enzymes to monitor cardiac markers    6. ECG in a.m. to evaluate current cardiac rhythm    7. Advance activity as tolerated, cardiac rehabilitation after discharge    8. Follow low fat, low cholesterol, low sodium diet    9. Cardiac education |
|  | Technology |  |
|  | Standard |  |
|  | Appendix | Refer to:  [VA/DoD Clinical Practice Guidelines for Management of Ischemic Heart Disease](http://www.healthquality.va.gov/guidelines/CD/ihd/ihd_poc_combined.pdf) |
| 8 | Action | Patient verbalizes care preferences and goals |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Patient  Provider |
|  | Action Breakdown | Patient verbalizes that they are “grateful for the excellent care that has been provided and are willing to do anything and everything that is recommended to make a full recovery and reduce future risks.” |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |
| 9 | Action | Together, the Nurse Practitioner and Patient agree upon a plan of care after discussion of recommended plan of care. |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Care Plan Activities/Targeted Initation:   1. Anti-platelet medications, as ordered/ In morning 2. Cardiac medications, as ordered/ In morning 3. Lipid lowering medication, as ordered/ This evening 4. Serial cardiac enzymes/ Immediately 5. ECG and Echocardiogram/ In morning 6. Activity as tolerated/ Immediately 7. Cardiac diet/ Immediately 8. Cardiac education/ Immediately, reinforce prior to discharge |
|  | Technology | EHR   1. Data entry of Care Plan |
|  | Standard |  |
|  | Appendix |  |
| 10 | Action | Dispensing Pharmacist receives notification of new medication orders and dispenses ordered medications |
|  | *Cognitive Goal:* | *Ensure patient safety by evaluating for drug-drug interactions and allergy concerns.* |
|  | Actor(s) | Disp. Pharmacist |
|  | Action Breakdown | Dispensing Pharmacist:   1. Receives notification that new medication orders have been placed and added to their work queue 2. Pharmacist clicks on the notification link and views medication orders, admitting diagnosis, and allergies 3. Ensures that there are no drug-drug interactions or medications ordered that conflict with patient allergies (*this is done via decision support of the pharmacy system)* 4. ‘Dispenses’ medication via Pyxis system for nursing access and administration |
|  | Technology | EHR   1. Pharmacy Information System Suite 2. Visualization of data 3. Visualization of eMAR |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) 3. [ICD10](http://www.icd10data.com/) |
|  | Appendix |  |
| 11 | Action | Telemetry RN performs q 4 hour assessment and enters SOAP note at the end of his/her shift |
|  | *Cognitive Goal:* | *Evaluate patient condition for procedure complications, clinical improvement, and observations that indicate a change in the plan of care.* |
|  | Actor(s) | Telemetry RN  Patient |
|  | Action Breakdown | Telemetry RN:   1. Evaluates and records cardiac rhythm    1. Sinus rhythm without ectopy, HR 78 2. Checks and records vital signs    1. BP 120/74, HR 78, RR 18, Pulse Oximetry on room air: 99% 3. Checks right femoral catheterization site and pedal pulses:    1. Femoral site clean and dry with band-aid    2. Bilateral femoral, popliteal, dorsalis pedis, posterior tibialis pulses +3, feet warm with good color 4. Performs head to toe assessment. Results documented on Telemetry Nursing Flow Sheet 5. Documents input and output 6. Administers Lovastatin 40 mg p.o. by using BCMA system 7. Enters SOAP note at end of shift |
|  | Technology | EHR   1. Integration with biomedical devices 2. Data entry 3. eMAR |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix | Refer to:  [Telemetry Nursing Flow Sheet](http://www.cantonmercy.org/uploads/File/pdf/6395_Step_Down_Telemetry.pdf)  [SOAP Note Explanation and Example](http://nurseone.ca/~/media/nurseone/page-content/pdf-en/soap_documentation_e.pdf) |
| 12 | Action | **Fast forward to the next morning.** Sonographer reviews work queue for the day and completes ordered diagnostic tests. |
|  | *Cognitive Goal:* | *Prioritize and manage work queue. Ensure the proper diagnostic test is performed on the proper patient.* |
|  | Actor(s) | Sonographer |
|  | Action Breakdown | Sonographer checks work queue in EHR and finds that an Echocardiogram is ordered for inpatient “John Doe” PatientID: 323343.   1. Sonographer uses work queue (validating patient via PatientID) and reviews diagnostic order and patient history 2. Sonographer adds task to Patient Transport work queue to bring patient “John Doe” to Ultrasound via wheelchair. |
|  | Technology | EHR   1. Query by PatientID 2. Data visualization 3. Integration with Patient Transport System |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |
| 13 | Action | Patient Transporter receives notification of patient transfer and completes the request |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Patient Transporter  Patient |
|  | Action Breakdown | Patient Transporter receives notification of transfer task added to their work queue.   1. Transporter opens notification, completes the transfer as requested, and flags the transfer as complete |
|  | Technology | EHR   1. Integration with Patient Transport System |
|  | Standard |  |
|  | Appendix |  |
| 14 | Action | Sonographer completes echocardiogram for patient “John Doe” |
|  | *Cognitive Goal:* | *Prioritize and manage work queue. Ensure the proper diagnostic test is performed on the proper patient.* |
|  | Actor(s) | Sonographer |
|  | Action Breakdown | Sonographer checks work queue in EHR and finds that an Echocardiogram is ordered for inpatient “John Doe” PatientID: 323343.   1. Sonographer uses work queue (validating patient via PatientID) and reviews diagnostic order and patient history 2. Sonographer adds task to Patient Transport work queue to bring patient “John Doe” to Ultrasound via wheelchair. |
|  | Technology | EHR   1. Query by PatientID 2. Data visualization 3. Integration with Patient Transport System |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |
| 15 | Action | Cardiologist receives notification of inpatient diagnostic test added to his/her work queue for interpretation |
|  | *Cognitive Goal:* | *Accurate evaluation of Echocardiogram (taking reason for exam and patient history, if needed, in to consideration)* |
|  | Actor(s) | Cardiologist |
|  | Action Breakdown | Cardiologist clicks on link in work queue notification to open inpatient echocardiogram reading for “John Doe”   1. Cardiologist evaluates the reading and enters the interpreted result in the EHR. Result: Normal echocardiogram. No cardiomegaly or effusion. Good valve function. Ejection Fraction: 58% |
|  | Technology | EHR   1. PACs system 2. Data entry |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix |  |
| 16 | Action | Echocardiogram (ECG) Technician views work queue and completes ECGs as ordered |
|  | *Cognitive Goal:* | *Task completion. Flag result for interpretation by Cardiologist.* |
|  | Actor(s) | ECG Tech |
|  | Action Breakdown | ECG Technician completes ECG, downloads reading, and flags the test as “ready for interpretation” by Cardiologist |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |
| 17 | Action | Cardiologist receives notification of diagnostic test added to his/her work queue for interpretation |
|  | *Cognitive Goal:* | *Accurate evaluation of ECG (taking reason for exam and patient history, if necessary, in to consideration)* |
|  | Actor(s) | Cardiologist |
|  | Action Breakdown | Cardiologist clicks on link in work queue notification to open ECG reading for patient “John Doe”   1. Reviews ECG reading and enters the interpreted result in the EHR. Result: SR 76. No ectopy. No hypertrophy. |
|  | Technology | EHR   1. Data entry |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix |  |
| 18 | Action | Cardiac Nurse Practitioner receives notification that diagnostic results are available for her patient, “John Doe” |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider |
|  | Action Breakdown | Provider opens link in notification and views ECG and Echocardiogram results. |
|  | Technology | EHR   1. Data visualization |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix |  |
| 19 | Action | **Fast forward to the next morning.**  Healthcare team discusses patient condition and plan of care during interdisciplinary patient rounds. |
|  | *Cognitive Goal:* | *Evaluation of patient condition and indicated care after discharge. Informed, collaborative decision-making related to the care indicated for this unique patient. This includes patient education and engagement.* |
|  | Actor(s) | Provider  Telemetry RN  Charge RN  Social Worker/ Case Manager  Clinical Pharmacist  Patient |
|  | Action Breakdown | Healthcare team   1. Reviews HPI, PMH, course of treatment, and care plan 2. Reviews most recent physical assessment 3. Utilizes Infobutton, Clinical Care Guidelines and other resources to evaluate indicated discharge care options 4. Formulates a recommended discharge plan that they will discuss with the patient.   Healthcare team enters patient’s room to evaluate condition   1. Determines that the patient’s condition warrants discharge that afternoon    1. Discuss discharge plans and instructions with the patient 2. Clinical Pharmacist (and Provider) review medications indicated for discharge (including drug safety, side effects, dosage titration and interactions), and confirm that the patient should remain on the following medications as ordered (HCTZ, Lisinopril, Metoprolol, ASA, Lovastatin, and Clopidogrel) 3. Discuss need for psychosocial support at home. Patient and healthcare team agree that no additional support is needed 4. Ensure that patient receives all indicated education related to heart disease, heart attack recovery, and post-catheterization recovery 5. Discuss the importance of exercise and cardiac rehabilitation 6. Discuss patient-specific risks    1. Counsel patient on their increased long term mortality risk and the importance of compliance to care regimen 7. Follow up with Cardiologist on a regular basis |
|  | Technology | EHR   1. Data visualization of Problem List, Care Plan, eMAR, Patient Goals |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) 4. [ICD10](http://www.icd10data.com/) |
|  | Appendix |  |
| 20 | Action | Patient verbalizes goal related health condition and discharge |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Patient  Provider  Healthcare Team |
|  | Action Breakdown | Patient verbalizes that they are eager to change their lifestyle, make healthier food choices, get in better shape to manage their heart health, and do whatever else is recommended. |
|  | Technology | EHR   1. Data entry as Patient Goal |
|  | Standard |  |
|  | Appendix |  |
| 21 | Action | Patient agrees to the discharge plan that was presented by their healthcare team |
|  | *Cognitive Goal:* | *Evaluate patient understanding of their discharge plan of care and responsibilities, along with their commitment to execute the plan.* |
|  | Actor(s) | Patient  Provider  Healthcare Team |
|  | Action Breakdown | Care Plan Activities / Targeted Initiation   1. Continue HCTZ, Lisinopril, Metoprolol, ASA, Lovastatin, and Clopidogrel as ordered, after discharge / Immediately 2. Follow up with Cardiologist in 3 days / Make appt. immediately 3. Cardiac education (encourage patient to view ‘Optimizing your Heart Health’ program on Channel 2 of inpatient TV system shown daily at 10 a.m. and 2 p.m., nurse will review/discuss cardiac education packet with patient, provide information about ‘Living with Heart Disease’ free classes offered by the hospital system) / Immediately 4. Begin light exercise (walking on a level surface for 5 minutes, 3 times a day). Add 1 minute to each session, each day until able to complete 10-15 minutes in each session without cardiac symptoms. / Tomorrow 5. Cardiac rehabilitation / Schedule evaluation for 2 weeks after discharge |
|  | Technology | EHR   1. Data entry in Care Plan |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix | Refer to:  [Exercise and Activity after a Heart Attack](http://www.uwhealth.org/healthfacts/cardiology/6090.html) |
| 22 | Action | Provider enters discharge orders in EHR |
|  | *Cognitive Goal:* | *Determine if any additional considerations need to be addressed for patient discharge* |
|  | Actor(s) | Provider |
|  | Action Breakdown | Provider utilizes CPOE to enter the following orders   1. Discharge to home today 2. Follow up with Cardiologist in 3 days 3. Discharge medication:    1. HCTZ 12.5 mg po daily – start in a.m.    2. Lisinopril 10 mg po daily – start in a.m.    3. Metoprolol 100 mg po twice daily – start this p.m.    4. \*\*\*ASA 325 mg po daily – start in a.m.    5. \*\*\*Lovastatin 40 mg once daily – start this p.m.    6. \*\*\*Clopidogrel 75 mg po daily – start in a.m. 4. Cardiac education    1. Nurse to review cardiac education packet with patient    2. Encourage patient to view ‘Optimizing your Heart Health’ on inpatient TV channel 2    3. Provide information about ‘Living with Heart Disease’ free classes 5. Begin light exercise, as tolerated and discussed by healthcare team 6. Cardiac rehabilitation    1. Schedule evaluation for 2 weeks after discharge 7. Provide post Heart Attack and post Cardiac Catheterization discharge instructions |
|  | Technology | EHR   1. CPOE |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |
| 23 | Action | Telemetry RN receives notification of new orders in his/her work queue |
|  | *Cognitive Goal:* | *Determine level of patient understanding of their condition, plan of care, lifestyle changes, and follow up care after discharge.* |
|  | Actor(s) | Telemetry RN |
|  | Action Breakdown | Telemetry RN reviews and implements the above orders as displayed in his/her work queue.   1. After cardiac education is completed, the RN reviews discharge instructions and ensures patient understands all instructions and the plan of care 2. Provides the patient with copies of all discharge instructions 3. Teaches the patient how to utilize the Patient Portal to view his/her medical record after discharge 4. Completes final SOAP note that encompasses all patient education and discharge teaching that has been reviewed |
|  | Technology | EHR   1. Data visualization 2. Data entry |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) |
|  | Appendix | Refer to:  [Discharge Instructions post Heart Attack](http://www.ebscohost.com/images-nursing/assets/PERC%20-%20Discharge%20Instructions%20Handout.pdf)  [Discharge Education and Instructions post Heart Attack (NLM)](http://www.nlm.nih.gov/medlineplus/ency/patientinstructions/000090.htm)  [Discharge Instructions post Cardiac Catheterization](http://www.nlm.nih.gov/medlineplus/ency/patientinstructions/000091.htm) |
| 24 | Action | Discharge protocol completion |
|  | *Cognitive Goal:* | *What are the relevant facts to communicate about this patient’s encounter in the Discharge Summary?* |
|  | Actor(s) | Respective clinician |
|  | Action Breakdown | After reviewing discharge instructions with the patient (with return demonstration, if appropriate):   1. The discharge provider’s medication orders are sent via e-RX to the outpatient pharmacy in the lobby. 2. The discharge provider’s referrals are automatically sent to the referring provider (if applicable) 3. The discharge summary is automatically sent to the primary care provider’s office—patient care coordinator |
|  | Technology | CPOE interoperability with external Pharmacy Suite System |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix | Refer to:  [Hospital Discharge Summary](http://clerkship.medicine.ufl.edu/portfolio/interpersonal-and-communicative-skills/discharge-summarytransfer-noteoff-service-note-instructions/) |
| 25 | Action | Patient is discharged to home from hospital |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Telemetry RN  Patient |
|  | Action Breakdown | Telemetry RN discharges patient to home via wheelchair. |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |

## Data fields required

See appendix references as examples/guides.

## Notes and Issues

1. Entries that include \*\*\* indicate compliance with a Meaningful Use clinical quality measure
   1. CMS 100 – Aspirin Prescribed at Discharge
   2. CMS 30 – Statin Prescribed at Discharge

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# Congestive Heart Failure: Previously Diagnosed, Acute Exacerbation - Emergency Care

CHF

## Introduction

1. This use case was created to evaluate the ontology created by the VistA Evolution GUI Research project. It includes common assessments, observations, interventions, and cognitive goals that arise while caring for a patient in this scenario to ensure that the ontology can accommodate these concepts.
2. All clinical data in this use case is synthetic. Data was created to support the flow of this use case and provide examples of clinical observations that are documented throughout the interaction.
3. Clinical decision making in this use case is based, primarily, on VA/DoD Clinical Practice Guidelines for the Management of Chronic Heart Failure, available at: <http://www.healthquality.va.gov/guidelines/cd/chf/index.asp>
4. Additional clinical resources are listed below in the Reference section.
5. The intent of this use case is to capture actions that may occur when a patient presents to the hospital with a CHF acute exacerbation. Many of the steps in this use case occur concurrently in an emergent case. In similar scenarios, the same actions may occur in slightly different order.
6. Cognitive goals are included in some ‘Actions’ to provide insight on the Provider or healthcare professional’s mental process at that point of the encounter.
7. Hyperlinks present in the Appendix column are included to provide examples of the data fields and values that may be entered by the EHR user during this step of the use case.
8. Hyperlinks present in the Standards column suggest standardized terminologies that may be used to capture data in this step of the use case.

## Actors

**Patient:** a person receiving or registered to receive medical treatment

**Provider:** Physician, physician assistant (PA), or nurse practitioner (NP). All are skilled health-care professionals trained and licensed to diagnose and treat patients within their defined scope of practice.

**Registration Clerk (Reg. Clerk):** a hospital employee that collects demographic, insurance and “reason for visit” information from a new patient and enters this information in to the Admission/Discharge/Transfer (ADT) system and/or the electronic health record (EHR).

**Triage Nurse (Triage RN):** A licensed nurse that assesses symptoms, health-related complaints, and vital signs to determine the degree of urgency for care.

**Unit Clerk (UC):** a hospital employee that performs administrative duties to facilitate workflow and patient care in the emergency department (ED) or a nursing unit.

**Emergency Department Technician (ED Tech):** a hospital employee that is trained to provide basic tasks such as vital signs and laboratory draws under the supervision of an RN or Provider.

**Registered Nurse (RN):** a licensed healthcare professional that is trained to provide nursing care to patients in inpatient and outpatient settings, within their defined scope of practice.

**Licensed Social Worker (LSW):** a licensed healthcare professional that assists patients to improve their quality of life and social needs, and facilitates care after discharge.

**Nurse’s Aide/Assistant (NA):** a trained healthcare worker that provides assistance with patient care, under the supervision of an RN.

**Clinical Pharmacist** – a licensed healthcare professional that often collaborates with physicians and other healthcare professionals to coordinate pharmaceutical interventions and promote health and disease prevention within their scope of practice.

**Dispensing Pharmacist** – a licensed healthcare professional that dispenses medications, monitors medication parameters and potential drug interactions, and provides information about medications, within their scope of practice.

**Radiology Technician (Rad Tech)** – a licensed radiography professional that performs diagnostic imaging exams on patients to help physicians assess illness and injury.

**Radiologist** - a licensed physician that specializes in diagnosing and treating diseases and injuries by using medical imaging.

**EKG Technician (EKG Tech)** – a cardiology technologist that administers basic electrocardiogram tests to patients. The results are then read by a cardiologist or other licensed physician.

**Respiratory Therapist (RT)** – a licensed healthcare practitioner that provides care and treatment to patients requiring breathing and oxygenation support.

**Charge RN** – a registered nurse that is responsible for the efficient management of a nursing unit or department, including admissions, discharges, and the oversight of all nursing and support staff.

**Medical Sonographer (Ultrasound Technician)** – trained healthcare professionals that operate special imaging equipment to create/capture images helping providers assess and diagnose medical conditions.

**House Supervisor** – registered nurse who coordinates bed management and staff mix in the hospital to assure that effective nursing services are provided, and quality standards are met.

**Hospitalist** – A physician whose primary focus is the general medical care of hospitalized patients.

## Description

A 72-year-old white female presents to the emergency department (ED), with her adult daughter, in moderate respiratory distress (using accessory muscles) with the ability to say three to four words in between respirations. The patient indicates the problem has progressively gotten worse within the past 24 hours. The patient complains of a persistent cough (especially at night). Note that patient reports that she has not taken any of her medications for her “sugar and heart” in about one week (because she ran out and could not get her medications refilled). Patient appears pale, sweaty, and dusky nailbeds noticed. Through the daughter and with acknowledgement from the patient, the triage nurse identifies the patient. Respiratory distress is potentially life threatening (Emergency Severity Index Triage Tool for EDs); therefore, the medical team urgently treats the patient.

## Trigger

1. Patient’s adult daughter brings the patient to the ED.
2. Patient is in respiratory distress (use of accessory muscles).

## Preconditions

1. Obesity (adult onset)
2. Diabetes Type 2 (15 years ago)
3. Hypertension (15 years ago)
4. Heart failure (1 year ago)
5. Myocardial Infarction ((MI) 2 years ago)
6. Dsylipidemia (2 years ago)

Note: The health system’s electronic health record (EHR) shows that the patient has been seen at the hospital previously. And, most recently treated (slightly over three months ago) for an acute heart failure episode with a hospital stay of two days. The patient’s past medical history and medications are present in the EHR.

