

iOS????FHIR?IRIS???

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[Peng Qiao](#)

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iOS????FHIR?IRIS???

Swift-FHIR-Iris

iOS???????HealthKit????InterSystems IRIS???????FHIR??????



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 - [???HealthKit?????](#)

- [???HealthKit?????FHIR](#)
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- [??](#)
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????

?????FHIR??????????

????????????????????????????????iPhone?
??HealthKit?????????????FHIR?????InterSystems IRIS ????????

????web?????????????

TL;DR: iPhone -> InterSystems FHIR -> web??.

????????

????

- ??? (iOS)
 - Xcode 12
- ???Web????
 - Docker

?? Xcode

????????????????AppStore???Xcode?????

??SwiftUi project

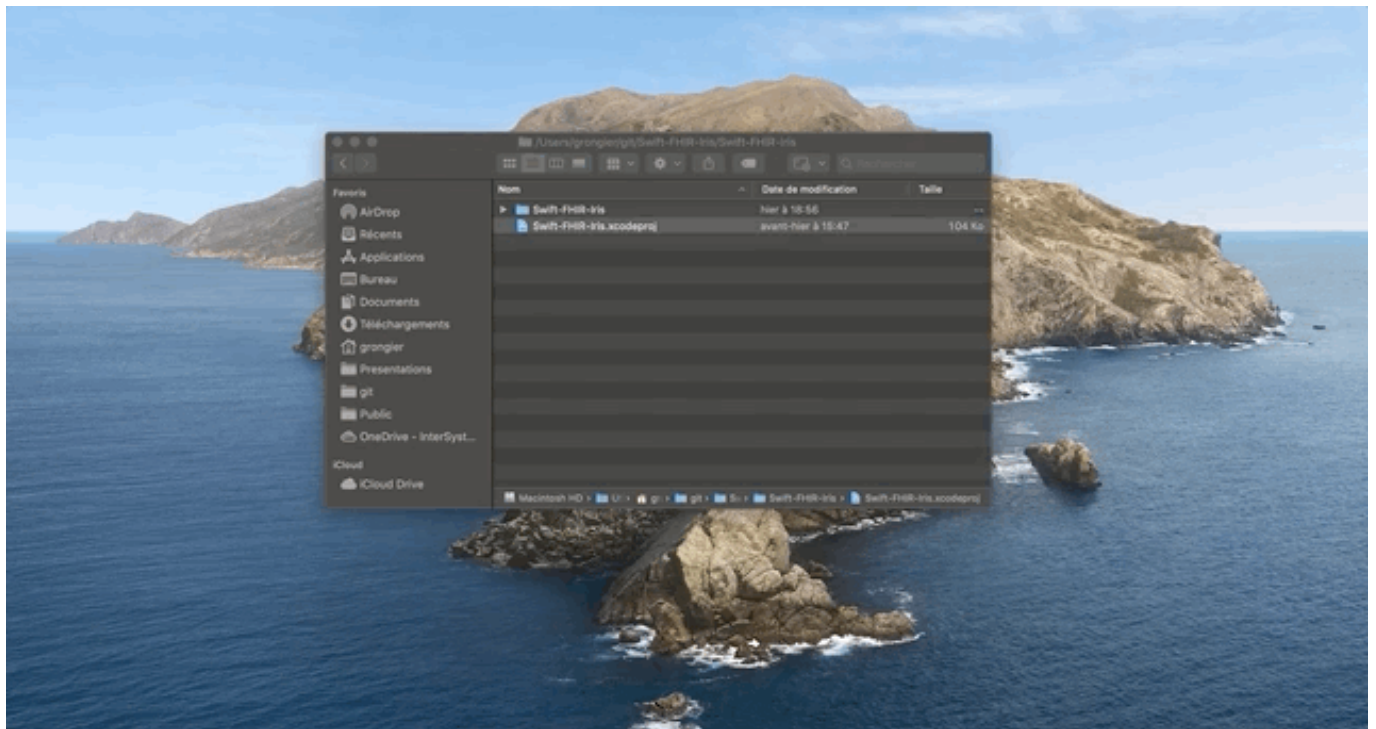
Swift????iOS?Mac?Apple TV?Apple Watch?????????????objective-C??????

??Swift-FHIR-Iris.xcodeproj

????????????????????

iOS????FHIR?IRIS???

Published on InterSystems Developer Community (<https://community.intersystems.com>)



?????

??Health

??“Steps”

????



??InterSystems FHIR???

