Department of Veterans Affairs
Veterans Health Administration
Office of Information

VHA Security Architecture
Framework Engineering

Consumer Centered Care Planning
Demonstration Report

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## Revision History

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<tr>
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1 INTRODUCTION

This report provides the details of the flows for the Consumer-Centered Care Planning demonstration which took place at HiMSS conference in January 2019. The demonstration featured a scenario for dynamic management and sharing of a FHIR-based care plans for a veteran patient among the members of the patient’s care team, particularly the interactions and interplay among:

- HL7 SMART/FHIR server,
- Electronic Health Record (EHR) system Apps hosted in a Healthcare Services Platform Consortium (HSPC) environment,
- Clinical Decision Support (CDS) system,
- Application of privacy policies based on Security Labeling, and
- Break-the-glass (BTG) Access.

The goal of the demo was to show how Security Labeling and CDS analyses can be used to protect the privacy of sensitive information, while the break-the-glass access can guarantee that the physician can override the default policies when patient safety is at stake.
2 USE-CASE AND REQUIREMENTS

The focus of this use-case is the balance between patient privacy and patient safety in the dynamic careplan management by enabling break-the-glass access for physicians in order to override privacy protections when patient’s safety is at risk.

A veteran patient persona named Amy Jackson is being treated by a care team of specialists, including a podiatrist, a nephrologist, and a psychiatrist. As part of a treatment for post-traumatic stress disorder (PTSD) treatment, Amy also visits a psychiatrist and takes anti-anxiety medications. She also visits a nephrologist as part of her ongoing care for chronic renal failure due to her diabetes. The main use-case for the demonstration is a visit by Amy to a podiatrist to seek treatment for diabetic foot pain in which an opioid prescription is considered by the physician but ultimately avoided based on the warnings from a CDS system.

The concerns and requirements are as the following:

- Patient Privacy: Amy’s anti-anxiety medication which is also indicative of her PTSD condition is privacy-sensitive information and must not be divulged to care providers unless it is necessary for the treatment and consequential in the careplan.

- Patient Safety: Anti-anxiety medication must not be mixed with certain other medications such as opioids because of the adverse consequences to the patient.

The proposed design for this use-case guarantees that:

- Physicians do not initially see the sensitive medications when seeing the patient’s summary.

- A Clinical Decision Support (CDS) system with full access to the patient’s information is leveraged for a analyzing the patient safety issue regarding drug-drug interactions.

- The physician is provided with the capability to request access to full medication list under break-the-glass condition in the case of patient safety concerns.

The following two cases demonstrate the satisfaction of the above requirements:

- When Amy visits the nephrologist, the nephrologist’s App shows the patient summary after launch. This summary does not include Amy’s sensitive anti-anxiety medications. When the nephrologist chooses to prescribe a new medication, and after calling a CDS hook, it is determined that the new medication does not pose any patient safety risks regarding the sensitive anti-anxiety medication, therefore, the prescription is recorded.

- When Amy visits the podiatrist, the podiatrist’s App shows a patient summary after launch, which initially does not include Amy’s anti-anxiety medication. Once the podiatrist proceeds to prescribe an opioid, a CDS hook is invoked to trigger and analysis of the potential risks of the new prescription. In this case, the CDS returns a patient-safety warning card which is rendered by the App and viewed by the physician. This prompts the specialist to request break-the-glass access to Amy’s complete list of medications including the sensitive anti-anxiety medication. The App then calls another CDS hook for specifying contraindication and suggestion of alternative non-opioid medication. Taking note of the patient safety risk and the CDS suggestion, the podiatrist proceeds with prescribing non-opioid alternative medication.
3 FLOW

This section discusses two flows for the two cases of access by a physician. The first case is access by a nephrologist in which no safety warning is involved and no break-the-glass takes access place. The nephrologist in this case only views a redacted list of Amy’s medications in which the anti-anxiety medication is redacted. In the second case, access by a podiatrist, a safety warning is issued by the CDS at the time of adding a new prescription which leads to a break-the-glass access request by the physician. After the break-the-glass access request, the podiatrist can see the complete list of Amy’s medications including the sensitive anti-anxiety medication.