## Postconditions

Minimal guarantees:

1. Data fields required to support this clinical workflow will be present in the EHR.
2. Data entered will be stored utilizing the appropriate clinical vocabulary.

Success guarantees:

1. EHR supports patient-centered care, guided by goals set by the patient.
2. Patient receives evidence-based care based on the health concerns that are noted during the outpatient visit.
3. Patient will achieve improved outcomes and satisfaction as a result of care facilitated by EHR functionality.

## Assumptions

1. Emergency Department (ED) is capable of providing assessment and initial treatment of life-threatening conditions.
2. ED utilizes a trained healthcare professional to triage (prioritize the care of patients based on clinical need) patients presenting to the ER.
3. ED utilizes the following triage levels:
   1. Resuscitation – immediate threat to life (i.e. cardiac or respiratory arrest, major trauma, shock, etc.)
   2. Emergent – potential threat to life (i.e. chest pain with cardiac suspicion, severe respiratory distress, decreased level of consciousness (LOC), etc.)
   3. Urgent – condition with significant distress (i.e. mild to moderate respiratory distress, head injury without decrease in LOC but with vomiting, etc.)
   4. Less urgent – conditions with mild to moderate discomfort (i.e. head injury –alert without vomiting, depression without suicidal attempt)
   5. Non-urgent – conditions are minor and treatment can be delayed (i.e. skin lacerations, sore throat, etc.)
4. All RNs, PAs, NPs, and physicians are certified in Advance Cardiac Life Support (ACLS).
5. Hospital is a Level 1 trauma center that is equipped to handle patients who present with any and all levels of medical severity.
6. Hospital has a full service Cardiac Catheterization Laboratory that has an Accreditation for Cardiovascular Excellence (ACE) and is credentialed to provide percutaneous cardiac interventions (PCI), including the placement of cardiac stents.
7. Hospital has an Interventional Cardiologist on call, who is present in the hospital and available to do an emergent PCI.
8. The Cardiac Catheterization unit has a room and staff available to support an emergent PCI case.
9. EHR is able to send notifications to healthcare providers when a task has been added to their work list (i.e. Radiology Technician receives notification when an X-ray has been added to his/her work list).
10. EHR is integrated with Picture Archiving Communication System (PACS).
11. EHR has computerized physician order entry (CPOE) functionality.
12. Medications ordered via CPOE system automatically populate the electronic Medication Administration Record (eMAR).
    1. Status of medication administration is documented on the eMAR (i.e. ‘G’ for Given, ‘R’ for Refused by Patient, etc.), along with the healthcare professional’s electronic signature and any pertinent information (i.e. heart rate when administering a beta-blocker, or the reason for patient refusal when entering ‘R’ for Refused by Patient)
13. Facility uses Bar Code Medication Administration (BCMA) system to validate administration of medication to all ED and inpatients.
14. BCMA system is integrated with the EHR.
15. EHR can manage the transition from Triage to Provider (e.g., move from one work list to another), ED to inpatient, etc.
16. EHR is able to generate referral request as entered by Provider.
17. Standard vocabularies utilized by the organization include: ICD10 for diagnosis, RxNorm for medications, SNOMED-CT for clinical assessments, care that is provided and lab results, and LOINC for laboratory tests.

## Normal Flow

| **Step** | | **Component** | **Narrative** |
| --- | --- | --- | --- |
| 1 | Action | Patient’s family member (daughter) pulls up to ED entrance, and with assistance, pushes her mother into the ED |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Patient’s family member  Patient  Triage RN  ED Tech |
|  | Action Breakdown | ED Tech assists patient from car to wheel chair, and wheels to the Triage area. |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |
| 2 | Action | Triage RN completes a brief assessment to determine the patient’s condition and the urgency of required care. |
|  | *Cognitive Goal:* | *Rapid assessment of patient condition.* ***Patient Goal:*** *“I am having a real hard time breathing. Please don’t let me die.”* |
|  | Actor(s) | Patient  Triage RN  ED Tech  Family member |
|  | Action Breakdown | Chief Complaint: “I am having a real hard time breathing. Especially when I try to walk and at night. My breathing has gotten worse since I have not been able to take my sugar and heart medications for over a week.”  Allergies: NKDA  Current medications:   1. Carvedilol 25mg PO BID 2. Captopril 12.5mg PO TID 3. Furosemide 20mg PO QD 4. Digoxin 0.125mcg PO QD 5. Lipitor 40mg PO QD 6. [Lantus](http://www.lantus.com/hcp/dosing-titration/dosing-calculator) (Insulin Gargine) 16U SC QD 7. High level assessment:    * LOC: Alert and fully oriented (x3)    * Temp: 99 F    * BP: 190/92 mmHg    * HR: 118 bpm    * Cardiac rhythm (ECG): Sinus tachycardia (ST) without ectopy    * Resp: 26/min and shallow    * Pulse Oximetry: 90% on room air    * Skin: pale and diaphoretic    * Weight: 190lbs (with ~5lb weight gain in the past week) |
|  | Technology | EHR   1. Data entry |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix | [Sample Triage Assessment Form](http://img.docstoccdn.com/thumb/orig/70160047.png) |
| 3 | Action | Triage RN determines that patient has a severity index of ‘2’ requiring immediate emergency nursing care.  **Note**: Steps 2 and 3 often occur concurrently. |
|  | *Cognitive Goal:* | *Assessment of severity of condition. Is the patient’s condition life threatening?* |
|  | Actor(s) | Triage RN  Patient  ED Charge RN  ED Physician  ED RN |
|  | Action Breakdown | Triage RN does the following:   1. Patient placed on stretcher (with triage nurse and ED tech). Moves the patient via stretcher to the ‘Emergent’ section of the ED 2. Notifies the ED charge nurse and ED attending physician of the new ED patient and their condition 3. Flags the patient as requiring Emergent care by an RN in the EHR 4. Provides transition of care report to the ED RN that will be caring for the patient |
|  | Technology | EHR   1. Status entry 2. Data visualization for report |
|  | Standard |  |
|  | Appendix | [Emergency Severity Index Triage Tool for EDs](http://www.ahrq.gov/professionals/systems/hospital/esi/esi1.html)  [Treatment Algorithm](http://www.healthquality.va.gov/guidelines/CD/chf/chf_full_text.pdf) (p. 7) |
| 4 | Action | ED RN initiates standing orders for emergency interventions that are indicated in the management of heart failure. |
|  | *Cognitive Goal:* | *Select and implement appropriate emergency interventions to hypertension and respiratory distress.* |
|  | Actor(s) | ED RN  ED Tech  Patient |
|  | Action Breakdown | ED RN does the following (unless noted as being delegated to the ED Tech):   1. Places the patient on a cardiac monitor (patient is still in ST) 2. Obtains updated set of vital signs (BP: 186/90, HR: 115, RR: 26) 3. Places the patient on 6L of oxygen (O2) via non-rebreather face mask 4. Completes 12 lead electrocardiogram (ECG)    1. Sinus tachycardia (ST) Q waves in the inferior leads, inferolateral ST- and T-wave changes (This is unchanged from the previous admission-3 months ago).    2. ED Provider is notified 5. Starts a peripheral intravenous (IV) line *– performed by EDT* 6. Sends blood sample for BNP, CMP, Magnesium, Phosphorus, CBC, CPK-MB, Troponin, PT/PTT *– orders for labs entered by RN, blood drawn and sent by EDT* 7. Performs POC blood glucose: 200 mg/dL – performed by EDT when labs were drawn (in f) 8. Administers medications (medications available in ED Pyxis)    1. Nitroglycerin IV, 5mcg/minute titrating rapidly by 20mcg/min until systolic BP is 120<150 mmHg       1. Highlights the medication in the eMAR, scans the medication, next scans the patient, then administers the medication after receiving BCMA verification of appropriate administration    2. Insulin Sliding Scale protocol       1. Follows process noted above for nitroglycerin IV administration    3. Furosemide 20mg IV administration one dose       1. Follows process noted above for nitroglycerin       2. If the patient does not produce 250ml urine in first 30 minutes, furosemide 40mg IV x1 should be administered 9. Orders Chest X-ray (CXR)- PA and Lateral views 10. Echocardiogram not indicated because previously done three months ago.   ***Note****: Each of these interventions is ‘ordered’ by activating the “Standard ED Order Set for Chest Pain.” The ED RN enters the orders as verbal orders, which are then “signed” by the Provider in the EHR.*  ***Note****: RN specifies ‘Nurse draw’ when entering order for lab work. EHR integrates with department printer, which prints labels for blood tubes. If the RN had specified ‘Lab draw’ the blood draw would have been added to a Laboratory Technician’s work list.* |
|  | Technology | EHR   1. Biomedical device integration to record VS and pulse oximetry 2. Data entry of care performed 3. Activation of standing order set for chest pain via CPOE by RN   Documents medications that were administered in the Medication Administration Record (MAR) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix | [Heart Failure Emergency Department Orders](http://www.scpcp.org/webdocs/hf-shared-practices/KE%202/FRH%20ED%20Order%20Set.pdf)  [MAR Sample](http://pharmacyprime.ie/PDF/MARS_CHART_EXAMPLE.PDF)  [VA Clinical Practice Guidelines for the Management of Chronic Heart Failure](http://www.healthquality.va.gov/guidelines/CD/chf/chf_full_text.pdf)  [Standing Sliding Scale Insulin Orders](http://www.pharmacypracticenews.com/download/insulinslidingscale.pdf) |
| 5 | Action | Provider receives notification that standing orders (function as verbal orders requiring signature) has been placed in his/her name |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider |
|  | Action Breakdown | Provider opens notification and views the task listed in their work queue   1. Provider opens patient record in EHR and views data entered to date 2. Provider enters ED room to assess patient *(assessment results are documented in Step 13)* |
|  | Technology | EHR   1. Notification system 2. Data visualization |
|  | Standard |  |
|  | Appendix |  |
| 6 | Action | Registration clerk enters insurance and demographic information in to the EHR system via tablet as verified by the patient’s wife. |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Registration Clerk  Family member |
|  | Action Breakdown | Registration Clerk enters/validates/updates the following information in to the system:   1. Demographic information 2. Primary and Secondary Insurance information: Medicare, member #: xxx-xx, etc. 3. Next of Kin contact information 4. Religious preference |
|  | Technology | EHR Registration System   1. Data entry |
|  | Standard | 1. [Address](http://pe.usps.gov/cpim/ftp/pubs/Pub28/pub28.pdf) 2. [Sex](http://phinvads.cdc.gov/vads/ViewValueSet.action?oid=2.16.840.1.114222.4.11.1038) 3. [Ethnicity](http://www.whitehouse.gov/omb/fedreg_1997standards) 4. [Race](http://www.cdc.gov/minorityhealth/populations/REMP/definitions.html) |
|  | Appendix | [Hospital Registration Form](http://www.saintpetershcs.com/uploadedFiles/preadmission%202010.pdf) |
| 7 | Action | ED RN evaluates respiratory effort and function, along with vital signs |
|  | *Cognitive Goal:* | *Evaluate effectiveness of interventions and need for escalation of therapy.* |
|  | Actor(s) | ED RN  Patient |
|  | Action Breakdown | 1. Patient is reporting slight to moderate ease with breathing difficulty 2. VS: BP 150/80, HR 96, RR 20, Pulse Ox: 95% on 6L non-rebreather 3. Nitroglycerin IV at 45 mcg/min with SBP=120<150 mmHg |
|  | Technology | EHR   1. Biomedical device integration to record VS and pulse oximetry 2. Data entry of care performed 3. Documents medications that were administered in the electronic Medication Administration Record (eMAR) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |
| 8 | Action | Radiology Technician (Rad Tech) receives notification that a diagnostic X-ray for an Emergent ED patient has been added to his/her work list |
|  | *Cognitive Goal:* | *Management of work queue. Ensure the proper diagnostic test is performed on the proper patient.* |
|  | Actor(s) | Rad Tech  Patient |
|  | Action Breakdown | Rad Tech receives notification that a task has been added to his/her work list for an Emergent ED patient.   1. Rad Tech checks work list in EHR, completes the procedure as ordered and documents completion. 2. Rad Tech flags the CXR as ‘ready for interpretation’ by Radiologist |
|  | Technology | EHR   1. Integration with Notification system 2. Data entry 3. Status entry |
|  | Standard | 1. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix |  |
| 9 | Action | Radiologist receives notification that a CXR is ready for interpretation for an Emergent ED patient |
|  | *Cognitive Goal:* | *Accurate evaluation of CXR (taking reason for CXR and old films in to consideration)* |
|  | Actor(s) | Radiologist |
|  | Action Breakdown | Radiologist receives notification that a chest film is ready for interpretation.   1. Radiologist checks work list in EHR, views the indicated CXR and enters the CXR results and interpretation. 2. Radiologist flags the CXR as ‘Resulted’ |
|  | Technology | EHR integration with PACS and Notification system   1. Image visualization 2. Data entry 3. Status entry |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix | [CXR Result Format](http://radreport.org/template/0000102) |
| 10 | Action | Provider receives notification that the CXR results are available |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider |
|  | Action Breakdown | Provider receives notification that a CXR ordered in their name has been ‘resulted.”   1. Provider pulls up results via hospital issued smart phone. 2. Provider utilizes EHR to view chest film to compare against previous images (if available). |
|  | Technology | EHR integration with PACS and Notification system   1. Image visualization 2. Data visualization |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix | [CXR Result Format](http://radreport.org/template/0000102) |
| 11 | Action | Registration clerk (Reg. Clerk) obtains Advance Directive and Authorization for Disclosure of Personal Health Information (PHI) from patient |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Reg. Clerk  Patient |
|  | Action Breakdown | Reg. Clerk provides tablet with Advance Directive and Authorization for Disclosure of PHI information of forms.   1. Patient completes Advance Directive form 2. Patient waives Authorization for Disclosure of PHI at this time. |
|  | Technology | EHR integration with hand held tablets |
|  | Standard |  |
|  | Appendix | [Advance Directives Form](http://www.saintpetershcs.com/uploadedFiles/Advancedirective.pdf)  [Authorization for Disclosure of Protected Health Information](http://www.saintpetershcs.com/uploadedFiles/Policy%20768-7%20-%20Attachment%20-%20Authorization%20-%20For%20Release%20of%20Health%20Information%20REVISED%2003-25-10.pdf) |
| 12 | Action | ED RN receives notification that diagnostic results have been returned for this patient |
|  | *Cognitive Goal:* | *Ensure results are not life threatening or will affect indicated treatment.* |
|  | Actor(s) | ED RN |
|  | Action Breakdown | ED RN receives alert that lab and CXR results have been returned. He/she accesses lab results in the EHR. Relevant lab values include:  Cardiac Values  Troponin: <0.1 mcg/ml  CK: 150 ng/ml  CK-MB: 3 ng/ml  BNP 620 mg/mL (H)  CBC  RBC=4.03 trillion cells/L  WBC=6.4 billion cells/L  Hgb=13.2 g/dL  Hct=37.5%  Plt=300 billion/L  CMP  Albumin=4.2 g/dL  Alkaline phosphate=95 IU/L  ALT=20 IU/L  AST=21 IU/L  BUN=14 mg/dL  Calcium=9.0 mg/dL  Chloride=100 mmol/L  CO2=28 mmol/L  Creatinine=1.9 mg/dL (H)  Glucose=200 mg/dL  Potassium=4.5 mEq/L  Sodium=140 mEq/L  Total bilirubin=1.1 mg/dL  Total protein=7.0 g/dL  Magnesium=2.8 mEq/L  Phosphorus=2.1 mEq/L  ABG  Ph=7.44  PaCO2=35  PaO2=68.2 (L)  SaO2=90% (L)  HCO3=23  BE=-0.75  Note=Room Air  Coags  PT: 12 seconds  PTT: 63 seconds  CXR  Mildly enlarged cardiac silhouette and pulmonary venous congestion  Note: pulmonary venous congestion is new when compared to previously hospital admission’s discharge CXR  Echo (from previous hospital admission, three months ago)  mildly dilated left ventricle with slightly increased wall thickness, inferobasilar akinesis, and an ejection fraction (EF) estimated at 35% to 40% |
|  | Technology | EHR   1. Visualization of lab and diagnostic reports |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix |  |
| 13 | Action | Provider assesses patient |
|  | *Cognitive Goal:* | *Expedite History and Physical. Formulate differential diagnosis (e.g., Exacerbation of CHF vs Pulmonary Embolism).* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | 1. Confirms past medical history (PMH) and enters active conditions to the Problem List ( CHF, Obesity, DM Type 2, HTN, MI 2 years ago) 2. Confirms allergies: NKDA 3. Confirms current medications listed in step 2. 4. Smoking history: No tobacco use 5. Completes physical assessment    1. Neuro: Alert and fully oriented    2. CV: No Chest pain, S1S2, S3 (common with volume overload)    3. Resp: 20 and slightly shallow. Lungs rales lower lobes bilaterally with wheezing    4. GI: Abdomen soft, flat with bowel sounds in all quadrants.    5. GU: Verbalizes no problems with voiding    6. Skin: Slightly pale. Diaphoretic. Warm and intact. +1 pedal edema bilateral    7. Psych: Calm and cooperative with wife present |
|  | Technology | EHR   1. Data entry to Problem List, Allergies and Current Medication 2. Visualization of lab and diagnostic reports 3. Data entry of assessment |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) 3. [LOINC](http://search.loinc.org/search.zul?query=BMI) 4. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix | [Adult Health History](http://georgetownmedical.com/util/documents/hx-physical-form.pdf)  [Head to Toe Physical Assessment Components](http://www.bing.com/images/search?q=physical+assessment+form&id=93FC06872326E1C4EFD077EA45F90F9AD366E450&FORM=IQFRBA#view=detail&id=4191BD83AAE82EDC8CB7989873FC8912998DE1B1&selectedIndex=26) |
| 14 | Action | Provider discusses clinical findings and treatment options with patient |
|  | *Cognitive Goal:* | *Engage and educate patient. Assess patient understanding to facilitate informed decisions.* ***Patient Goal:*** *“I am starting to feel a little better. I just want to be back to my normal. I know I need to take my meds.”* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | 1. Diagnosis confirmed by previous medical history, lab results, CXR, previous echo, and physical assessment: Acute exacerbation, congestive heart failure (respiratory distress, DM type 2, hypertension)    1. Problem list reviewed and updated 2. Recommendation:    1. Admission to IMC       1. Reintroduce outpatient medication regimen controlling heart failure, hypertension, and DM type 2       2. Start anticoagulation therapy (clinical guidelines/protocol)    2. Start education with patient and help identify barriers to self-care (including medication management adherence)   **Note**: full education is not appropriate during emergent medical management; this task will be carried out through the inpatient and discharge process   * 1. Provider can access Clinical Care Guidelines, American Cardiology, American Heart Association, and American Diabetes Association resources via hyperlink or Infobutton, as needed |
|  | Technology | EHR   1. Data entry to Problem List |
|  | Standard |  |
|  | Appendix |  |
| 15 | Action | Patient conveys agreement to the treatment plan of care |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Care Plan Activities / Targeted Completion   1. Signs verbal order that ED RN entered to activate ED standing orders for patients presenting with heart failure / Immediately 2. Admission to IMC / Once bed is available    1. Nothing to eat or drink until respiratory distress dissipates 3. Wean nitroglycerine IV once PO medications have been dispensed by pharmacy / Immediately |
|  | Technology | EHR   1. Data entry of Care Plan |
|  | Standard |  |
|  | Appendix |  |
| 16 | Action | Provider utilizes CPOE to enter orders for agreed upon care |
|  | *Cognitive Goal:* | *Determine appropriate orders for this patient.* |
|  | Actor(s) | Provider |
|  | Action Breakdown | Provider enters the following orders:   * 1. Admit to IMC, transfer order, with recommended orders for Hospitalist (provider)   2. Move patient to O2 NC, starting at 6L as tolerated keeping SaO2 >95%, Notify MD and perform ABG if SaO2 <95%   3. CHF Admission Order Set   4. Lovenox 40mg SC QD   5. Carvedilol 25 mg PO BID   6. Captopril 12.5 mg PO TID   7. Furosemide 20 mg PO QD   8. Digoxin 0.125 mcg PO QD   9. [Lantus](http://www.lantus.com/hcp/dosing-titration/dosing-calculator) (Insulin Gargine) 16U SC QD (starting with normal cardiac diet, tomorrow)   10. Titrate nitroglycerine by half within first 30 minutes of administration of PO medications; turn off nitroglycerine 1 hour after administration of PO medications   Note: notify MD if systolic BP >150mmHg |
|  | Technology | EHR   1. CPOE |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix | [Heart Failure Admission Order Set](https://www.heart.org/idc/groups/heart-public/@wcm/@hcm/@gwtg/documents/downloadable/ucm_308978.pdf) |
| 17 | Action | Nurse pages house supervisor for bed management/admission |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | ED RN  House Supervisor |
|  | Action Breakdown | ED RN pages house supervisor relaying new admission to hospital. Admission order also triggers on house supervisor’s work queue (within the EHR) |
|  | Technology | EHR   1. Work queue |
|  | Standard |  |
|  | Appendix | [Heart Failure Admission Order Set](https://www.heart.org/idc/groups/heart-public/@wcm/@hcm/@gwtg/documents/downloadable/ucm_308978.pdf) |
| 18 | Action | ED RN receives notification of new order for PatientID ########. |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | ED RN |
|  | Action Breakdown | ED RN receives notification that the provider has placed admission orders to IMC |
|  | Technology | EHR integration with Notification system |
|  | Standard |  |
|  | Appendix | [ED Flow Sheet](http://www.azdhs.gov/bems/documents/trauma/EmergencyServicesTraumaFlowSheet.pdf) |
| 19 | Action | ED RN administers cardiac medications, as ordered |
|  | *Cognitive Goal:* | *Evaluate how respiratory status, BP, and urinary output has been affected by medication therapy.* |
|  | Actor(s) | ED RN  Patient |
|  | Action Breakdown | 1. ED RN evaluates vital signs, I/O, and respiratory status 2. BP: VS: BP 148/88, HR 90, RR 20, Pulse Ox: 98% on 6LNC, U/O=600 ml/last hour 3. Enters BP 148/88 when prompted to evaluate patient’s BP with nitroglycerine drip continuing 4. Enters ‘I’ for Infusing in eMAR and rate of 45 mcg/min   Scans patient’s wristband   1. Note: elevated blood glucoses will be managed once transferred to IMC |
|  | Technology | EHR   1. Biomedical device integration to record VS and pulse oximetry 2. Data entry of care performed |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |
| 20 | Action | House supervisor has found bed placement in IMC |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | House Supervisor  ED Nurse |
|  | Action Breakdown | 1. House supervisor calls ED nurse and provides information on IMC admission bed 2. House supervisor changes patient bed to a transfer status to IMC bed (indicating patient remains in ED until transfer is complete) |
|  | Technology | EHR   1. Work queue 2. Bed management |
|  | Standard |  |
|  | Appendix |  |
| 21 | Action | ED RN provides transition of care report to the IMC RN that will be caring for the patient |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | ED RN  IMC RN |
|  | Action Breakdown | Report is completed verbally, over the phone. IMC RN enters PatientID in computer, views all documentation entered in ED, and accepts patient as an assignment. |
|  | Technology | EHR   1. Query 2. Data visualization 3. Bed management |
|  | Standard |  |
|  | Appendix |  |
| 22 | Action | Patient is transferred to IMC via stretcher |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | ED RN  Patient  IMC RN |
|  | Action Breakdown | IMC RN assumes care of the patient, will review and acknowledge heart failure admission orders while patient is being transported from ED to IMC.  **Note**: Patient is transported by ED RN and ED Tech (because of patient acuity to cardiac care). |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |

