FHIR Intermediate Course, Unit 4

SMART ON FHIR & CDS HOOKS

Micro assignment answers

Micro assignment 1

Define the name of the hook that is triggered upon receipt of an IPS document.

document-receive

Micro assignment 2

Describe the discovery of the service that upon receiving the IPS document looks for critical values in the laboratory observations. Note that the service will need to access the historical values of the patient's observations to evaluate their variation. The client that consumes the CDSS will have to retrieve these values to send them to the service. Only this service subscribed to the hook will use the patient's observation history.

GET {BASE URL}/cds-services

```
1. {
2.     "services": [
3.         {
4.             "hook": "document-receive",
5.             "title": "Critical laboratory values",
6.             "description": "Check critical laboratory values when a
   document is received.",
7.             "id": "document-laboratory-critical-values",
8.             "prefetch": {
9.                 "patientObservations":
   "Observation?subject={{context.patientId}}"
10.            }
11.        }
12.    ]
13. }
```

Micro assignment 3

Define the structure of the hook that will be sent to the CDSS service.

POST {BASE URL}/cds-services/document-laboratory-critical-values

```
1. {
2.     "hook": "document-receive",
3.     "hookInstance": "d1577c69-dfbe-44ad-ba6d-3e05e953b2ea",
4.     /*In this case the "fhirServer" and the "fhirAuthorization" would be
   optional
5.     since I have all the data to be able to make the decision*/
6.     "fhirServer": "http://hooks.smarthealthit.org:9080",
```

```
    "fhirAuthorization": {
     "access_token" : "some-opaque-fhir-access-token",
     "token_type" : "Bearer",
     "expires_in" : 300,
     "scope" : //These would be the same permissions as the SMART App, if I use the same token
     "subject" : "cdss-service"
    },
    "context": {
        "userId" : "Practitioner/example",
        "patientId" : "1288992",
        "encounterId" : "89284" //Optional
        "patientDocument":{
                    //Need to put the Composition here
        }
    },
    "prefetch": {
        "patientObservations": //Bundle with Patient Observations
    }
}

```

Micro assignment 4

Given critical hemoglobin values (above 21 g/dL) and previous values that either are not available for comparison (are not registered in the system) or also were above 21 g/dL, define the card that returns information alerting the physician that the patient has abnormal hemoglobin values, possibly associated with the disease polycythemia vera.

```
{
   "cards":[
      {
         "summary": "Abnormal hemoglobin values",
         "detail": "The patient has abnormal hemoglobin values that may be related to polycythemia vera disease",
         "indicator":"warning",  // It can also be "info"
         "source":[
            {
               "label":"Polycythemia vera overview",
               "url":"https://www.mayoclinic.org/diseases-conditions/polycythemia-vera/symptoms-causes/syc-20355850"
            }
         ]
      }
   ]
}
```

Micro assignment 5

If the hemoglobin value is greater than 21 g/dL and the previous values are normal, return an action-oriented suggestion card indicating that the study be repeated. When accepting the suggestion, you must generate a POST to the FHIR server with the ServiceRequest resource returned by the card.


```
{
   "cards":[
      {
         "summary": "Abnormal hemoglobin values",
         "detail": "The patient has sudden abnormal hemoglobin values it is necessary to confirm them",
         "indicator":"warning",
         "source":[
            {
               "label":"Critical laboratory values",
               "url":"https://www.aruplab.com/Testing-Information/resources/PDF_Brochures/ARUP_Critical_Values.pdf"
            }
         ],
         "suggestions":[
            {
               "label":"Repeat laboratory study",
               "uuid":"e862541e-41f9-43b8-b304-d6b305d8aa02",
               "actions":[
                  {
                    "type":"create",
                     "description":"A ServiceRequest will be created to repeat the hemoglobin study",
                     "resource":{
                        "resourceType":"ServiceRequest",
                        "id":"9",
                        "meta":{
                           "profile":[
"https://saintmartinhospital.org/fhir/StructureDefinition/ServiceRequest"
                           ]
                        },
                        "text":{
                           "status":"generated",
                           "div":"<div xmlns=\"http://www.w3.org/1999/xhtml\"><p></p></div>"
                        },
                        "identifier":[
                           {
                              "use":"official",
"system":"https://saintmartinhospital.org/service-request-id",
                              "value":"9",
                              "period":{
                                 "start":"2020-01-18T21:35:50-03:00"
                              }
```

```
                            }
                        ],
                        "status": "active",
                        "intent": "original-order",
                        "code": {
                            "coding": [
                                {
                                    "system":
"http://purl.bioontology.org/ontology/SNOMEDCT",
                                    "code": "38082009" //It would be the code
to have a hemoglobin study
                                }
                            ],
                            "text": "Hemoglobin study"
                        },
                        "subject": {
                            "reference": "Patient/1288992"
                        },
                        "encounter": {
                           "reference": "Encounter/89284"
                        },
                        "occurrenceDateTime": "2020-02-02T16:16:00-07:00",
                        "requester": {
                           "reference": "Practitioner/example"
                       }
                    }
                }
            ]
        }
    ]
}
```

Micro assignment 6

Set the permissions that should be added in the launch of the SMART app to read the IPS, read previous observations and generate test requests. Justify.

- patient/Composition.read
- patient/Observation.read
- patient/ServiceRequest.write

**Could also be set at the user level, but since the application is launched in the context of a patient, patient is the best option.