3.1 Normal Access by the Nephrologist

The flow of normal access to medication list and adding a new prescription by the nephrologist is shown in Figure 1. The details of each steps are discussed below.

Figure 1. Nephrologist access flow including access to redacted medication list and leveraging CDS hooks.
- The nephrologist selects the patient\textsuperscript{1} and launches the specialist App with Amy as the patient context.

- The App requests a launch from the SMART/FHIR server and fetches the resources required to render the patient summary. This includes a summary of medications. Based on the security labels on the respective FHIR resources and the privacy policies, the list of medications does not include the sensitive anti-anxiety medications.

- The App renders the patient summary including the redacted list of medications for the physician.

- After interacting with the patient and determining the course of care, the nephrologist requests adding a new prescription for the patient.

- The App initiates a request for a CDS hook for prescription analysis. This request includes the patient identifier and the new medication.

- Based on this request, the CDS fetches the full list of medications for Amy and conducts a drug-drug interaction analysis by comparing the new prescription with the current list of medications. Since this does not trigger any concerns, no warnings are returned in response.

- The App records the new prescription for Amy by posting an update to the FHIR server.

\textsuperscript{1} In the current HSPC flows, selecting the patient identity takes place in the context of the EHR system and before launching the App; in other words, the patient ID must be determined \textit{before} the App starts.
3.2 BTG Access by the Podiatrist
The flow the podiatrist’s access which includes CDS warning cards followed by BTG access to the complete medication list is shown in Figure 2. The details for each step is discussed below.

Figure 2. Podiatrist access flow including CDS warning and BTG access.
- The podiatrist selects the patient and launches the specialist App with Amy as the patient context.

- The App requests a launch from the SMART/FHIR server and fetches the resources required to render the patient summary including a summary of medications. Similar to the case of the nephrologist, sensitive anti-anxiety medications are redacted based on their security labels and the privacy policies.

- The App renders the patient summary including the redacted list of medications.

- After a conversation with the patient to determine the course of care, the podiatrist enters a request for an opioid prescription for the patient’s diabetic foot pain.

- The App sends a request for the CDS hook for prescription analysis. The request includes the patient identifier and the code for the opioid medication requested in the prescription.

- The CDS fetches the complete list of medications for Amy, including the anti-anxiety medication, and conducts a drug-drug interaction analysis. This triggers a patient safety warning based on the rule that anti-anxiety medication cannot be mixed with opioids. A response is sent to the App with a CDS card warning about a patient safety consequences of the prescription in question.

- The App renders the warning and the podiatrist takes note of it.

- Based on the patient safety warning, the podiatrist issues a BTG requests to see the full list of Amy’s medication, citing the patient safety reasons as the rationale for this request.

- The SMART/FHIR server, returns a complete and unredacted list of Amy’s medications based on the BTG context of the request which overrides the protective rules applicable to the sensitive medications.

- At this point the App calls a CDS hook for contraindication and suggestion of alternative medication.

- The CDS fetches the complete list of Amy’s medications\(^2\), including the anti-anxiety medication, and performs the analysis for determining contraindication and suggestion of alternative. The result is then sent back to the app in the form of a CDS card.

- The App renders the CDS card so the podiatrist can take note of it.

- Taking note of information regarding contraindication and the suggestion of alternative medication presented by the CDS card, the podiatrist changes the prescription to a non-opioid alternative.

- The App records the new prescription for Amy by posting an update to the FHIR server.

\(^2\) Note that the CDS can use a cached copy of this list from the previous steps.
## 4 ACRONYMS

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>API</td>
<td>Application Programming Interface</td>
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<tr>
<td>BTG</td>
<td>Break-the-Glass</td>
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<tr>
<td>CDS</td>
<td>Clinical Decision Support</td>
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<td>EHR</td>
<td>Electronic Health Record</td>
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<tr>
<td>SLS</td>
<td>Security Labeling Service</td>
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