## Data fields required

See appendix references as examples/guides

## Notes and Issues

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# Congestive Heart Failure: Previously Diagnosed, Acute Exacerbation – Admitted to Intermediate Care Unit

CHF 2

## Introduction

1. This use case was created to evaluate the ontology created by the VistA Evolution GUI Research project. It includes common assessments, observations, interventions, and cognitive goals that arise while caring for a patient in this scenario to ensure that the ontology can accommodate these concepts.
2. All clinical data in this use case is synthetic. Data was created to support the flow of this use case and provide examples of clinical observations that are documented throughout the interaction.
3. Clinical decision making in this use case is based, primarily, on VA/DoD Clinical Practice Guidelines for the Management of Chronic Heart Failure, available at: http://www.healthquality.va.gov/guidelines/cd/chf/index.asp
4. Additional clinical resources are listed below in the Reference section.
5. The intent of this use case is to capture actions that may occur when a patient presents to the hospital with a CHF acute exacerbation. Many of the steps in this use case occur concurrently in an emergent case. In similar scenarios, the same actions may occur in slightly different order.
6. Cognitive goals are included in some ‘Actions’ to provide insight on the Provider or healthcare professional’s mental process at that point of the encounter.
7. Hyperlinks present in the Appendix column are included to provide examples of the data fields and values that may be entered by the EHR user during this step of the use case.
8. Hyperlinks present in the Standards column suggest standardized terminologies that may be used to capture data in this step of the use case.

## Actors

**Patient:** a person receiving or registered to receive medical treatment

**Provider:** Physician, physician assistant (PA), or nurse practitioner (NP). All are skilled health-care professionals trained and licensed to diagnose and treat patients within their defined scope of practice.

**Registration Clerk (Reg. Clerk):** a hospital employee that collects demographic, insurance and “reason for visit” information from a new patient and enters this information in to the Admission/Discharge/Transfer (ADT) system and/or the electronic health record (EHR).

**Triage Nurse (Triage RN):** A licensed nurse that assesses symptoms, health-related complaints, and vital signs to determine the degree of urgency for care.

**Unit Clerk (UC):** a hospital employee that performs administrative duties to facilitate workflow and patient care in the emergency department (ED) or a nursing unit.

**Emergency Department Technician (ED Tech):** a hospital employee that is trained to provide basic tasks such as vital signs and laboratory draws under the supervision of an RN or Provider.

**Registered Nurse (RN):** a licensed healthcare professional that is trained to provide nursing care to patients in inpatient and outpatient settings, within their defined scope of practice.

**Licensed Social Worker (LSW):** a licensed healthcare professional that assists patients to improve their quality of life and social needs, and facilitates care after discharge.

**Nurse’s Aide/Assistant (NA):** a trained healthcare worker that provides assistance with patient care, under the supervision of an RN.

**Clinical Pharmacist** – a licensed healthcare professional that often collaborates with physicians and other healthcare professionals to coordinate pharmaceutical interventions and promote health and disease prevention within their scope of practice.

**Dispensing Pharmacist** – a licensed healthcare professional that dispenses medications, monitors medication parameters and potential drug interactions, and provides information about medications, within their scope of practice.

**Radiology Technician (Rad Tech)** – a licensed radiography professional that performs diagnostic imaging exams on patients to help physicians assess illness and injury.

**Radiologist** - a licensed physician that specializes in diagnosing and treating diseases and injuries by using medical imaging.

**EKG Technician (EKG Tech)** – a cardiology technologist that administers basic electrocardiogram tests to patients. The results are then read by a cardiologist or other licensed physician.

**Respiratory Therapist (RT)** – a licensed healthcare practitioner that provides care and treatment to patients requiring breathing and oxygenation support.

**Charge RN** – a registered nurse that is responsible for the efficient management of a nursing unit or department, including admissions, discharges, and the oversight of all nursing and support staff.

**Medical Sonographer (Ultrasound Technician)** – trained healthcare professionals that operate special imaging equipment to create/capture images helping providers assess and diagnose medical conditions.

**House Supervisor** – registered nurse who coordinates bed management and staff mix in the hospital to assure that effective nursing services are provided, and quality standards are met.

**Hospitalist** – A physician whose primary focus is the general medical care of hospitalized patients.

## Description

A 72-year-old white female with respiratory distress (acute exacerbation, congestive heart failure) is stabilized and transferred to IMC.

## Trigger

Patient has been stabilized in the ED with admission orders to IMC.

## Preconditions

1. Obesity (adult onset)
2. Diabetes Type 2 (15 years ago)
3. Hypertension (15 years ago)
4. Heart failure (1 year ago)
5. Myocardial Infarction ((MI) 2 years ago)
6. Dyslipidemia (2 years ago)

**Note**: The health system’s electronic health record (EHR) shows that the patient has been seen at the hospital previously. And, most recently treated (slightly over three months ago) for an acute heart failure episode with a hospital stay of two days. The patient’s past medical history and medications are present in the EHR

## Postconditions

Minimal guarantees:

1. Data fields required to support this clinical workflow will be present in the EHR.
2. Data entered will be stored utilizing the appropriate clinical vocabulary.

Success guarantees:

1. EHR supports patient-centered care, guided by goals set by the patient.
2. Patient receives evidence-based care based on the health concerns that are noted during the outpatient visit.
3. Patient will achieve improved outcomes and satisfaction as a result of care facilitated by EHR functionality.

## Assumptions

1. EHR is able to send notifications to healthcare providers when a task has been added to their work list (i.e. Radiology Technician receives notification when an X-ray has been added to his/her work queue).
2. EHR is integrated with Picture Archiving Communication System (PACS).
3. EHR is integrated with information systems in the following departments: Pharmacy, Laboratory, Radiology, Cardiology, Dietary, Rehabilitation
4. EHR has computerized physician order entry (CPOE) functionality.
5. Orders entered via CPOE are automatically implemented and assigned to the appropriate work queue (e.g., CBC in a.m. is automatically assigned to the Laboratory work queue)
6. Medications ordered via CPOE system automatically populate the electronic Medication Administration Record (eMAR).
7. EHR system allows the Provider to select existing active medication to pre-populate discharge medication orders. Provider can then de-select any carried over medication, if desired.
8. Orders for discharge medications entered via CPOE are sent directly to the outpatient pharmacy that is designated by the patient.
9. Facility utilizes Hospitalists to provide and manage care of hospitalized patients.
10. Facility uses Bar Code Medication Administration (BCMA) system to document administration of medication to all ED and inpatients.
11. BCMA system is integrated with the EHR.
12. EHR A/D/T system allows user to tentatively hold a bed, pending formal orders from Provider (e.g. ICU, IMC, or Telemetry bed post-PCI while patient is recovering from the procedure)
13. EHR can manage the transition of tasks (e.g., move tasks from one work queue to another)
14. PatientID is a unique ID assigned to a specific patient for each unique hospital stay
15. Standard vocabularies utilized by the organization include: ICD10 for Diagnosis, RxNorm for medications, SNOMED-CT for clinical assessments, care that is provided and lab results, and LOINC for laboratory tests.

## Normal Flow

| **Step** | | **Component** | **Narrative** |
| --- | --- | --- | --- |
| 1 | Action | Hospitalist (provider) admits patient to IMC (after receiving report from the ED Provider)  **Day 1** |
|  | *Cognitive Goal:* | *Determine indicated care and orders for this unique patient admitted from ED with congestive heart failure.* |
|  | Actor(s) | ED Provider  Hospitalist (provider) |
|  | Action Breakdown | Receives telephone report from ED physician, and utilizes [Heart Failure Admission Order Set](https://www.heart.org/idc/groups/heart-public/@wcm/@hcm/@gwtg/documents/downloadable/ucm_308978.pdf) via CPOE and adds additional orders, as needed. For example:   1. Admit to IMC 2. Dx: Congestive Heart Failure (428.0), Respiratory Distress (J80) Secondary: DM type 2, hypertension, obesity, dyslipidemia 3. Allergies: NKDA 4. History of Tobacco use: No 5. Condition: Stable 6. Code Status: Full code 7. VS: Per unit protocol, daily weights 8. Diet: Low fat, Low cholesterol, Low salt (cardiac diet), Strict I/O 9. Heparin Lock IV. 10. Activity: Advance as tolerated, starting in AM 11. Labs: CBC/diff, BMP, fasting Lipid profile, PT/PTT in AM 12. Move patient to O2 NC, starting at 6L as tolerated keeping SaO2 >95%, Notify MD and perform ABG if SaO2 <95% 13. Medications:     1. \*\*\*Lovenox 40mg SC QD     2. Carvedilol 25 mg PO BID     3. Captopril 12.5 mg PO TID     4. Furosemide 20 mg PO QD     5. Digoxin 0.125 mcg PO QD     6. Lipitor 40mg PO QD     7. [Lantus](http://www.lantus.com/hcp/dosing-titration/dosing-calculator) (Insulin Gargine) 16U SC QD     8. Titrate nitroglycerine by half within first 30 minutes of administration of PO medications; turn off nitroglycerine 1 hour after administration of PO medications     9. Note: notify MD if systolic BP >150mmHg     10. Administer Influenza vaccination, if patient has not be vaccinated this season     11. Administer Pheumococcal immunization if not previously vaccinated, or if vaccination was > 5 years ago. |
|  | Technology | EHR  CPOE |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) 4. [ICD10](http://www.icd10data.com/) |
|  | Appendix | [Heart Failure Admission Order Set](https://www.heart.org/idc/groups/heart-public/@wcm/@hcm/@gwtg/documents/downloadable/ucm_308978.pdf). (pages 1-3) |
| 2 | Action | IMC Unit Clerk confirms formal bed transition from ED to IMC in Admission/Discharge /Transfer (ADT) System |
|  | *Cognitive Goal:* | *Implement physician order for appropriate bed assignment (based on severity of illness driving the intensity of service).* |
|  | Actor(s) | IMC Unit Clerk |
|  | Action Breakdown | IMC Unit Clerk views available IMC beds and, in collaboration with the IMC Charge RN, selects appropriate bed for patient, as ordered by physician |
|  | Technology | EHR   1. Integration with ADT system |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) 4. [ICD10](http://www.icd10data.com/) |
|  | Appendix | [ED Flow Sheet](http://www.azdhs.gov/bems/documents/trauma/EmergencyServicesTraumaFlowSheet.pdf) |
| 3 | Action | ED RN provides transition of care report to the IMC RN that will be caring for the patient |
|  | *Cognitive Goal:* | *Formulate and ask appropriate questions during report to gather information required to properly care for patient.* |
|  | Actor(s) | ED RN  IMC RN |
|  | Action Breakdown | ED RN provides transition of care report verbally over telephone to the IMC RN   1. IMC RN acknowledges patient admission on EHR bed tracker, validates patient with PatientID, and assigns him/herself as the primary care nurse    1. Views ED encounter notes, and [Heart Failure Admission Orders](https://www.heart.org/idc/groups/heart-public/@wcm/@hcm/@gwtg/documents/downloadable/ucm_308978.pdf) in patient record 2. ED RN and ED Tech transfers patient to IMC after report is completed |
|  | Technology | EHR   1. Manage patient assignment through EHR bed tracker 2. Query by PatientID 3. Data visualization |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) 4. [ICD10](http://www.icd10data.com/) |
|  | Appendix | [ED Flow Sheet](http://www.azdhs.gov/bems/documents/trauma/EmergencyServicesTraumaFlowSheet.pdf) |
| 4 | Action | IMC RN assumes care of patient |
|  | *Cognitive Goal:* | *Evaluate baseline assessment. Determine areas of concern and/or observations requiring additional interventions* |
|  | Actor(s) | IMC RN |
|  | Action Breakdown | IMC RN:   1. Attaches cardiac leads to patient and ensures monitoring is effective    1. Notes cardiac rhythm: Sinus rhythm without ectopy, HR 84 2. VS    1. BP 146/80, HR 84, RR 20, Pulse Oximetry on 4L O2 NC: 96% 3. I/O 4. Performs head to toe assessment. Results documented on Nursing Flow Sheet |
|  | Technology | EHR   1. Biomedical device integration 2. Data entry |
|  | Standard | EHR   1. SNOMED-CT 2. LOINC |
|  | Appendix | [Stepdown Nursing Flow Sheet](http://www.cantonmercy.org/uploads/File/pdf/6395_Step_Down_Telemetry.pdf) |
| 5 | Action | Hospitalist (Provider) assumes care of patient. Documents formal History of Present Illness (HPI) and performs assessment |
|  | *Cognitive Goal:* | *Perform assessment. Validate existing orders and ensure no additional orders are indicated. Determine relevant information to be included in HPI.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Provider:   1. Queries EHR on PatientID and reviews all documentation and diagnostic results from ED 2. Interviews patient about Chief Complaint, PMH, etc. 3. Performs head to toe assessment. 4. Creates HPI documentation 5. Enters SOAP note 6. Ensures [Heart Failure Admission Orders](https://www.heart.org/idc/groups/heart-public/@wcm/@hcm/@gwtg/documents/downloadable/ucm_308978.pdf) address all indicated care (no additional orders are indicated) |
|  | Technology | 1. Data visualization 2. Data entry |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) 4. [ICD10](http://www.icd10data.com/) |
|  | Appendix | [History of Present Illness Documentation](http://r.search.yahoo.com/_ylt=A0LEViP7.KtUJ74AbQAPxQt.;_ylu=X3oDMTByNW1iMWN2BHNlYwNzcgRwb3MDNwRjb2xvA2JmMQR2dGlkAw--/RV=2/RE=1420585339/RO=10/RU=http%3a%2f%2fwww2.sunysuffolk.edu%2fmccabes%2fH%26P%2520guide%2520for%2520pdarev.doc/RK=0/RS=Z7BjPbb7uLomK15w4NcJV6eKkBc-)  [Head to Toe Physical Assessment Components](http://www.bing.com/images/search?q=physical+assessment+form&id=93FC06872326E1C4EFD077EA45F90F9AD366E450&FORM=IQFRBA#view=detail&id=4191BD83AAE82EDC8CB7989873FC8912998DE1B1&selectedIndex=26)  [SOAP Note Explanation and Example](http://nurseone.ca/~/media/nurseone/page-content/pdf-en/soap_documentation_e.pdf) |
| 6 | Action | Hospitalist (Provider) discusses patient’s condition and the indicated plan of care for the coming days |
|  | *Cognitive Goal:* | *Determine recommended plan of care. Engage and educate patient. Assess patient understanding to facilitate informed decision-making.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Provider discusses the following with the patient:   1. Admitting diagnosis: Congestive Heart Failure (428.0), Respiratory Distress (J80) Secondary: DM type 2, hypertension, obesity 2. Indicated care and [education for managing chronic heart failure](http://www.rwjf.org/content/dam/supplementary-assets/2008/06/Heart-Failure-Patient-Teaching-Guide-2011.pdf)    1. Beta-blocker and ACE inhibitor to support cardiac function (related to heart failure) and hypertension    2. Diuretic to manage hypertension and heart failure    3. Digoxin (in combination with diuretic) to manage heart failure    4. DM type 2 management (with Lantus)    5. Monitoring body weight daily    6. Chest x-ray in AM to assess pulmonary congestion (resolution)    7. Lab work in AM to evaluate cardiac, renal, liver and thyroid factors    8. EKG in AM to evaluate cardiac electrical activity    9. Echocardiogram to evaluate cardiac function    10. Advance activity as tolerated (to patient’s baseline)    11. Follow low fat, low cholesterol, low sodium diet (cardiac diet)    12. Cardiac education related to heart failure    13. Referral to outpatient case management (related to medication compliance and mitigation of barriers to care access) 3. Provider accesses Coronary Risk Assessment tool (i.e. Framingham) and/or Functional Status Assessment tools (i.e. Minnesota Living with Heart Failure Questionnaire [MLHFQ]), as needed via hyperlinks in EHR to facilitate additional assessment or provide context for discussion and patient education |
|  | Technology | EHR   1. Data visualization 2. Visualization of clinical resources via hyperlinks |
|  | Standard |  |
|  | Appendix | [VA/DoD Clinical Practice Guidelines for Management of Ischemic Heart Disease](http://www.healthquality.va.gov/guidelines/CD/ihd/ihd_poc_combined.pdf) |
| 7 | Action | Patient verbalizes care preferences and goals |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Patient  Provider |
|  | Action Breakdown | Patient verbalizes that they are “thankful for not letting me die and I am willing to do anything in my reach to make sure I don’t get any worse. I don’t like hospitals, but I am glad I am receiving great care.” |
|  | Technology | EHR   1. Data entry of Care Plan |
|  | Standard |  |
|  | Appendix |  |
| 8 | Action | Together, the Hospitalist (provider) and Patient agree upon a plan of care after discussion of recommended plan of care. |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Care Plan Activities / Targeted Initiation   1. Anticoagulation (Lovenox), as ordered / In morning 2. Cardiac medications, as ordered / Immediately 3. Heart failure medications, as ordered / Immediately 4. DM type 2 management / With cardiac diet 5. Chest x-ray, lab work, and EKG / In morning 6. Activity as tolerated (patient baseline) / Immediately 7. Cardiac diet / Immediately 8. [Heart failure education](http://www.rwjf.org/content/dam/supplementary-assets/2008/06/Heart-Failure-Patient-Teaching-Guide-2011.pdf) / Immediately and reinforce prior to discharge |
|  | Technology | EHR   1. Data entry of Care Plan |
|  | Standard |  |
|  | Appendix |  |
| 9 | Action | Dispensing Pharmacist receives notification of new medication orders and dispenses ordered medications |
|  | *Cognitive Goal:* | *Ensure patient safety by evaluating for drug-drug interactions and allergy concerns.* |
|  | Actor(s) | Disp. Pharmacist |
|  | Action Breakdown | Dispensing Pharmacist:   1. Receives notification that new medication orders have been placed and added to their work queue 2. Pharmacist clicks on the notification link and views medication orders, admitting diagnosis, and allergies 3. Ensures that there are no drug-drug interactions or medications ordered that conflict with patient allergies (*this is done via decision support of the pharmacy system)* 4. ‘Dispenses’ medication via Pyxis system for nursing access and administration |
|  | Technology | EHR   1. Pharmacy Information System Suite 2. Visualization of data 3. Visualization of eMAR |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) 3. [ICD10](http://www.icd10data.com/) |
|  | Appendix |  |
| 10 | Action | IMC RN performs q 4 hour assessment and enters SOAP note at the end of his/her shift |
|  | *Cognitive Goal:* | *Evaluate patient condition for procedure complications, clinical improvement, and observations that indicate a change in the plan of care.* |
|  | Actor(s) | IMC RN  Patient |
|  | Action Breakdown | IMC RN:   1. Evaluates and records cardiac rhythm    1. Sinus rhythm without ectopy, HR 80 2. Checks and records vital signs    1. BP 140/80, HR 80, RR 18, Pulse 2L O2 NC, 98%    2. Records I/O 3. Performs head to toe assessment. Results documented on Nursing Flow Sheet    1. Notable: Lung sounds improving (mild rales right lower lobe) 4. Documents input and output 5. Administers medications as ordered (BCMA) 6. Carvedilol 25 mg PO 7. Captopril 12.5 mg PO 8. Furosemide 20 mg PO 9. Digoxin 0.125 mcg PO 10. Lipitor 40mg PO 11. Enters SOAP note at end of shift 12. Decreased nitroglycerine by half (30 minutes after PO medication administration) 13. Discontinued nitroglycerine (60 minutes after PO medication administration) |
|  | Technology | EHR   1. Integration with biomedical devices 2. Data entry 3. eMAR |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix | [Stepdown Nursing Flow Sheet](http://www.cantonmercy.org/uploads/File/pdf/6395_Step_Down_Telemetry.pdf)  [SOAP Note Explanation and Example](http://nurseone.ca/~/media/nurseone/page-content/pdf-en/soap_documentation_e.pdf) |
| 11 | Action | **Fast forward to the next morning.** Radiology Technician (Rad Tech) receives notification that a diagnostic X-ray for an IMC patient has been added to his/her work list  **Day 2** |
|  | *Cognitive Goal:* | *Prioritize and manage work queue. Ensure the proper diagnostic test is performed on the proper patient.* |
|  | Actor(s) | Rad. Tech |
|  | Action Breakdown | Rad Tech receives notification that a task has been added to his/her work list for an IMC patient.   1. Rad Tech checks work list in EHR, completes the procedure as ordered and documents completion. 2. Rad Tech flags the CXR as ‘ready for interpretation’ by Radiologist |
|  | Technology | EHR   1. Query by PatientID 2. Data visualization 3. Integration with Patient Transport System |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |
| 12 | Action | Radiologist receives notification that a CXR is ready for interpretation for an IMC patient |
|  | *Cognitive Goal:* | *Accurate evaluation of CXR (taking reason for CXR and old films in to consideration)* |
|  | Actor(s) | Radiologist |
|  | Action Breakdown | Radiologist receives notification that a chest film is ready for interpretation.   1. Radiologist checks work list in EHR, views the indicated CXR and enters the CXR results and interpretation. 2. Radiologist flags the CXR as ‘Resulted’ |
|  | Technology | EHR integration with PACS and Notification system   1. Image visualization 2. Data entry Status entry |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix | [CXR Result Format](http://radreport.org/template/0000102) |
| 13 | Action | Hospitalist (provider) receives notification that the CXR results are available |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider |
|  | Action Breakdown | Provider receives notification that a CXR ordered in their name has been “resulted.”   1. Provider pulls up results via hospital issued smart phone. 2. Provider utilizes EHR to view chest film to compare against previous images (if available). |
|  | Technology | EHR integration with PACS and Notification system   1. Image visualization 2. Data visualization |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix | [CXR Result Format](http://radreport.org/template/0000102) |
| 14 | Action | IMC RN performs q 4 hour assessment and enters SOAP note at the end of his/her shift |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | IMC RN  Patient |
|  | Action Breakdown | IMC RN continues to follow prescribed care, heart failure admission orders (noted in step 1) with notable care including   * 1. Advance cardiac diet   2. Continue medication administration as prescribed   3. Wean O2 to room air as tolerated (maintaining SaO2 >95%)   4. Strict I/O   5. VS      1. BP 130/80, HR 80, RR 18, Pulse Oximetry on 2L O2 NC, 98% (Lung sounds clear) |
|  | Technology | EHR   1. Data visualization 2. Data entry 3. Biomedical device integration |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix | [Stepdown Nursing Flow Sheet](http://www.cantonmercy.org/uploads/File/pdf/6395_Step_Down_Telemetry.pdf) |
| 15 | Action | **Fast forward to the next morning.**  Healthcare team discusses patient condition and plan of care during interdisciplinary patient rounds.  **Day 3** |
|  | *Cognitive Goal:* | *Evaluation of patient condition and the indicated acuity of care after diuresis and medication management.* |
|  | Actor(s) | Provider  IMC RN  Charge RN  Social Worker/Case Manager  Clinical Pharmacist  Patient |
|  | Action Breakdown | Healthcare team   1. Reviews HPI, PMH, course of treatment, and care plan 2. Reviews most recent physical assessment 3. Utilizes Infobutton, Clinical Care Guidelines and other resources to evaluate indicated care options 4. Formulates a recommended plan that they will discuss with the patient. 5. Potential transfer to a medical unit if physical assessment is improved and patient’s condition is stable   Healthcare team enters patient’s room to evaluate condition   1. Determines that the patient’s clinical condition warrants transfer to a medical unit this morning 2. Discuss transfer plans with the patient 3. Clinical Pharmacist (and Provider) review medications indicated for transfer (including drug safety, side effects, dosage titration and interactions), and confirm that the patient should remain on their current meds. 4. Provider enters transfer orders to Medical unit   *Note: Transfer of care to the Medical unit would occur as outlined above in Steps 1-4* |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |
| 16 | Action | **Fast forward to the next morning.**  Healthcare team discusses patient condition and plan of care during interdisciplinary patient rounds. |
|  | *Cognitive Goal:* | *Evaluation of patient condition and indicated care after discharge. Informed, collaborative decision-making related to the care indicated for this unique patient. This includes patient education and engagement.* |
|  | Actor(s) | Provider  IMC RN  Charge RN  Social Worker/Case Manager  Clinical Pharmacist  Patient |
|  | Action Breakdown | Healthcare team   1. Reviews HPI, PMH, course of treatment, and care plan 2. Reviews most recent physical assessment 3. Utilizes Infobutton, Clinical Care Guidelines and other resources to evaluate indicated discharge care options 4. Formulates a recommended discharge plan that they will discuss with the patient. 5. Healthcare team enters patient’s room to evaluate condition 6. Determines that the patient’s condition warrants discharge that afternoon    1. Discuss discharge plans and instructions with the patient 7. Clinical Pharmacist (and Provider) review medications indicated for discharge (including drug safety, side effects, dosage titration and interactions), and confirm that the patient should remain on the following medications as ordered    1. Carvedilol 25 mg PO BID    2. Captopril 12.5 mg PO TID    3. Furosemide 20 mg PO QD    4. Digoxin 0.125 mcg PO QD    5. Lipitor 40 mg PO QD    6. [Lantus](http://www.lantus.com/hcp/dosing-titration/dosing-calculator) (Insulin Gargine) 16U SC QD 8. Discuss need for psychosocial support at home related to medication compliance/barrier mitigation to plan-of-care 9. Patient and healthcare team agree that no additional support is needed 10. Patient will have pharmacy-to-door ([mail order](http://www.washingtonpost.com/sf/brand-connect/wp/2014/03/17/consumer-benefits-of-receiving-medication-through-the-mail/)) prescription service setup 11. Ensure that patient receives all indicated education related to heart failure 12. Discuss the importance of medication compliance and [heart failure plan-of-care/education](http://www.rwjf.org/content/dam/supplementary-assets/2008/06/Heart-Failure-Patient-Teaching-Guide-2011.pdf) 13. Discuss patient-specific risks     1. Counsel patient on their increased long term mortality risk and the importance of compliance to care regimen 14. Follow up primary care provider on a regular basis |
|  | Technology | EHR   1. Data visualization of Problem List, Care Plan, eMAR, Patient Goals |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) 4. [ICD10](http://www.icd10data.com/) |
|  | Appendix |  |
| 17 | Action | Patient verbalizes goal related health condition and discharge |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Patient  Provider  Healthcare Team |
|  | Action Breakdown | Patient verbalizes that they are eager to be more regular about taking their medications, and excited to have her prescriptions delivered directly to her house. The patient is also in agreement to monitor diet (cardiac), activity, and daily weights. |
|  | Technology | EHR   1. Data entry as Patient Goal |
|  | Standard |  |
|  | Appendix |  |
| 18 | Action | Patient agrees to the discharge plan that was presented by their healthcare team |
|  | *Cognitive Goal:* | *Evaluate patient understanding of their discharge plan of care and responsibilities, along with their commitment to execute the plan.* |
|  | Actor(s) | Patient  Provider  Healthcare Team |
|  | Action Breakdown | Care Plan Activities/ Targeted Initiation   1. Continue medications listed in step 16 / Immediately 2. Follow up with primary care provider within 3 days / Make apt immediately 3. [Heart failure education](http://www.rwjf.org/content/dam/supplementary-assets/2008/06/Heart-Failure-Patient-Teaching-Guide-2011.pdf) (i.e. notify healthcare provider if you gain 2 pound in one day or if you have trouble breathing (shortness of breath) / Immediately |
|  | Technology | EHR   1. Data entry in Care Plan |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |
| 19 | Action | Provider enters discharge orders in EHR |
|  | *Cognitive Goal:* | *Determine if any additional considerations need to be addressed for patient discharge* |
|  | Actor(s) | Provider |
|  | Action Breakdown | Provider utilizes CPOE to enter the following orders   1. Discharge to home today 2. Follow up with primary care provider within 3 days 3. Discharge medication:    1. Carvedilol 25 mg PO BID    2. Captopril 12.5 mg PO TID    3. Furosemide 20 mg PO QD    4. Digoxin 0.125 mcg PO QD    5. Lipitor 40 mg PO QD    6. [Lantus](http://www.lantus.com/hcp/dosing-titration/dosing-calculator) (Insulin Gargine) 16U SC QD 4. [Heart failure education](http://www.rwjf.org/content/dam/supplementary-assets/2008/06/Heart-Failure-Patient-Teaching-Guide-2011.pdf) to be completed by IMC RN 5. Activity as tolerated (to patient baseline) |
|  | Technology | EHR   1. CPOE |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |
| 20 | Action | IMC RN receives notification of new orders in his/her work queue |
|  | *Cognitive Goal:* | *Determine level of patient understanding of their condition, plan of care, medication compliance, and follow up care after discharge.* |
|  | Actor(s) | IMC RN |
|  | Action Breakdown | IMC RN reviews and implements the above orders as displayed in his/her work queue   1. After heart failure education is completed, the RN reviews discharge instructions and ensures patient understands all instructions and the plan of care 2. Provides the patient with copies of all discharge instructions 3. Teaches the patient how to utilize the Patient Portal to view his/her medical record after discharge 4. Completes final SOAP note that encompasses all patient education and discharge teaching that has been reviewed |
|  | Technology | EHR   1. Data visualization 2. Data entry 3. EHR Patient Portal 4. Data visualization |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) |
|  | Appendix | [Heart Failure Education](http://www.rwjf.org/content/dam/supplementary-assets/2008/06/Heart-Failure-Patient-Teaching-Guide-2011.pdf)  [Heart Failure Discharge Instructions](http://www.nlm.nih.gov/medlineplus/ency/patientinstructions/000114.htm) |
| 21 | Action | Discharge protocol completion |
|  | *Cognitive Goal:* | *What are the relevant facts to communicate about this patient’s encounter in the Discharge Summary?* |
|  | Actor(s) | Respective clinician |
|  | Action Breakdown | After reviewing discharge instructions with the patient (with return demonstration, if appropriate):   1. The discharge provider’s medication orders are sent via e-RX to the mail order pharmacy 2. The discharge provider’s referrals are automatically sent to the referring provider (if applicable) 3. The discharge summary is automatically sent to the primary care provider’s office—patient care coordinator |
|  | Technology | CPOE interoperability with external Pharmacy Suite System |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [RXNORM](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix | [Hospital Discharge Summary](http://clerkship.medicine.ufl.edu/portfolio/interpersonal-and-communicative-skills/discharge-summarytransfer-noteoff-service-note-instructions/) |
| 22 | Action | Patient is discharged to home from hospital  **LOS: 3 days** |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | IMC RN  Patient |
|  | Action Breakdown | IMC RN discharges patient to home (with adult daughter) via wheelchair |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |

## Data fields required

See appendix references as examples/guides

## Notes and Issues

\*\*\*Indicates an aspect of clinical care that falls within a Meaningful Use (MU) clinical quality measure (CQM)

* + 1. CMS 190 – Intensive Care Unit Venous Thromboembolism Prophylaxis

## References for Clinical Management of Ischemic Heart Disease

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# Depression: Follow-up Outpatient Visit Use Case

Depression

## Introduction

1. This use case was created to evaluate the ontology created by the VistA Evolution GUI Research project. It includes common assessments, observations, interventions, and cognitive goals that arise while caring for a patient in this scenario to ensure that the ontology can accommodate these concepts.
2. All clinical data in this use case is synthetic. Data was created to support the flow of this use case and provide examples of clinical observations that are documented throughout the interaction.
3. Clinical decision making in this use case is based, primarily, on VA/DoD Clinical Practice Guidelines for the Management of Major Depression and Post Traumatic Stress Disorder, available at: [VA/DoD Clinical Guideline for Management of Depression](http://www.healthquality.va.gov/guidelines/MH/mdd/) and [VA/DoD Clinical Guidelines for Management of PTSD](http://www.healthquality.va.gov/guidelines/MH/ptsd/)
   1. Additional clinical resources are listed below in the Reference section.
4. Cognitive goals are included in some Actions to provide insight on the Provider or healthcare professional’s mental process at that point of the encounter.
5. Hyperlinks present in the Appendix column are included to provide examples of the data fields and values that may be entered by the EHR user during this step of the use case.
6. Hyperlinks present in the Standards column suggest standardized terminologies that may be used to capture data during this step of the use case.

## Actors

**Patient:** a person receiving or registered to receive medical treatment

**Provider:** a skilled healthcare professional specializing in mental health that is licensed to practice medicine (within restrictions of their licensure). This can be a physician (MD or DO, i.e. Psychiatrist), nurse practitioner (NP), or physician assistant (PA).

**Medical Office Assistant (MOA) also known as a Medical Assistant or Medication Technician**: a healthcare care team member performing administrative and/or clinical tasks to support the work of physicians or other health professionals

## Description

Routine follow-up visit for an existing diagnosis of depression and PTSD

## Trigger

Patient arrives at a psychiatrist’s office for a follow-up check on their depression (and PTSD)

## Preconditions

This is a 32 year old male with a 6 month treatment history of major depression on Zoloft and receiving group psychotherapy. Risk assessment scores from the last visit 1 month ago: PHQ-9 (15), PCL (16), AUDIT-C (0), ASSIST (10) for Tobacco only. No suicidal ideations or risk of violence towards others.

**PMH:** Depression, PTSD, ETOH Abuse (Recovering), Right Above the Knee Amputation (AKA) 6 months ago – has prosthesis. Denies substance abuse of medications. Smokes 2 ppd. Patient does not have a Traumatic Brain Injury (TBI).

**Psychosocial:** Patient is S/P 2 deployments to Afghanistan, is estranged from family, has no close friends, lives alone and is unemployed. His best friend died during their last deployment together, when the patient was injured. He attends AA meetings daily, is undergoing vocational rehabilitation and has been seen by a community social service agency.

**Depression Risk Factors:**

* Family History of Depressive Disorder
* Age of Onset < 40
* Estranged from family and friends
* Stressful life events (2 deployments, and best friend in platoon died during last deployment)
* ETOH Abuse (Recovering)
* Right AKA 6 months ago (unable to drive at this time). Has prosthesis.
* Unemployed

**Current Treatment regimen (prior to this follow up appointment):**

* Zoloft 150 mg p.o. daily
* Weekly group psychotherapy
* Attending AA meetings regularly

**Assumptions leading in to this use case:**

* Patient was diagnosed with PTSD and MDD 6 months ago with screening and diagnostic tools utilized by the VHA.
* Patient has been receiving regular outpatient care for these conditions, during which time treatment (medication and psychotherapy) has been adjusted as indicated.
  + EHR is able to display a history of all implemented treatments, along with start and stop dates and reason for discontinuation
* Patient is compliant with care regimen that is agreed upon at each encounter with their provider.
* Patient has formed a trusting relationship with their Provider and is engaged in their care.
* Patient has signed a contract, agreeing to contact a health care provider if he is suicidal.
* Patient has refused Tobacco Cessation treatment.

## Postconditions

Minimal guarantees:

1. Data fields required to support this clinical workflow will be present in the EHR.
2. Data entered will be stored utilizing the appropriate clinical vocabulary.

Success guarantees:

1. EHR supports patient-centered care, guided by goals set by the patient.
2. Patient receives evidence-based care based on the health concerns that are noted during the outpatient visit.
3. Patient will achieve improved outcomes and satisfaction as a result of care facilitated by EHR functionality.

## Assumptions

1. EHR can manage the transition of MOA to Provider (e.g., move from one work list to another)
2. For this use case, the psychiatrist may also be substituted with another diagnostician—nurse practitioner or physician assistant.
3. Cognitive decision making throughout this office visit is based on [VA/DoD Clinical Guideline for Management of Depression](http://www.healthquality.va.gov/guidelines/MH/mdd/) and [VA/DoD Clinical Guidelines for Management of PTSD](http://www.healthquality.va.gov/guidelines/MH/ptsd/)
4. This use case focuses on management of depression (and PTSD). Detailed psychotherapy techniques and modalities would be outlined in the psychotherapist’s encounter notes, as opposed to the PCP or psychiatrist’s notes.
5. Management of depression (and PTSD), in this use case, is being overseen by a psychiatrist since the patient has comorbidities and the diagnoses have persisted beyond 3 months. Although, many patients with major depression disorder can be treated in primary care settings, indications for referral to a mental health specialist is indicated in some cases. These indications are outlined on page 37 of [VA/DoD Clinical Guideline for Management of Depression](http://www.healthquality.va.gov/guidelines/MH/mdd/)
6. Standard vocabularies utilized by the organization include: ICD 10 for Diagnosis, RxNorm for medications, SNOMED-CT for clinical assessments, care that is provided and lab results, and LOINC for laboratory tests.

## Normal Flow

| **Step** | | **Component** | **Narrative** |
| --- | --- | --- | --- |
| 1 | Action | Patient checks-in at front desk of medical office |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | MOA  Patient |
|  | Action Breakdown | 1. MOA validates current patient demographics and billing information (i.e. current address and phone number, current insurance) 2. MOA provides patient with tablet loaded with self-administered assessments for Depression (PHQ-9), PTSD (PCL), ETOH abuse (AUDIT-C), and Substance abuse (ASSIST) |
|  | Technology | EHR (Registration System)   1. Data visualization 2. Data entry |
|  | Standard | 1. [Address](http://pe.usps.gov/cpim/ftp/pubs/Pub28/pub28.pdf) 2. [Sex](http://phinvads.cdc.gov/vads/ViewValueSet.action?oid=2.16.840.1.114222.4.11.1038) 3. [Ethnicity](http://www.whitehouse.gov/omb/fedreg_1997standards) 4. [Race](http://www.cdc.gov/minorityhealth/populations/REMP/definitions.html) |
|  | Appendix | [Psychiatric Intake Form](http://cairncenter.com/forms/Psychiatric%20Intake%20Form.pdf) |
| 2 | Action | Patient accepts tablet, completes risk assessments, and returns tablet to MOA. |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Patient  MOA |
|  | Action Breakdown | 1. Patient answers all questions, resulting in the following scores (which will be evaluated by the Provider):    1. PHQ-9 – Score: 17    2. PCL – Score: 15    3. AUDIT-C - Score: 0 (No symptoms of abuse)    4. ASSIST – Score: 10 (Moderate risk for tobacco products) |
|  | Technology | EHR   1. Data entry |
|  | Standard |  |
|  | Appendix | [PHQ-9 (Depression Screening Tool)](https://www.myhealthevet.va.gov/mhv-portal-web/anonymous.portal?_nfpb=true&_pageLabel=mentalHealth&contentPage=mh_screening_tools/PHQ_SCREENING.HTML&WT.ac=mentalHealth_PHQScreen)  [PCL (PTSD Screening Tool)](https://www.myhealthevet.va.gov/mhv-portal-web/anonymous.portal?_nfpb=true&_pageLabel=mentalHealth&contentPage=mh_screening_tools/PTSD_SCREENING.HTML&WT.ac=mentalHealth_PTSDScreen)  [AUDIT-C (ETOH Screening Tool)](https://www.myhealthevet.va.gov/mhv-portal-web/anonymous.portal?_nfpb=true&_pageLabel=mentalHealth&contentPage=mh_screening_tools/ALCOHOL_SCREENING.HTML&WT.ac=mentalHealth_AlcoholScreen)  [ASSIST (Substance Abuse Screening Tool)](https://www.myhealthevet.va.gov/mhv-portal-web/anonymous.portal?_nfpb=true&_pageLabel=mentalHealth&contentPage=mh_screening_tools/ASSIST.HTML&WT.ac=mentalHealth_AssistScreen) |
| 3 | Action | MOA syncs tablet to EHR |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | MOA |
|  | Action Breakdown | 1. Risk assessment responses are uploaded to EHR and ready for Provider review 2. Registration to EHR: flagged ‘ready to be roomed’ |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |
| 4 | Action | Patient is roomed |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | MOA |
|  | Action Breakdown | Patient is placed in room (in EHR) |
|  | Technology | EHR   1. Status entry in Registration System |
|  | Standard |  |
|  | Appendix |  |
| 5 | Action | MOA asks patient for their chief complaint (CC) and any updates on their psychosocial and medical history |
|  | *Cognitive Goal:* | *Determine areas where existing history has changed.* |
|  | Actor(s) | MOA  Patient |
|  | Action Breakdown | 1. Reviews and validates reason for visit—routine outpatient visit for depression and PTSD management 2. Reviews and updates psychosocial history (no changes) |
|  | Technology | EHR   1. Data entry 2. Visualization of Psychosocial History |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) |
|  | Appendix | [Psychiatric Intake Form](http://cairncenter.com/forms/Psychiatric%20Intake%20Form.pdf)  [VA/DoD Clinical Guideline for Management of Depression](http://www.healthquality.va.gov/guidelines/MH/mdd/)  [VA/DoD Clinical Guidelines for Management of PTSD](http://www.healthquality.va.gov/guidelines/MH/ptsd/) |
| 6 | Action | MOA asks patient to list the medications that they are currently taking |
|  | *Cognitive Goal:* | *Ensure understanding of what the patient is reporting. Determine clarifying questions if there are any concerns.* |
|  | Actor(s) | MOA  Patient |
|  | Action Breakdown | 1. MOA initiates \*\*\*[Medication reconciliation](http://www.healthit.gov/providers-professionals/achieve-meaningful-use/menu-measures/medication-reconciliation) by documenting a list of current medications that the patient reports taking. *(Medication reconciliation is not finalized until the Provider reviews the list of medication ordered, compares this to the list reported by the patient, and makes clinical decisions based on the comparison.)*    1. Zoloft 150 mg p.o. daily |
|  | Technology | EHR   1. Visualization of Interventions (Current Medications) 2. Data entry |
|  | Standard | 1. [RxNorm](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix | [VA Medication Reconciliation](http://www.va.gov/vhapublications/ViewPublication.asp?pub_ID=2390) |
| 7 | Action | Vital signs (VS) are taken by the MOA and entered in to the EHR |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | MOA  Patient |
|  | Action Breakdown | height=72”  weight=176 lbs  \*\*\*BMI=23.9  heart rate= 80 bpm  respirations= 18 /min  blood pressure= 124/74 mmHg  temperature=98.2F |
|  | Technology | EHR   1. Data entry |
|  | Standard | 1. [LOINC](http://search.loinc.org/) 2. [SNOMED-CT](http://browser.ihtsdotools.org/) |
|  | Appendix |  |
| 8 | Action | Patient ready for provider |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | MOA |
|  | Action Breakdown | ‘Ready for provider’ flag initiated in EHR |
|  | Technology | EHR   1. Status entry in Registration System |
|  | Standard |  |
|  | Appendix |  |
| 9 | Action | Provider reviews patient record prior to entering patient room |
|  | *Cognitive Goal:* | *Determine meaning of responses from the screening administered on patient arrival. Evaluate effectiveness of treatment based on information gathered to date. Plan areas of focus for the patient encounter (i.e. worsening PHQ-9 score -- what has prompted this?)* |
|  | Actor(s) | Provider |
|  | Action Breakdown | 1. Reviews past medical history (PMH), current medications and dosages, current treatment regimen, and recent reports from specialist referrals (if indicated) 2. Reviews information entered by MOA (including VS) and patient responses to the health risk screening tools. Evaluates scores for trends and/or concerns. |
|  | Technology | EHR   1. Query and visualization of Problem List, Patient History, Interventions and Observations |
|  | Standard | 1. [LOINC](http://search.loinc.org/) 2. [SNOMED-CT](http://browser.ihtsdotools.org/) 3. [RxNorm](http://www.nlm.nih.gov/research/umls/rxnorm/) 4. [ICD-10](http://www.icd10data.com/) |
|  | Appendix |  |
| 10 | Action | Provider enters patient room and greets patient |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider |
|  | Action Breakdown |  |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |
| 11 | Action | Provider discusses and documents the patient’s expression of how they are feeling, along with their concerns. |
|  | *Cognitive Goal:* | *Determine clear understanding of patient’s feelings. Formulate clarifying questions, as needed.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Patient: “I’m not very good. I’m so tired all the time. I’m not sleeping well and I have trouble concentrating. I go to my AA meetings, but that is about it.”  After discussion with the patient, the Provider discovers that patient is concerned about long term living accommodations. The patient is running through his/her savings and will not be able to afford rent beyond the next 4 months. |
|  | Technology | EHR   1. Data entry |
|  | Standard |  |
|  | Appendix |  |
| 12 | Action | Provider completes psychiatric evaluation |
|  | *Cognitive Goal:* | *Evaluate verbal and non-verbal clues to inform psychiatric assessment.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Provider assesses the patient’s mental status, i.e.:   1. Appearance: poorly groomed, patient slouching 2. Behavior: subdued 3. State of consciousness: alert and oriented x 3 4. Attention: slow to respond, shrugs shoulders in response to some questions 5. Speech: soft, coherent |
|  | Technology | EHR   1. Data entry |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) |
|  | Appendix | Mental Status Exam portion of [Psychiatric Evaluation](http://web.utah.edu/umed/courses/year3/psychiatry/psychaid.html) |
| 13 | Action | Provider completes and validates \*\*\*Medication Reconciliation |
|  | *Cognitive Goal:* | *Evaluate for discrepancies. Educate and rectify, as needed.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Provider discusses the meds that the patient states they are currently taking against the medication that has been prescribed.   1. Provider creates an updated list of current medications, documents the list in the system, and provides the patient with a copy at the end of the visit. *(Note: This information is included in the After Visit Summary)*    1. Zoloft 150 mg p.o. daily |
|  | Technology | EHR   1. Data visualization 2. Data entry |
|  | Standard | 1. [RxNorm](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix | [VA Medication Reconciliation](http://www.va.gov/vhapublications/ViewPublication.asp?pub_ID=2390) |
| 14 | Action | Provider completes a head to toe assessment and documents results |
|  | *Cognitive Goal:* | *Evaluate health to assess for medication side effects or physical manifestations of depression* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Head/Neuro: WNL  Heart: S1S2, BP normal  Lungs: Clear  Abdomen: Soft, benign. No GI/GU issues.  Extremities: No swelling, pedal pulses strong. |
|  | Technology | EHR   1. Data entry |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) |
|  | Appendix | [Physical Exam (p 2)](https://www.uthsc.edu/gim/documents/ward-H&P.pdf) |
| 15 | Action | Provider evaluates current therapy |
|  | *Cognitive Goal:* | *Determine areas of concern and begin to formulate a new plan of care* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Provider assesses:   1. Effectiveness of current therapy    1. PHQ-9 indicates worsening depression and patient doesn’t feel well. Additional support is indicated. 2. Adverse effects from the medication    1. None noted 3. Medical problems influencing recovery    1. Patient smokes 2 packs/day, but refuses cessation therapy 4. Psychosocial barrier to therapy    1. Patient has financial concerns. They are not impacting therapy at present, but may in time 5. Accuracy of diagnoses    1. Worsening moderate depression and PTSD are accurate diagnoses |
|  | Technology | EHR   1. Visualization of past Interventions and Observations |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) 3. [RxNorm](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |
| 16 | Action | Provider discusses the possible next steps for the provision of care |
|  | *Cognitive Goal:* | *Evaluate patient engagement and level of commitment. Formulate a plan of care that will work for the patient and achieve patient buy-in.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Provider discusses his/her concern about worsening depression and the need to adjust treatment to better manage the patient’s condition   1. Discuss medication management    1. Provider views Intervention history (i.e. medications and treatments). This includes start and stop dates and the reason for discontinuation.       1. Provider notices that the patient did not tolerate Prazosin in the past (which was started to address difficulty sleeping)       2. Provider also notes: Wellbutrin was prescribed from date *xx/xx/xxxx – xx/xx/xxxx* and was discontinued due to irregular heartbeats and hyperventilation,Prozac was prescribed from date *xx/xx/xxxx – xx/xx/xxxx* and was discontinued due to irregular heartbeats and restlessness*, etc.*       3. Zoloft was started at 50 mg/day on *xx/xx/xxxx*, increased to 100 mg on *xx/xx/xxxx*, and increased to 150 mg on *xx/xx/xxxx*    2. Decide whether to increase dosage of Zoloft vs. adding a second medication (SSRI vs. SNRI vs. others) vs. switching to a different medication 2. Discuss therapy options    1. Provider visualizes psychotherapy history (i.e. started group therapy on date *xx/xx/xxxx*    2. Decide whether to increase frequency of current psychotherapy vs. change type of psychotherapy (i.e. IPT vs. CBT) vs. add additional type of psychotherapy to current regimen 3. Discuss psychosocial concerns    1. Visualize psychosocial support that has been provided (i.e. community based social service agency referral on *xx/xx/xxxx,* started vocational rehabilitation on *xx/xx/xxxx,* receiving telephone care coordination support)    2. How can financial concerns be addressed?       1. Initiate referral to Supported Housing Services       2. Discuss status of vocational rehabilitation and training 4. Discuss smoking cessation.    1. Patient still refuses cessation treatment despite motivational interventions. |
|  | Technology | EHR   1. Visualization of past Interventions and Observations |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) 3. [RxNorm](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |
| 17 | Action | Patient articulates their care preferences, along with their goal |
|  | *Cognitive Goal:* | *Accurate documentation of agreed up next steps.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | “I would prefer to stay on Zoloft since I am not having any side effects from it. I am okay with starting a second medication, if that is what it takes. I will start on individual therapy. I want to feel better. If you can get me help to figure out my money problems, I will take it.” |
|  | Technology | EHR   1. Data entry of Patient Goal |
|  | Standard |  |
|  | Appendix |  |
| 18 | Action | Provider and patient agree upon the following changes to the care regimen, which are documented in the Care Plan. |
|  | *Cognitive Goal:* | *Accurate documentation of agreed up next steps.* |
|  | Actor(s) |  |
|  | Action Breakdown | Care Plan Activities / Targeted Completion   1. Continue Zoloft 150 mg p.o. daily / Immediately 2. Start Venlafaxine 37.5 mg daily x 4 days, then increase to 37.5 mg twice daily / Immediately 3. Referral for weekly individual psychotherapy – *by Provider* / Now 4. Make appointment for weekly individual psychotherapy – *by Patient* / Immediately 5. Continue weekly group psychotherapy / Ongoing 6. Referral to Supported Housing Services provided. Patient to follow up / Immediately 7. Continue Vocational Rehabilitation Training / Ongoing 8. Follow up in 2 weeks to evaluate for medication side effects. - *Provider adds task for MOA to schedule appointment when patient checks out.* / 2 Weeks   Note: Graphic User Interface (GUI) would allow user to populate a target date for each activity (i.e. 1 week = 1.17.15), along with a Completed date when the activity is completed/closed.  Note: Patient understands that they are responsible for making appointments for all referrals and follow up appointments. |
|  | Technology | EHR   1. Data entry of Care Plan |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) 3. [RxNorm](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |
| 19 | Action | Provider utilizes CPOE to implement orders and referrals. |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider |
|  | Action Breakdown | Provider utilizes CPOE to order the following:   1. Venlafaxine 37.5 mg daily x 4 days, then increase to 37.5 mg twice daily. Disp: 24 2. Referral for individual psychotherapy. 20 sessions. Diagnosis: Depression, PTSD. Reason: Worsening depression (PHQ-9 15 ->17 on Zoloft 150 mg daily and weekly group psychotherapy) 3. Referral for Supported Housing Services |
|  | Technology | EHR   1. CPOE |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) 3. [RxNorm](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |
| 20 | Action | Provider closes the visit by having the patient do a “return demonstration” of their next steps in the management of their health. This includes time frames for completion of each event.  An [after visit summary](http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/13_Clinical_Summaries.pdf) (AVS) is provided. |
|  | *Cognitive Goal:* | *Evaluation of patient understanding.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Patient states, “I am going to:   1. Keep taking my Zoloft and start taking Venlafaxine (once a day for 4 days and then twice a day after that) 2. Keep going to my group psychotherapy and make an appointment for weekly individual psychotherapy with the person that you recommended 3. Contact Supported Housing Services and finish my Vocational Rehabilitation Training 4. Make an appointment to see you in 2 weeks and let you know sooner if I am having side effects from the new medication. |
|  | Technology |  |
|  | Standard |  |
|  | Appendix | [After Visit Summary (AVS)](http://www.hsrd.research.va.gov/for_researchers/cyber_seminars/archives/743-notes.pdf) |
| 21 | Action | Patient ‘checks out’ with MOA |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Patient  MOA |
|  | Action Breakdown | MOA view task list and sees that patient needs a follow up appointment in 2 weeks.   1. OC schedules follow up appointment in 2 weeks 2. OC marks the encounter as ‘completed’ |
|  | Technology | Scheduling system   1. Visualization of work list and Provider schedule 2. Data entry |
|  | Standard |  |
|  | Appendix |  |
| 22 | Action | Provider signs off on the encounter |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider |
|  | Action Breakdown | 1. Provider reviews and validates note and data entered during the encounter 2. Provider signs off on the encounter |
|  | Technology | EHR   1. Visualization of data 2. Data entry |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) 3. [RxNorm](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |

## Data fields required

See appendix references as examples/guides

## Notes and Issues

1. Entries that include \*\*\* indicate compliance with a Meaningful Use clinical quality measure
   1. CMS 68 – Documentation of Current Medications in the Medical Record
   2. CMS 138 – Preventative Care and Screening: Tobacco Use: Screening and Cessation Intervention
   3. CMS 69 – Preventative Care and Screening: BMI Screening and Follow up Plan

## References for Clinical Management of Depression and PTSD

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# New patient profile and initial diagnosis of DM Type 2

DM 1

## Introduction

1. This use case was created to evaluate the ontology created by the VistA Evolution GUI Research project. It includes common assessments, observations, interventions, and cognitive goals that arise while caring for a patient in this scenario to ensure that the ontology can accommodate these concepts.
2. All clinical data in this use case is synthetic. Data was created to support the flow of this use case and provide examples of clinical observations that are documented throughout the interaction.
3. Clinical decision making in this use case is based, primarily, on VA/DoD Clinical Practice Guidelines for the Management of Diabetes Mellitus in Primary Care, available at: <http://www.healthquality.va.gov/guidelines/CD/diabetes/>
4. Additional clinical resources are listed below in the Reference section.
5. Cognitive goals are included in some ‘Actions’ to provide insight on the Provider or healthcare professional’s mental process at that point of the encounter.
6. Hyperlinks present in the Appendix column are included to provide examples of the data fields and values that may be entered by the EHR user during this step of the use case.
7. Hyperlinks present in the Standards column suggest standardized terminologies that may be used to capture data in this step of the use case.

## Actors

**Patient:** a person receiving or registered to receive medical treatment

**Provider:** Physician, physician assistant (PA), or nurse practitioner (NP). All are skilled health-care professionals trained and licensed to diagnose and treat patients within their defined scope of practice.

**Office Clerk (OC):** an administrative assistant that manages appointment schedules for the physicians in the practice and handles insurance coverage intake and receipt of co-pays for office visits.

## Description

New patient (35 year old white male) presents to primary care practice for a physical and is diagnosed with DM Type 2

## Trigger

1. Patient arrives to primary care practice office for a scheduled physical that is required as a pre-employment requirement
2. Minimum demographic data was collected from patient over-the-phone for pre-arrival insurance/eligibility verification

## Preconditions

1. The patient brings a copy of their most recent lab work drawn one year ago:
   1. Fasting—chem7 (blood):
2. sodium (NA)=138 mEq/L
3. potassium (K)=3.9 mEq/L
4. blood urea nitrogen (BUN)=12 mg/dL
5. creatinine (Cr)=0.8 mg/dL
6. **glucose=135 (H**)
   1. Fasting—**glycated hemoglobin (HbA1c)=6.4 (H)**
   2. Fasting—lipid panel:
      1. total cholesterol=185 mg/dL
      2. triglycerides=150 mg/dL
      3. high-density lipoproteins (HDL)=60 mg/dL
      4. low-density lipoproteins (LDL)=125 mg/dL
   3. CBC
      1. WBC = 6.6
      2. RBC = 4.7
      3. Hemoglobin = 14.5 grams/dL
      4. Hematocrit = 40.2 %
      5. Platelet count = 235 billion/L

## Postconditions

Minimal guarantees:

1. Data fields required to support this clinical workflow will be present in the EHR.
2. Data entered will be stored utilizing the appropriate clinical vocabulary.

Success guarantees:

1. EHR supports patient-centered care, guided by goals set by the patient.
2. Patient receives evidence-based care based on the health concerns that are noted during the outpatient visit.
3. Patient will achieve improved outcomes and satisfaction as a result of care facilitated by EHR functionality.

## Assumptions

1. The patient was provided the option of entering their demographic and past medical history information via an online patient portal, however they did not have time to utilize this option. In this scenario, a patient portal tablet is provided to the patient when they present to the office to enter the required information.
   1. Patients who do not utilize the online patient portal prior to their appointment are asked to arrive for their appointment 15 minutes early to provide time for this required data collection.
2. The practice utilizes patient portal tablets in their office to capture patient demographic, past medical history (PMH), “reason for visit” information, etc.
   1. The patient portal can sync with the EHR and populate required fields in the EHR
   2. The patient portal enforces mandatory fields to ensure that all required data is captured
   3. The patient is oriented to the patient portal and enters all relevant and required information
3. Patient is able to select any Provider to complete the pre-employment physical
4. Patient has not had anything to eat or drink since the night before.
5. EHR can manage the transition of OC to Provider (e.g., move from one work list to another)
6. EHR has computerized physician order entry (CPOE) functionality
7. EHR is able to generate referral request as entered by Provider
8. Diabetics on oral hypoglycemic medications are managed by their primary care physician.
9. Standard vocabularies utilized by the organization include: ICD10 for Diagnosis, RxNorm for medications, SNOMED-CT for clinical assessments, care that is provided and lab results, and LOINC for laboratory tests.

## Normal Flow

| **Step** | | **Component** | **Narrative** |
| --- | --- | --- | --- |
| 1 | Action | Patient checks in at front desk of medical office |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | OC  Patient |
|  | Action Breakdown | OC marks the patient as present in the scheduling system |
|  | Technology | Scheduling system (data entry) |
|  | Standard |  |
|  | Appendix |  |
| 2 | Action | OC provides the patient with an electronic tablet to finish new patient information (e.g. demographic info, PMH, etc.) |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | OC  Patient |
|  | Action Breakdown | Patient enters the following information in to the system:   1. Validates demographic information 2. Validates insurance: Tricare, member #: xxx-xx, etc. 3. PMH: melanoma on nose 2007, appendectomy 1990 4. Allergies: Penicillin (hives) 5. Current medications: none 6. Smoker: No 7. Alcohol Use: Social 8. Substance Use: No 9. Reason for visit: Pre-employment physical   Patient completes depression screening (PHQ-2)   1. Result: 0 (Negative)   Patient completes PTSD screening   1. Results: Negative   Patient completes alcohol use screening   1. Result: 2 (Negative)   Patient completes substance use screening   1. Result: Alcohol ‘5’ (Low Risk) |
|  | Technology | EHR Patient Portal (Data entry) |
|  | Standard |  |
|  | Appendix | [New Patient Sheet](https://www.freeprintablemedicalforms.com/download.php?file=TmV3X1BhdGllbnRfU2hlZXQucGRmLDE0OTY3MDMxNDUsZmNlNGZkZjgzYTY5YmY4ZmFkMTE3Yzg3ZGVhY2Q3MWE%3D)  [Adult Health History](http://georgetownmedical.com/util/documents/hx-physical-form.pdf)  [VA/DoD Clinical Guidelines for Depression](http://www.healthquality.va.gov/guidelines/MH/mdd/CPGMDDClinicalGuidelinesPocketCard053013.pdf)  [PCL (PTSD Screening Tool)](https://www.myhealthevet.va.gov/mhv-portal-web/anonymous.portal?_nfpb=true&_pageLabel=mentalHealth&contentPage=mh_screening_tools/PTSD_SCREENING.HTML&WT.ac=mentalHealth_PTSDScreen)  [Alcohol Use Screening Tool](https://www.myhealthevet.va.gov/mhv-portal-web/anonymous.portal?_nfpb=true&_pageLabel=mentalHealth&contentPage=mh_screening_tools/ALCOHOL_SCREENING.HTML&WT.ac=mentalHealth_AlcoholScreen#noJavascript)  [Substance Abuse Screening Tool](https://www.myhealthevet.va.gov/mhv-portal-web/anonymous.portal?_nfpb=true&_pageLabel=mentalHealth&contentPage=mh_screening_tools/ASSIST.HTML&WT.ac=mentalHealth_AssistScreen#noJavascript) |
| 3 | Action | OC accepts tablet back from patient, syncs it with the EHR, and completes registration process |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | OC |
|  | Action Breakdown | 1. Validates that all required fields are populated and house relevant data 2. Enters demographic information in to EHR using standard vocabulary 3. Registration to EHR: flagged ‘ready for provider’ |
|  | Technology | Registration system (data transfer and validation)  EHR (status entry) |
|  | Standard | 1. [Address](http://pe.usps.gov/cpim/ftp/pubs/Pub28/pub28.pdf) 2. [Sex](http://phinvads.cdc.gov/vads/ViewValueSet.action?oid=2.16.840.1.114222.4.11.1038) 3. [Ethnicity](http://www.whitehouse.gov/omb/fedreg_1997standards) 4. [Race](http://www.cdc.gov/minorityhealth/populations/REMP/definitions.html) |
|  | Appendix |  |
| 4 | Action | PA/NP views task list to review the day’s list of scheduled appointments. |
|  | *Cognitive Goal:* | *Plan the day ahead. Review charts (if time allows) and alert self to potential problems or areas for close review.* |
|  | Actor(s) | Provider |
|  | Action Breakdown | Views task list to review list of scheduled appointments for the day and the location of patients who have checked in with the front desk already |
|  | Technology | Scheduling system (visualization) |
|  | Standard |  |
|  | Appendix |  |
| 5 | Action | PA/NP reviews information provided by the patient via the portal, lab results presented to the OC, and then searches the EHR system for other health care occurrences. |
|  | *Cognitive Goal:* | *Create a patient “profile” with the gathered information, along with a list of indicated interventions based on age, demographics, and other data viewed. (i.e. will need flu shot if it is flu season).* ***Note: This cognitive function is supplemented by decision support reminders and notifications.*** *Form questions about gaps in information.* |
|  | Actor(s) | Provider |
|  | Action Breakdown | 1. Provider queries the system by patient name, social security number, and Patient ID number. No results returned. |
|  | Technology | EHR (Query and visualization) |
|  | Standard |  |
|  | Appendix |  |
| 6 | Action | PA/NP calls patient in to examination room |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Patient reports that they are “feeling fine and the only reason they made the appointment was for a pre-employment physical”   1. Reviews and validates reason for visit—pre-employment physical 2. Reviews and updates medical history 3. Enters relevant existing history to the Active Problem List |
|  | Technology | EHR (Visualization of Health History and Data entry) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) |
|  | Appendix |  |
| 7 | Action | PA/NP discusses lab results brought by the patient that were drawn one year ago |
|  | *Cognitive Goal:* | *Create a differential diagnosis (i.e. Type 1 DM vs. Type 2 DM vs. Metabolic Syndrome, etc.) Select a ‘working’ diagnosis (DM Type 2). Begin to formulate a mental plan for additional diagnostic tests to confirm suspected diagnosis.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Provider discusses concern about elevated glucose and HbA1c.  Patient states, “The other doctor explained that my blood sugar was a little high and I should watch what I eat. I feel fine though. I haven’t had any problems.” |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |
| 8 | Action | PA/NP provides the patient a gown and allows time for the patient to change |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown |  |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |
| 9 | Action | PA/NP returns to the exam room. Vital signs (VS) are taken and entered in to the EHR. |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown |  |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |
| 10 | Action | PA/NP returns to the exam room. Vital signs (VS) are taken and entered in to the EHR. |
|  | *Cognitive Goal:* | *Assess health status. Determine observations outside of normal limits. Identify risk factors for DM (i.e. elevated BMI)* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | height=72”  weight=235 lbs  \*\*\*BMI=31  heart rate= 82 bpm  respirations= 18 /min  blood pressure= 128/78 mmHg  temperature=97.9F  Eye exam = Right 20/20, Left 20/20 without glasses  Pupils: Equal |
|  | Technology | EHR (Data entry) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix | [Pre-employment Physical Exam form (page 2)](http://healthcareexpress.us/downloads/physical_evaluation_form.pdf) |
| 11 | Action | PA/NP performs a head to toe assessment, documents findings in EHR, and completes pre-employment physical form. |
|  | *Cognitive Goal:* | *Assess health status. Determine observations outside of normal limits. Identify areas of concern if DM is confirmed (i.e. ingrown toenail)* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Eyes/Ears/Nose/Throat: Within normal limits (WNL)  Heart: S1S2, regular  Pulses: + 2 throughout  Lungs: clear bilaterally  Abdomen: soft, benign, waist circumference = 42 inches  Skin: intact.  Visual inspection of feet: Ingrown toenail |
|  | Technology | EHR (Data entry) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) |
|  | Appendix | [Pre-employment Physical Exam form (page 2)](http://healthcareexpress.us/downloads/physical_evaluation_form.pdf) |
| 12 | Action | Point-of-care (POC) analysis—fasting glucose performed due to elevated results in the past. Results entered in to EHR. |
|  | *Cognitive Goal:* | *Evaluate fasting glucose to determine validity of differential diagnosis. If elevated, this is the second incidence of an elevated fasting blood glucose, therefore the patient will be diagnosed with DM Type 2.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | POC fasting glucose=145mg/dL |
|  | Technology | EHR (Data entry) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix |  |
| 13 | Action | PA/NP utilizes hyperlinks to clinical guidelines and decision support resources to confirm diagnosis |
|  | *Cognitive Goal:* | *Validate working diagnoses of Obesity and DM Type 2 by utilizing scientific resources.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | 1. Provider views clinical guidelines for obesity and DM Type 2 that are available via an InfoButton and validates:    1. Patient is obese based on BMI       1. Obesity is added to the Problem List    2. Fasting glucose is elevated. Since this is the second occurrence of fasting glucose >=126, the patient is now diagnosed as having DM Type 2       1. DM Type 2 is added to the Problem List |
|  | Technology | EHR (Links to Clinical Resources and Data entry on Problem List) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) |
|  | Appendix | [Standards of Medical Care in Diabetes](http://care.diabetesjournals.org/content/36/Supplement_1/S11.full)  [VA Clinical Practice Guidelines for Management of DM](http://www.healthquality.va.gov/guidelines/CD/diabetes/DM2010_FUL-v4e.pdf) |
| 14 | Action | PA/NP discusses findings and health concerns noted during the examination |
|  | *Cognitive Goal:* | *Evaluate patient understanding and engagement following discussion of diagnoses’ and indications for care.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | 1. Patient is Obese based on elevated BMI 2. Patient has Type 2 Diabetes Mellitus based on evidence of elevated fasting blood glucose levels >= 126 on 2 different occasions 3. Provider discusses the clinical significance of these diseases, their impact on the body, and recommended treatment regimens    1. Provider recommends detailed follow up for DM to properly manage the disease, along with a weight loss program (since DM may be caused by the obesity).    2. Discuss the need for lifestyle changes and the possibility of starting on an oral hypoglycemic medication 4. Patient is cleared for employment |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |
| 15 | Action | Patient and PA/NP discuss the patient’s goals based on these physical findings and recommendations |
|  | *Cognitive Goal:* | *Understand patient perspective and goals. Begin to formulate a personalized plan of care for the patient.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | 1. Patient states that they want to lose weight, since that will reduce insurance premiums and help with the diabetes 2. They prefer group exercise classes, otherwise they tend to skip work out sessions. 3. They also want to learn about as much as possible about DM, because they do not know anything about it. 4. They prefer to try lifestyle modification (diet and exercise) to manage their blood sugar before starting on a medication |
|  | Technology | EHR (Data entry of Patient Goals and priorities) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) |
|  | Appendix | [Shared Decision Making Resource](http://www.healthquality.va.gov/guidelines/CD/diabetes/cpgSDMDMPOCKETFinalPRESS022513.pdf) |
| 16 | Action | Provider develops a care plan with the patient, based on their stated goals |
|  | *Cognitive Goal:* | *Appropriate selection of interventions based on the patient’s condition and preferences.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | 1. Order: Chem 7, CBC, \*\*\*Fasting Lipid Profile, urine for microalbuminuria, and HbA1c **to be drawn during this appointment**.    1. Add task for OC to print out lab orders 2. Follow up in one month to evaluate blood sugar and weight with lifestyle modifications    1. Add task for OC to schedule a follow up appointment in 1 month 3. \*\*\*Refer to weight loss program for diet, exercise and behavior modification – \*Make first appointment within next week.  * \*Weight loss goal – 5 pounds within next month  1. Provide brochures on free exercise classes at local community center  * \*Attend 1 hour exercise class 3 times a week and walk 2 miles 4 times a week  1. Refer to diabetic educator for disease specific education related to symptoms and management  * \*Make first appointment within next week  1. Refer to support group education sessions for newly diagnosed diabetics.  * \*Attend one meeting/month  1. \*\*\*Refer to Podiatrist  * \*Make appointment within next month * Provider adds task to review outcome of referral in 6 weeks  1. \*\*\*Refer to Ophthalmologist  * \*Make appointment within next month. * Provider adds task to review outcome of referral in 6 weeks  1. Encourage patient to utilize patient portal Provide access information to patient portal so that patient can view records at any time 2. Establish personalized goals:  * \*Maintain HbA1c < 7% * \*Fasting blood sugar <125 * \*BP < 140/80 * \*LDL < 125 mg/dL |
|  | Technology | EHR (Data entry of Care Plan) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix | [Physician Referral Form](http://www.mayo.edu/pmts/mc0600-mc0699/mc0688-04.pdf)  [VA Clinical Guidelines for Obesity](http://www.healthquality.va.gov/guidelines/CD/obesity/VADoDOBECPGPocketCardFINAL070314.pdf)  [DM Teaching Checklist](http://www.healthquality.va.gov/guidelines/CD/diabetes/DiabetesTeachingChecklist.pdf)  [Teaching Points for Patients with DM](http://www.healthquality.va.gov/guidelines/CD/diabetes/DiabetesTeachingFlipChart.pdf) |
| 17 | Action | Provider creates a care plan with the patient (based on their stated goals), then closes the OV by having the patient do a “return demonstration” of their next steps in the management of their health. This includes time frames for completion of each event.  An [after visit summary](http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/13_Clinical_Summaries.pdf) (AVS) is provided. |
|  | *Cognitive Goal:* | *Evaluate patient understanding of the plan of care, along with their level of commitment. Determine if the patient would benefit from additional support mechanisms.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Care Plan Activities / Targeted Completion   1. Fasting lab work at the end of this visit. / Now 2. Follow up appt. / 1 Month 3. Make appt. w/ weight loss program and diabetic educator within next week / 1 week 4. Lose 10 lbs within next 3 months (patient will monitor progress weekly) / 3 months 5. Attend exercise class 3 x’s/week and walk 4 x’s/week / weekly 6. Attend 1 DM group therapy session per month / 1 month 7. Make appointments. with Podiatrist and Ophthalmologist and be seen by these specialists within the next month / 1 month 8. Work to achieve my personal goals / Ongoing   *Note: Graphic User Interface (GUI) would allow user to populate a target date for each activity (i.e. 1 day = 1.10.15), along with a Completed date when the activity is completed/closed. GUI will also allow provider to view progress towards toward Activity Completion, if the activity spans a period of time (i.e. lose 10 lbs within the next 3 months).* |
|  | Technology | EHR (Visualization of care plan) |
|  | Standard |  |
|  | Appendix | [AVS](http://www.healthit.gov/sites/default/files/avs-tech-guide.pdf) |
| 18 | Action | Patient ‘checks out’ with OC |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Patient  OC |
|  | Action Breakdown | 1. OC schedules follow up appointment in one week 2. OC prints lab orders, labels blood vials and sends blood samples to lab 3. OC marks the encounter as ‘completed’ |
|  | Technology | Scheduling system (Data entry and visualization)  CPOE (Visualization of lab orders for printing) |
|  | Standard |  |
|  | Appendix |  |
| 19 | Action | Provider signs off on the encounter |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider |
|  | Action Breakdown | 1. Provider reviews and validates note and data entered during the encounter 2. Provider signs off on the encounter |
|  | Technology | EHR (Data entry and visualization) |
|  | Standard |  |
|  | Appendix |  |
| Alternative Flows: | | |
| 20 | Action | Lab results are returned |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Patient |
|  | Action Breakdown | * 1. Patient receives email notification that lab results are available on the patient portal      1. Patient logs in to the patient portal to view results         1. Patient clicks on information buttons for each result to view explanation of the lab test, result ranges, and links to additional information      2. Since Provider has set notification alert thresholds to only notify for abnormal results or lack of results, the lab results are added to the Provider’s task list for viewing and the Provider only receives notification about elevated HbA1c and glucose levels |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |
| 21 | Action | Patient has question about a specific lab result |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Patient  Provider |
|  | Action Breakdown | 1. Patient clicks on secure email icon within the patient portal, enters their question for the Provider, and hits the Send button 2. Provider receives email notification that a secure message is waiting from a patient 3. Provider enters secure email application, sends a response to the patient, and encourages the patient to email or call the office with any additional questions or concerns. |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |

## Data fields required

See appendix references as examples/guides

## Notes and Issues

1. Entries that include \*\*\* indicate compliance with a Meaningful Use clinical quality measure
   1. CMS 2 - Preventative Care and Screening: Screening for Clinical Depression and Follow-Up Plan

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# Follow-up Outpatient Visit for Established Diabetic Patient

DM 2

## Introduction

1. This use case was created to evaluate the ontology created by the VistA Evolution GUI Research project. It includes common assessments, observations, interventions, and cognitive goals that arise while caring for a patient in this scenario to ensure that the ontology can accommodate these concepts.
2. All clinical data in this use case is synthetic. Data was created to support the flow of this use case and provide examples of clinical observations that are documented throughout the interaction.
3. Clinical decision making in this use case is based, primarily, on VA/DoD Clinical Practice Guidelines for the Management of Diabetes Mellitus in Primary Care, available at: <http://www.healthquality.va.gov/guidelines/CD/diabetes/>
4. Additional clinical resources are listed below in the Reference section.
5. Cognitive goals are included in some ‘Actions’ to provide insight on the Provider or healthcare professional’s mental process at that point of the encounter.
6. Hyperlinks present in the Appendix column are included to provide examples of the data fields and values that may be entered by the EHR user during this step of the use case.
7. Hyperlinks present in the Standards column suggest standardized terminologies that may be used to capture data in this step of the use case.

## Actors

**Patient:** a person receiving or registered to receive medical treatment.

**Provider:** a skilled health-care professional that is trained and licensed to practice medicine. This includes: Physician (MD or DO), nurse practitioner (NP) or physician assistant (PA).

**Medical Office Assistant (MOA) also known as a Medical Assistant or Medical Technician:** a healthcare care team member that performs administrative and/or clinical tasks to support the work of Providers or other health professionals.

## Description

Routine follow-up visit for previous diagnosis of patient with Diabetes Mellitus Type 2 (DM2)

## Trigger

Patient arrives to physician office for their DM2 routine follow-up

## Preconditions

1. Patient has already been diagnosed with DM2
2. Patient has an established relationship with this primary care provider.
3. Patient had laboratory tests completed one week prior to office visit.
4. Fasting—Chem7 (blood):
5. sodium (NA)=140 mEq/L
6. potassium (K)=4.5 mEq/L
7. blood urea nitrogen (BUN)=13 mg/dL
8. creatinine (Cr)=0.9 mg/dL
9. glucose=**120 (H)**
10. Fasting—glycated hemoglobin (HbA1c)=**7.5 (H)**
11. \*\*\*Fasting—lipid panel:
12. total cholesterol=185 mg/dL
13. triglycerides=150 mg/dL
14. high-density lipoproteins (HDL)=60 mg/dL
15. low-density lipoproteins (LDL)=125 mg/dL
16. \*\*\*Micro-albumin (urine)=22 mg

## Postconditions

Minimal guarantees:

1. Data fields required to support this clinical workflow will be present in the EHR.
2. Data entered will be stored utilizing the appropriate clinical vocabulary.

Success guarantees:

1. EHR supports patient-centered care, guided by goals set by the patient.
2. Patient receives evidence-based care based on the health concerns that are noted during the outpatient visit.
3. Patient will achieve improved outcomes and satisfaction as a result of care facilitated by EHR functionality.

## Assumptions

1. EHR can manage the transition of MOA to Provider (e.g., move from one work list to another)
2. For this use case, the physician may also be substituted with another diagnostician—nurse practitioner (NP) or physician assistant (PA).
3. Cognitive decision making throughout this office visit is based on [VA Clinical Practice Guidelines for Management of DM](http://www.healthquality.va.gov/guidelines/CD/diabetes/DM2010_FUL-v4e.pdf)
4. Standard vocabularies utilized by the organization include: ICD 10 for Diagnosis, RxNorm for medications, SNOMED-CT for clinical assessments, care that is provided and lab results, and LOINC for laboratory tests.
5. Diabetic patients on oral hypoglycemic medications are managed by their primary care provider.

## Normal Flow

| **Step** | | **Component** | **Narrative** |
| --- | --- | --- | --- |
| 1 | Action | Patient checks-in at front desk of medical office |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | MA  Patient |
|  | Action Breakdown | 1. Validates current patient demographics and billing information 2. Registration to EHR: flagged ‘ready to be roomed’ |
|  | Technology | Registration System (Data entry) |
|  | Standard | 1. [Address](http://pe.usps.gov/cpim/ftp/pubs/Pub28/pub28.pdf) 2. [Sex](http://phinvads.cdc.gov/vads/ViewValueSet.action?oid=2.16.840.1.114222.4.11.1038) 3. [Ethnicity](http://www.whitehouse.gov/omb/fedreg_1997standards) 4. [Race](http://www.cdc.gov/minorityhealth/populations/REMP/definitions.html) |
|  | Appendix | [New Patient Sheet](https://www.freeprintablemedicalforms.com/download.php?file=TmV3X1BhdGllbnRfU2hlZXQucGRmLDE0OTY3MDMxNDUsZmNlNGZkZjgzYTY5YmY4ZmFkMTE3Yzg3ZGVhY2Q3MWE%3D) |
| 2 | Action | Patient is seated in waiting room |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Patient |
|  | Action Breakdown |  |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |
| 3 | Action | Patient is escorted in to an exam room |
|  | *Cognitive Goal:* |  |
|  | Actor(s) |  |
|  | Action Breakdown | MOA |
|  | Technology | Patient is placed in room (in EHR) |
|  | Standard |  |
|  | Appendix |  |
| 4 | Action | Patient reports chief complaint (CC), and provides updates on psycho-social and medical history |
|  | *Cognitive Goal:* | *Determine the reason for the patient's visit and relevant updates to their medical history.* |
|  | Actor(s) | MOA  Patient |
|  | Action Breakdown | 1. Reviews and validates reason for visit—routine OV for DM2 management 2. Reviews and updates psychosocial history |
|  | Technology | EHR (Visualization of Health History and Data entry |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) |
|  | Appendix | [Adult Health History](http://georgetownmedical.com/util/documents/hx-physical-form.pdf)  Health Risk Assessment    [VA Clinical Practice Guidelines for Management of DM](http://www.healthquality.va.gov/guidelines/CD/diabetes/DM2010_FUL-v4e.pdf) |
| 5 | Action | MOA asks patient to provide an update on current medications |
|  | *Cognitive Goal:* | *Thorough understanding and documentation of reported meds.* |
|  | Actor(s) | MOA  Patient |
|  | Action Breakdown | MOA initiates \*\*\*[Medication reconciliation](http://www.healthit.gov/providers-professionals/achieve-meaningful-use/menu-measures/medication-reconciliation) by documenting a list of current medications that the patient reports taking. *(Medication reconciliation is not finalized until the provider reviews ordered medications, compares the two lists and makes clinical decisions based on the comparison.)* |
|  | Technology | EHR (Visualization of Interventions and Data entry) |
|  | Standard | 1. [RxNorm](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix | [VA Medication Reconciliation](http://www.va.gov/vhapublications/ViewPublication.asp?pub_ID=2390) |
| 6 | Action | Patient provides MOA 90-day history of glucose readings from patient (if available). |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | MOA |
|  | Action Breakdown | 1. Patient reviews 90-day glucose history and places in temporary paper chart. |
|  | Technology | EHR (Data entry) |
|  | Standard |  |
|  | Appendix | Blood Sugar Tracker |
| 7 | Action | Vital signs (VS) are taken and entered in to the EHR |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | MOA  Patient |
|  | Action Breakdown | height=72”  weight=265 lbs  \*\*\*BMI=35.9  heart rate= 80 bpm  respirations= 18 /min  blood pressure= 124/78 mmHg  temperature=98.4F |
|  | Technology | EHR (Data entry) |
|  | Standard | 1. [LOINC](http://search.loinc.org/) 2. [SNOMED-CT](http://browser.ihtsdotools.org/) |
|  | Appendix | [Diabetes Provider Visit Form](http://www.diabetesinitiative.org/resources/tools/documents/45-PROV-ProviderSOAPform_web.pdf) (Section ‘O’)  [Diabetic Clinical Form and Problem List](http://www.diabetesinitiative.org/resources/tools/documents/3-MAIC-Clinicalform_resources_web.pdf) |
| 8 | Action | Point-of-care (POC) analysis—glucose performed and results entered in to EHR |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | MOA  Patient |
|  | Action Breakdown | POC glucose=154mg/dL |
|  | Technology | EHR (Data entry) |
|  | Standard | 1. [LOINC](http://search.loinc.org/) 2. [SNOMED-CT](http://browser.ihtsdotools.org/) |
|  | Appendix | [Diabetes Provider Visit Form](http://www.diabetesinitiative.org/resources/tools/documents/45-PROV-ProviderSOAPform_web.pdf) (Section ‘O’) |
| 9 | Action | Patient ready for provider |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | MOA |
|  | Action Breakdown | ‘Ready for provider’ flag initiated in EHR |
|  | Technology | EHR (Status entry) |
|  | Standard |  |
|  | Appendix |  |
| 10 | Action | Provider reviews patient chart prior to entering patient room |
|  | *Cognitive Goal:* | *Formulate priorities for this encounter (i.e. evaluation of current therapy). Determine if there are gaps in information or areas of concern to address. Evaluate gathered observations for trends or concerns.* |
|  | Actor(s) | Provider |
|  | Action Breakdown | 1. Reviews past medical history (PMH), current medications and dosages, recent lab results and lab trends, recent diagnostic procedure results (if applicable), recent reports from specialist referrals 2. Reviews information entered by MOA (including VS and Health Risk Assessment form) and evaluates for trends or concerns 3. Evaluates patient's 90 day glucose history |
|  | Technology | EHR (Visualization of Problem List, Patient History, Interventions and Observations) |
|  | Standard | 1. [LOINC](http://search.loinc.org/) 2. [SNOMED-CT](http://browser.ihtsdotools.org/) 3. [RxNorm](http://www.nlm.nih.gov/research/umls/rxnorm/) 4. [ICD-10](http://www.icd10data.com/) |
|  | Appendix | [Diabetes Provider Visit Form](http://www.diabetesinitiative.org/resources/tools/documents/45-PROV-ProviderSOAPform_web.pdf) (completes chart and lab review section)  [Diabetic Clinical Form and Problem List](http://www.diabetesinitiative.org/resources/tools/documents/3-MAIC-Clinicalform_resources_web.pdf) |
| 11 | Action | Provider enters patient room and greets patient |
|  | *Cognitive Goal:* |  |
|  | Actor(s) |  |
|  | Action Breakdown |  |
|  | Technology |  |
|  | Standard |  |
|  | Appendix | [Diabetes Provider Visit Form](http://www.diabetesinitiative.org/resources/tools/documents/45-PROV-ProviderSOAPform_web.pdf) (Section ‘S’) |
| 12 | Action | Provider discusses the patient’s concerns and complaints and documents them |
|  | *Cognitive Goal:* | *Establish patient's perspective on their health and disease management. Formulate discussion points or interventions to address patient's concerns* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | “Sometimes I forget to take my medications in the morning because I am rushing out the door. I don’t have time to pack my lunch, so I eat out nearly every day.” |
|  | Technology | EHR (Data entry) |
|  | Standard |  |
|  | Appendix | [Diabetes Provider Visit Form](http://www.diabetesinitiative.org/resources/tools/documents/45-PROV-ProviderSOAPform_web.pdf) (Section ‘S’) |
| 13 | Action | Provider completes and validates \*\*\*Medication Reconciliation |
|  | *Cognitive Goal:* | *Determine if there are discrepancies between what meds the patient is taking and what they were ordered. Clarify expectations and medication orders to ensure proper provision of care and compliance.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Provider discusses what the patient states that they are currently taking against the medication that has been prescribed.   1. Provider creates an updated list of current medications, documents the list in the system, and provides the patient with a copy at the end of the visit. *(Note: This information is included in the After Visit Summary)* |
|  | Technology | EHR (Data entry) |
|  | Standard | 1. [RxNorm](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix | [VA Medication Reconciliation](http://www.va.gov/vhapublications/ViewPublication.asp?pub_ID=2390) |
| 14 | Action | Provider completes a head to toe assessment and documents results |
|  | *Cognitive Goal:* | *Determine assessments that require discussion and/or follow-up. Evaluate for complications of DM.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Head/Neuro: WNL  Heart: S1S2, BP normal  Lungs: Clear  Abdomen: Soft, benign  Extremities: No swelling, bilateral pedal pulses +2,  Foot exam: skin intact.  \*\*\*Referral provided for annual evaluations (podiatrist, ophthalmologist) |
|  | Technology | EHR (Data entry) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) |
|  | Appendix | [Physical Exam (p 2)](https://www.uthsc.edu/gim/documents/ward-H&P.pdf)  [Physician Referral Form](http://www.mayo.edu/pmts/mc0600-mc0699/mc0688-04.pdf) (additionally allow the attachment of most recent OV, lab values, or other diagnostics) |
| 15 | Action | Provider discusses blood sugar control |
|  | *Cognitive Goal:* | *Evaluate effectiveness of current care regimen. Refine the list of potential interventions to address noted concerns.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | 1. Reviews 90-day history of home glucose readings (Average fasting glucose = 120) 2. Reviews HbA1c result (HbA1c = 7.5) and trend. Shows patient data visualization. 3. Reviews current diabetes medications   500mg Metformin BID (preferably AM meal and PM meal) |
|  | Technology | EHR (Visualization of Interventions and Observations) |
|  | Standard | 1. [LOINC](http://search.loinc.org/) 2. [SNOMED-CT](http://browser.ihtsdotools.org/) 3. [RxNorm](http://www.nlm.nih.gov/research/umls/rxnorm/) |
|  | Appendix |  |
| 16 | Action | Patient discusses his/her goal related to diabetes management |
|  | *Cognitive Goal:* | *Adjust potential interventions based on the patient's goals and preferences.* |
|  | Actor(s) | Patient  Provider |
|  | Action Breakdown | “I really want to remain on a pill to control my blood sugar. I don’t want to have to start insulin injections”   1. \*\*\*Provider initiates dietary counsel referral for nutrition coaching (eating healthy with a busy lifestyle, tips/tricks) 2. Improve Rx compliance by providing tips/tricks (place morning medication in briefcase or lunch bag) 3. Provide referral to community wellness center (that provides group time management classes) |
|  | Technology | EHR (Visualization of Goals, Order entry for referrals) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) |
|  | Appendix |  |
| 17 | Action | Provider assesses tobacco use |
|  | *Cognitive Goal:* | *Address DM risk factors to improve ability to manage the disease. Select indicated cessation therapy if patient agrees to tobacco cessation.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | 1. Pt. states that they smoke ½ pack of cigarettes a day and are open to quitting. 2. Diagnosis of Tobacco User added to Problem List 3. \*\*\*Tobacco Cessation protocol initiated   [VA Clinical Guideline for Treating Tobacco Use](http://www.healthquality.va.gov/guidelines/CD/mtu/phs_2008_quickguide.pdf)   1. Prescription written for tapering dose of Nicotine patch: 21mg every day for 4 weeks, followed by 14 mg every day for 4 weeks, followed by 7mg patch every day for 4 weeks 2. Start group counseling for cessation therapy 3. Provide telephone counseling resource and printed materials on smoking cessation |
|  | Technology | EHR |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [RxNorm](http://www.nlm.nih.gov/research/umls/rxnorm/) 3. [ICD-10](http://www.icd10data.com/) |
|  | Appendix | *Note: Provider navigates to medication order screen* |
| 18 | Action | \*Provider closes outpatient visit by having the patient do a “return demonstration” of their next steps in the management of their health. This includes time frames for completion of each event.  An [after visit summary](http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/13_Clinical_Summaries.pdf) (AVS) is provided |
|  | *Cognitive Goal:* | *Evaluate patient understanding of the plan of care, along with their level of commitment. Determine if the patient would benefit from additional support mechanisms.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Care Plan Activities / Targeted Completion   1. Referral to Podiatrist by physician / Immediately 2. Patient seen by a Podiatrist / 4 weeks 3. Referral to Ophthalmologist by physician / Immediately 4. Patient seen by an Ophthalmologist / 4 weeks 5. Referral to Nutritionist by physician / Immediately 6. Patient seen by a Nutritionist / 4 weeks 7. Referral to community wellness center by physician / Immediately 8. Medication management reinforcement by physician / Immediately 9. Smoking cessation teaching with prescription aid / 1 week 10. Repeat Chem7 and HbA1c one week prior to next visit. Lab slips provided to patient / 11 weeks 11. Complete Nicotine patch tapering dose regimen as ordered / Immediately 12. Provide referral for tobacco cessation group therapy, cessation literature, and telephone ‘quit line’ number / Immediately 13. Follow-up visit scheduled in 3 months / 12 weeks   *Note: Graphic User Interface (GUI) would allow user to populate a target date for each activity (i.e. 1 week = 1.17.15), along with a Completed date when the activity is completed/closed.*  *Note: Patient understands that they are responsible for making appointments for all referrals, follow up visits, and lab work.* |
|  | Technology | EHR (Data Entry, Registration/Scheduling) |
|  | Standard |  |
|  | Appendix | [AVS](http://www.healthit.gov/sites/default/files/avs-tech-guide.pdf) |

## Data fields required

See appendix references as examples/guides

## Exceptions

1. Patient does not bring historic glucose readings to the appointment, therefore it cannot be entered
2. Patient refuses one or more evaluations of VS, therefore results cannot be entered in EHR

## Notes and Issues

1. Entries that include \*\*\* indicate compliance with a Meaningful Use clinical quality measure
   1. CMS 123 – Diabetes: Foot Exam
   2. CMS 131 – Diabetes: Eye Exam
   3. CMS 134 – Diabetes: Urine Protein Screening
   4. CMS 64 – Diabetes: LDL Management
   5. CMS 88 – Diabetic Retinopathy: Documentation of Presence or Absence of Macular Edema and Level of Severity of Retinopathy
   6. CMS 68 – Documentation of Current Medications in the Medical Record
   7. CMS 138 – Preventative Care and Screening: Tobacco Use: Screening and Cessation Intervention
   8. CMS 69 – Preventative Care and Screening: BMI Screening and Follow up Plan

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# Referral to Podiatry for newly diagnosed patient with diabetes mellitus type 2

This patient is also new to the podiatry practice. DM 3

## Introduction

1. This use case was created to evaluate the ontology created by the VistA Evolution GUI Research project. It includes common assessments, observations, interventions, and cognitive goals that arise while caring for a patient in this scenario to ensure that the ontology can accommodate these concepts.
2. All clinical data in this use case is synthetic. Data was created to support the flow of this use case and provide examples of clinical observations that are documented throughout the interaction.
3. Clinical decision making in this use case is based, primarily, on VA/DoD Clinical Practice Guidelines for the Management of Diabetes Mellitus in Primary Care, available at: <http://www.healthquality.va.gov/guidelines/CD/diabetes/>
4. Additional clinical resources are listed below in the Reference section.
5. Cognitive goals are included in some ‘Actions’ to provide insight on the Provider or healthcare professional’s mental process at that point of the encounter.
6. Hyperlinks present in the Appendix column are included to provide examples of the data fields and values that may be entered by the EHR user during this step of the use case.
7. Hyperlinks present in the Standards column suggest standardized terminologies that may be used to capture data in this step of the use case.

## Actors

**Patient:** a person receiving or registered to receive medical treatment

**Provider:** Physician, physician assistant (PA), or nurse practitioner (NP). These skilled health-care professionals are trained and licensed to diagnose and treat patients within their defined scope of practice.

**Office Clerk (OC):** an administrative assistant that manages appointment schedules for the physicians in the practice and handles insurance coverage intake and receipt of co-pays for office visits.

## Description

New patient presents to podiatry practice for an initial diabetic foot exam (patient is newly diagnosed with DM type 2, with a mild ingrown toenail)

Note: This referral results from the DM1 use case.

## Trigger

1. Patient arrives to podiatry practice office for a scheduled diabetic foot exam
2. Minimum demographic data was collected from patient over-the-phone for pre-arrival insurance/eligibility verification
3. Referral was received from primary care provider (for diabetic foot care, podiatrist)

## Preconditions

1. The patient brings a copy of their most recent lab work drawn from primary care outpatient visit:
   1. Fasting—chem7 (blood):
2. sodium (NA)=137 mEq/L
3. potassium (K)=3.7 mEq/L
4. blood urea nitrogen (BUN)=12 mg/dL
5. creatinine (Cr)=0.7 mg/dL
6. glucose=**134**
   1. Fasting—glycated hemoglobin (HbA1c)=6.6
   2. Lipids
   3. Fasting—glycated hemoglobin (HbA1c)=**7.5**
   4. Fasting—lipid panel:
7. total cholesterol=185 mg/dL
8. triglycerides=150 mg/dL
9. high-density lipoproteins (HDL)=60 mg/dL
10. low-density lipoproteins (LDL)=125 mg/dL
    1. micro-albumin (urine)=22 mg

## Postconditions

Minimal guarantees:

1. Data fields required to support this clinical workflow will be present in the EHR
2. Data entered will be stored utilizing the appropriate clinical vocabulary

Success guarantees:

1. EHR supports patient-centered care, guided by goals set by the patient.
2. Patient receives evidence-based care based on the health concerns that are noted during the outpatient visit
3. Patient will achieve improved outcomes and satisfaction as a result of care facilitated by EHR functionality

## Assumptions

1. The practice utilizes patient portal tablets in their office to capture patient demographic, PMH, CC info, etc.
   1. The patient portal can sync with the EHR and populate required fields in the EHR
   2. The patient portal enforces mandatory fields to ensure that all required data is captured
   3. The patient enters all relevant and required information
2. EHR can manage the transition of OC to provider (e.g., move from one work list to another)
3. EHR has computerized physician order entry functionality
4. EHR is able to receive referral request as entered by provider
5. Standard vocabularies utilized by the organization include: ICD10 for Diagnosis, RxNorm for medications, SNOMED-CT for clinical assessments, care that is provided and lab results, and LOINC for laboratory tests.

## Normal Flow

| **Step** | | **Component** | **Narrative** |
| --- | --- | --- | --- |
| 1 | Action | Patient checks in at front desk of medical office |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | OC  Patient |
|  | Action Breakdown | OC marks the patient as present in the scheduling system |
|  | Technology | Scheduling system (data entry) |
|  | Standard |  |
|  | Appendix |  |
| 2 | Action | OC provides the patient with an electronic tablet to finish new patient information (e.g. demographic info, PMH, etc.) |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | OC  Patient |
|  | Action Breakdown | Patient enters the following information in to the system:   1. Validates demographic information 2. Validates insurance: Tricare, member #: xxx-xx, etc. 3. PMH: melanoma on nose 2007, appendectomy 1990 4. Allergies: Penicillin (hives) 5. Current medications: none 6. Smoker: No 7. Alcohol Use: No 8. Reason for visit: Initial diabetic foot exam (ingrown toenail noted by primary care physician) |
|  | Technology | EHR Patient Portal (Data entry) |
|  | Standard |  |
|  | Appendix | [New Patient Sheet](https://www.freeprintablemedicalforms.com/download.php?file=TmV3X1BhdGllbnRfU2hlZXQucGRmLDE0OTY3MDMxNDUsZmNlNGZkZjgzYTY5YmY4ZmFkMTE3Yzg3ZGVhY2Q3MWE%3D)    [Adult Health History](http://georgetownmedical.com/util/documents/hx-physical-form.pdf) |
| 3 | Action | OC accepts tablet back from patient, syncs it with the EHR, and completes registration process |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | OC |
|  | Action Breakdown | 1. Validates that all required fields are populated and house relevant data 2. Enters demographic information in to EHR using standard vocabulary 3. Registration to EHR: flagged ‘ready for provider’ |
|  | Technology | Registration system (data transfer and validation) |
|  | Standard | 1. [Address](http://pe.usps.gov/cpim/ftp/pubs/Pub28/pub28.pdf) 2. [Sex](http://phinvads.cdc.gov/vads/ViewValueSet.action?oid=2.16.840.1.114222.4.11.1038) 3. [Ethnicity](http://www.whitehouse.gov/omb/fedreg_1997standards) 4. [Race](http://www.cdc.gov/minorityhealth/populations/REMP/definitions.html) |
|  | Appendix |  |
| 4 | Action | Podiatrist reviews information provided by the patient via the portal, lab results presented to the OC and in the system, the referral sent by the primary care physician, and then searches the EHR system for other health care occurrences |
|  | *Cognitive Goal:* | *Formulate priorities for this encounter (i.e. document thorough baseline assessment and educate patient on indicated foot care regimen for diabetic patients). Determine if there are gaps in information or areas of concern to address. Evaluate severity of ingrown toenail noted in primary care notes.* |
|  | Actor(s) | Provider |
|  | Action Breakdown | 1. Provider queries the system by patient name and is able to view data entered during the patient’s recent Primary Care visit. 2. Provider is also able to view lab results from recent blood draw. |
|  | Technology | EHR (Query and visualization) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) 3. [ICD-10](http://www.icd10data.com/) |
|  | Appendix |  |
| 5 | Action | OC calls patient in to examination room |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | OC  Patient |
|  | Action Breakdown | Patient is placed in room (in EHR) |
|  | Technology | EHR (Data entry) |
|  | Standard |  |
|  | Appendix |  |
| 6 | Action | OC enters room with patient and takes Vital signs (VS) and enters VS in to the EHR |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | OC  Patient |
|  | Action Breakdown | height=72”  weight=235 lbs  \*\*\*BMI=31  heart rate= 82 bpm  respirations= 18 /min  blood pressure= 128/78 mmHg  temperature=97.9F |
|  | Technology | EHR (Data entry) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix |  |
| 7 | Action | Podiatrist enters exam room and discusses the reason for the patient’s visit/chief complaint (CC) and updates the medical history |
|  | *Cognitive Goal:* | *Clarify reason for visit and capture accurate PMH* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Patient reports that they are “there to have a foot exam because of the new diabetes diagnosis.”   1. Reviews and validates reason for visit—diabetic foot exam 2. Reviews and updates medical history 3. Enters relevant existing history to the Active Problem List |
|  | Technology | EHR (Visualization of Health History and Data entry) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) |
|  | Appendix |  |
| 8 | Action | Podiatrist discusses lab results brought by the patient that were drawn by primary care provider (all results are within normal limits except fasting glucose = 110, HbA1c = 7.2%) |
|  | *Cognitive Goal:* | *Evaluate severity of condition and patient's perspective on their disease.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Patient states, “The other doctor explained that my blood sugar was high on more than two occurrences, and I have been diagnosed with diabetes. He said that my feet and eyes are at higher risk for issues, so I decided to take the referral and come see you. I feel fine though. I haven’t had any problems with my feet, except for this toenail that is a little ingrown.” |
|  | Technology | EHR (Visualization of lab results) |
|  | Standard | 1. [LOINC](http://search.loinc.org/search.zul?query=BMI) |
|  | Appendix |  |
| 9 | Action | Podiatrist asks patient to remove socks and shoes |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown |  |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |
| 10 | Action | Podiatrist performs a comprehensive foot exam and documents findings in EHR |
|  | *Cognitive Goal:* | *Assess condition of patient's feet. Determine observations outside of normal limits. Identify areas of concern (i.e. ingrown toenail), and begin for formulate potential interventions.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Provider performs foot risk assessment, wound assessment, and physical exam of both feet, then documents the results.   1. Skin: integrity intact (skin warm, good turgor, skin dry, color normal (except for skin on right medial big toe along toenail, which is slightly red) 2. Nails: normal color, thickness, and intact 3. Pedal pulses + (posterior tibial, dorsalis pedis, right/left) 4. Monofilament test: + on five areas, right/left) 5. Wound assessment: Medial portion of right big toe (approx. 5 mm x 5mm) at top of toenail is slightly red. No breakdown. No sign of infection. 6. Foot risk assessment (low risk)   *\*\*\*NOTE: Visual, sensory and pulse exams meet care measured in CMS 123 (a Meaningful Use diabetes foot care measure)* |
|  | Technology | EHR (Data entry) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) |
|  | Appendix | Annual Comprehensive Diabetes Foot Exam Form    [VA Clinical Practice Guidelines for Management of DM](http://www.healthquality.va.gov/guidelines/CD/diabetes/DM2010_FUL-v4e.pdf), Algorithm F (Foot Screening) |
| 11 | Action | Podiatrist discusses findings and health concerns noted during the examination |
|  | *Cognitive Goal:* | *Evaluate patient understanding and engagement following discussion of clinical findings.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | 1. Patient is obese based on BMI. Increased BMI contributes to diagnosis of diabetes. 2. Diabetic foot exam yielded the following results: feet in good health, except for mild ingrown toenail on right great toe. Ingrown toenail can be removed during this visit. |
|  | Technology | EHR (Data entry on Problem List) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) |
|  | Appendix | [Standards of Medical Care in Diabetes](http://care.diabetesjournals.org/content/36/Supplement_1/S11.full) |
| 12 | Action | Patient and podiatrist discuss the patient’s goals based on these physical findings and recommendations |
|  | *Cognitive Goal:* | *Understand patient perspective and goals. Begin to formulate a personalized plan of care for the patient.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | 1. Patient states that he wants to lose weight, since that will reduce insurance premiums and help with the diabetes 2. Patient indicates that he wants to take care of his feet so he does not have any issues and agrees to removal of ingrown toenail. 3. Provider and patient discuss recommended foot care for diabetic patients |
|  | Technology | EHR (Data entry of Patient Goals and priorities) |
|  | Standard |  |
|  | Appendix | [Shared Decision Making Resource](http://www.healthquality.va.gov/guidelines/CD/diabetes/cpgSDMDMPOCKETFinalPRESS022513.pdf) |
| 13 | Action | Provider removes ingrown toenail |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Provider removes ingrown toenail without complications. No infection noted. Skin intact, with slight inflammation. |
|  | Technology | EHR (Data entry of procedure and assessment) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) |
|  | Appendix |  |
| 14 | Action | Provider educates patient on diabetic foot care and care for ingrown toenail |
|  | *Cognitive Goal:* | *Evaluate patient understanding and level of commitment following discussion of agreed upon interventions.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Patient education:   1. Keep feet clean and moisturized (do not place lotion in between toes) 2. Keep feet covered with cotton or wool socks 3. Wear enclosed shoes that fit properly (while awake)—no bare feet 4. Referred to local shoe cobbler that specializes in diabetic feet 5. Inspect feet daily (recommended prior to bed when moisturizing) 6. Monitor right great toe for signs and symptoms of [infection](http://www.aafp.org/afp/2009/0215/p303.html). Notify MD immediately if any signs are present. 7. Notify MD if redness of right great toe worsens or does not improve over the next 3 days. |
|  | Technology | EHR (Data entry of Education) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) |
|  | Appendix | [VA Clinical Guidelines for Obesity](http://www.healthquality.va.gov/guidelines/CD/obesity/VADoDOBECPGPocketCardFINAL070314.pdf)  [DM Teaching Checklist](http://www.healthquality.va.gov/guidelines/CD/diabetes/DiabetesTeachingChecklist.pdf) |
| 15 | Action | Provider develops a care plan with the patient (based on their stated goals), then closes the OV by having the patient do a “return demonstration” of their next steps in the management of their health. This includes time frames for completion of each event.  An [after visit summary](http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/13_Clinical_Summaries.pdf) (AVS) is provided |
|  | *Cognitive Goal:* | *Evaluate patient understanding of the plan of care, along with their level of commitment. Determine if the patient would benefit from additional support mechanisms.* |
|  | Actor(s) | Provider  Patient |
|  | Action Breakdown | Care Plan Activities / Targeted Completion   1. Place into action learnings from provider/patient education (#12) / Immediately 2. Maintain follow-up appointment with primary care provider / 3 months 3. Annual podiatry OV (diabetic foot exam) / 1 year 4. Referral: shoe cobbler (specializing in diabetic feet) for appropriate shoe size and types of shoes by physician / Immediately 5. Make appointment with shoe cobbler / 2 weeks 6. Maintain weight loss goals as outlined by primary care physician (10 lbs over the next 3 months) / 3 months 7. Attend exercise class 3x/week and walk 4x/week / Immediately 8. Monitor right great toe inflammation and for signs and symptoms of infection. Call MD with any concerns / Immediately and daily for next 2 weeks 9. Provider will send consult note outlining findings and the plan of care to the referring Provider / Within 24 hours   *Note: Graphic User Interface (GUI) would allow user to populate a target date for each activity (i.e. Immediately = 1.10.15), along with a ‘Completed’ date when the activity is completed/closed. GUI will also allow provider to view progress towards Activity completion, if the activity spans a period of time.*  *Note: Patient understands that they are responsible for making appointments for all referrals, follow up visits, and lab work.* |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |

## Data fields required

See appendix references as examples/guides

## Notes and Issues

Entries that include \*\*\* indicate compliance with a Meaningful Use clinical quality measure

## References for Clinical Management of Diabetes

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# Diabetes Care Coordinator Telephone Follow-Up

DM 4

## Introduction

1. This use case was created to evaluate the ontology created by the VistA Evolution GUI Research project. It includes common assessments, observations, interventions, and cognitive goals that arise while caring for a patient in this scenario to ensure that the ontology can accommodate these concepts.
2. All clinical data in this use case is synthetic. Data was created to support the flow of this use case and provide examples of clinical observations that are documented throughout the interaction.
3. Clinical decision making in this use case is based, primarily, on VA/DoD Clinical Practice Guidelines for the Management of Diabetes Mellitus in Primary Care, available at: <http://www.healthquality.va.gov/guidelines/CD/diabetes/>
4. Additional clinical resources are listed below in the Reference section.
5. Cognitive goals are included in some ‘Actions’ to provide insight on the Provider or healthcare professional’s mental process at that point of the encounter.
6. Hyperlinks present in the Appendix column are included to provide examples of the data fields and values that may be entered by the EHR user during this step of the use case.
7. Hyperlinks present in the Standards column suggest standardized terminologies that may be used to capture data in this step of the use case.

## Actors

**Patient:** a person receiving or registered to receive medical treatment

**Patient Care Coordinator (PCC):** a professional (usually registered nurse or social worker) within the medical care team that works with patients and medical professionals to remove barriers and reach health care goals.

## Description

A 30-day follow-up telephone call from the care coordinator to review the status of each of the care plan action items (managing treatment for diabetes mellitus type 2) identified/discussed during the previous primary care provider (PCP) office visit (OV).

## Trigger

1. Patient had a previous primary care office visit for treatment of diabetes mellitus (T-30 days)
2. Minimum identification reviewed on the phone call to ensure protection of PHI.

## Preconditions

PCP Care Plan Activities (previous office visit) / Targeted Completion

1. Fasting lab work in a.m. / 1 day
2. Make appt. w/ weight loss program and diabetic educator within next week / 1 week
3. Lose 10 lbs. within next 3 months / 90 days
4. Attend exercise class 3 x/week and walk 4 x/week / Immediately
5. Attend 1 DM group therapy session per month / Immediately
6. Make appts. with Podiatrist and Ophthalmologist within next month / 1 month
7. Keep follow-up appt. with primary care provider / 3 months
8. Work to achieve my personal goals / Ongoing

## Postconditions

Minimal guarantees:

1. Data fields required to support this clinical workflow will be present in the EHR.
2. Data entered will be stored utilizing the appropriate clinical vocabulary.

Success guarantees:

1. EHR supports patient-centered care, guided by goals set by the patient.
2. Patient receives evidence-based care based on the health concerns that are noted during the associated provider visits.
3. Patient will achieve improved outcomes and satisfaction as a result of care facilitated by EHR functionality.

## Assumptions

1. Patient Care Coordinator that is assigned to assist this patient with the management of their condition will have an ongoing relationship that spans the continuum of care. The relationship is built on trust, mutual respect, and a shared vision.
2. EHR can manage the documentation Provider to PCC (e.g., move from one work list to another)
3. EHR has capability for telephonic office visit (non-prescribing/non-diagnosing provider)
4. EHR has compatible patient portal (to facilitate information sharing)
5. Diabetics on oral hypoglycemic medications are managed by their primary care providers
6. Standard vocabularies utilized by the organization include: ICD10 for Diagnosis, RxNorm for medications, SNOMED-CT for clinical assessments, care that is provided and lab results, and LOINC for laboratory tests
7. The patient portal has capability to send email reminders

## Normal Flow

| **Step** | | **Component** | **Narrative** |
| --- | --- | --- | --- |
| 1 | Action | Patient receives a telephone call from the PCC |
|  | *Cognitive Goal:* |  |
|  | Actor(s) | PCC  Patient |
|  | Action Breakdown | PCC appropriately identifies patient (protecting PHI) and asks the patient if now is still a good time for a 20-minute follow-up call (related to the last primary care visit) |
|  | Technology | EHR (telephone visit encounter) |
|  | Standard |  |
|  | Appendix |  |
| 2 | Action | PCC level sets on previously identified patient goals identified in the outpatient visit notes/care plan  Noted in “Preconditions” |
|  | *Cognitive Goal:* | *Verify patient goals, along with their understanding of the care plan* |
|  | Actor(s) | PCC  Patient |
|  | Action Breakdown | PCC level sets with patient about reason for the call—review current status of action items identified/mutually agreed upon goals from the previous primary care office visit (30 days ago) as related to managing diabetes. The action items are available via   1. The after visit summary (AVS) provided at the end of the previous primary care office visit 2. The patient portal (where pertinent medical information is available to the patient) |
|  | Technology | EHR (Patient Portal) |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) 3. LOINC |
|  | Appendix | [AVS](http://www.healthit.gov/sites/default/files/avs-tech-guide.pdf) |
| 3 | Action | PCC confirms that the patient did have labs drawn and reviews labs with patient |
|  | *Cognitive Goal:* | *Determine patient compliance and identify opportunities to reinforce importance of lab work* |
|  | Actor(s) | PCC  Patient |
|  | Action Breakdown | Relevant labs (glucose and HgA1c) are reviewed (EHR and patient portal). PCC provides education on lab results, where gaps are identified. |
|  | Technology | EHR (Patient Portal) |
|  | Standard | 1. LOINC 2. [SNOMED-CT](http://browser.ihtsdotools.org/) |
|  | Appendix |  |
| 4 | Action | PCC asks patient about the status of making an appt. with the diabetes educator |
|  | *Cognitive Goal:* | *Determine patient compliance and identify ways to facilitate completion of task.* |
|  | Actor(s) | PCC  Patient |
|  | Action Breakdown | 1. Provider queries the system within the patient record and does not see a referring report from the diabetes educator (which would indicate an education OV). 2. Patient notes that work has been busy, and that no time has been available to make the appointment 3. To prevent ongoing procrastination, the PCC offers to make the appointment for the patient since the diabetes educator is part of the medical practice (using the same scheduling system and EHR). 4. The appointment is sent to the patient portal |
|  | Technology | EHR (Query and visualization)  EHR provider directory  Scheduling System  Patient Portal |
|  | Standard | 1. [SNOMED-CT](http://browser.ihtsdotools.org/) 2. [ICD-10](http://www.icd10data.com/) |
|  | Appendix |  |
| 5 | Action | PCC asks patient about the status of going to a weight loss group |
|  | *Cognitive Goal:* | *Determine patient compliance and identify alternative interventions that may work better for the patient.* |
|  | Actor(s) | PCC  Patient |
|  | Action Breakdown | The PCC asks the patient about going to one of the group weight loss sessions (e.g., Weight Watchers). The patient indicates a lack of will and readiness. The PCC explores the option of seeing a therapist specializing in weight management and food relationships. The patient agrees to see a therapist.  The PCC submits a referral request to the primary care doctor (since referrals must be from diagnosing clinicians). In the meantime, the PCC sets up the therapist appointment, since the therapist is employed by the same health system using the EHR and central scheduling system.   1. The therapist referral (with associated notes from PCC follow-up phone call) is awaiting provider signature. Once signed, the referral will be available to the therapist’s office (via the EHR). 2. The therapy appointment is sent to the patient portal. |
|  | Technology | EHR (Data entry)  EHR provider directory  EHR queue management  Scheduling System  Patient Portal |
|  | Standard |  |
|  | Appendix |  |
| 6 | Action | PCC asks patient about exercise |
|  | *Cognitive Goal:* | *Determine patient compliance* |
|  | Actor(s) | PCC  Patient |
|  | Action Breakdown | Prior to asking, the patient quickly indicated that they have been taking evening walks around the block (a little over 1 mile) every night. The PCC uses positive reinforcement and encourages the patient to slowly increase activity as tolerated, and reiterates the need to “switch-up” exercise routines. The PCC asks the patient if he would like a referral to an exercise physiologist. The patient indicated that he enjoys walking and maybe later he will go see the “exercise guru.” |
|  | Technology | EHR  EHR provider directory |
|  | Standard |  |
|  | Appendix |  |
| 7 | Action | PCC asks about scheduled podiatrist and ophthalmologist visits |
|  | *Cognitive Goal:* | *Determine patient compliance* |
|  | Actor(s) | PCC  Patient |
|  | Action Breakdown | Patient confirmed that visits have been scheduled with podiatrist and ophthalmologist |
|  | Technology | EHR (manual data entry since ophthalmologist and podiatrist are outside of health system EHR) |
|  | Standard |  |
|  | Appendix |  |
| 8 | Action | PCC reviews with patient next steps |
|  | *Cognitive Goal:* | *Evaluate patient understanding, engagement, and buy-in to their plan of care.* |
|  | Actor(s) | PCC  Patient |
|  | Action Breakdown | Patient and PCC agree to complete another follow-up call in 2 weeks to review:   1. Therapist session (not details, but that the event occurred) 2. Diabetes educator (not details, but that the event occurred) 3. Determine if referral to exercise physiologist is necessary 4. Podiatry appointment outcome 5. Ophthalmology appointment outcome 6. PCC reviews contact information and asks if there are any unanswered questions 7. Patient thanks the PCC for the follow-up phone call |
|  | Technology |  |
|  | Standard |  |
|  | Appendix |  |

## Data fields required

See appendix references as examples/guides

## Notes and Issues

## References for Clinical Management of Diabetes

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