??git??????????????:

docker-compose up -d

?????????????????FHIR?????:

<http://localhost:32783/fhir/portal/patientlist.html>

The screenshot shows the InterSystems FHIR Patient List application. On the left, there is a 'Patient List' section with a search bar labeled 'Find Patients' and a refresh button. Below the search bar, a patient entry is visible: 'Adina377 Corkery305' with 'FHIR Patient ID: 1'. On the right, there is a 'Patient Details' form with fields for 'FHIR Patient ID', 'SSN', 'First name', 'Last name', 'Date of Birth', 'Gender' (with a dropdown menu), 'Address', 'City', 'State', and 'Country'. There is an 'Update' button with a lock icon at the bottom right of the form. Below the form, there are four expandable sections: 'Allergy', 'Activity', 'Observation', and 'Vital Signs', each with a downward arrow.

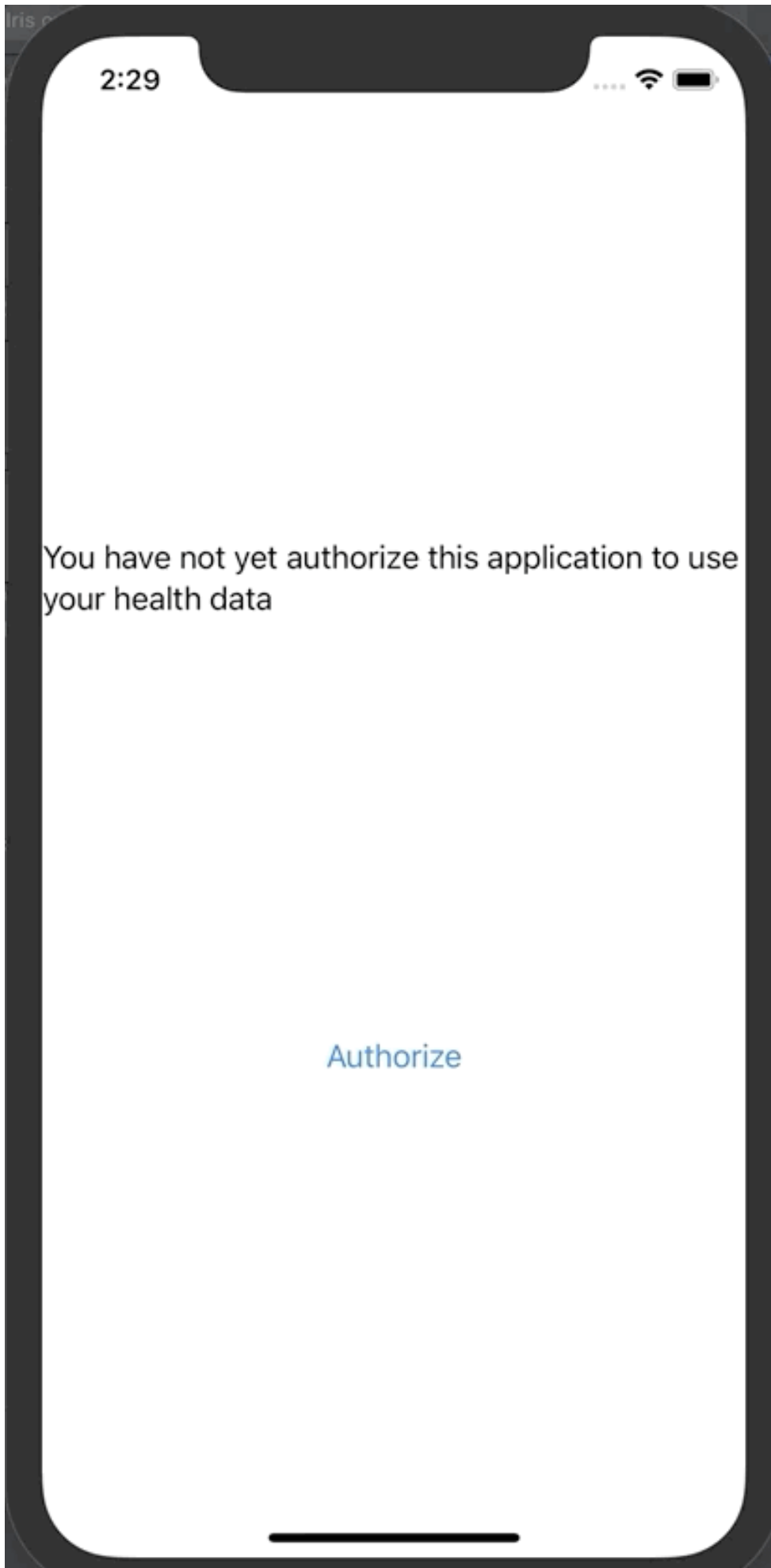
??????@diashenrique??.

???Apple?????????????????

?iOS?????????

iOS?????????????????????????

?????



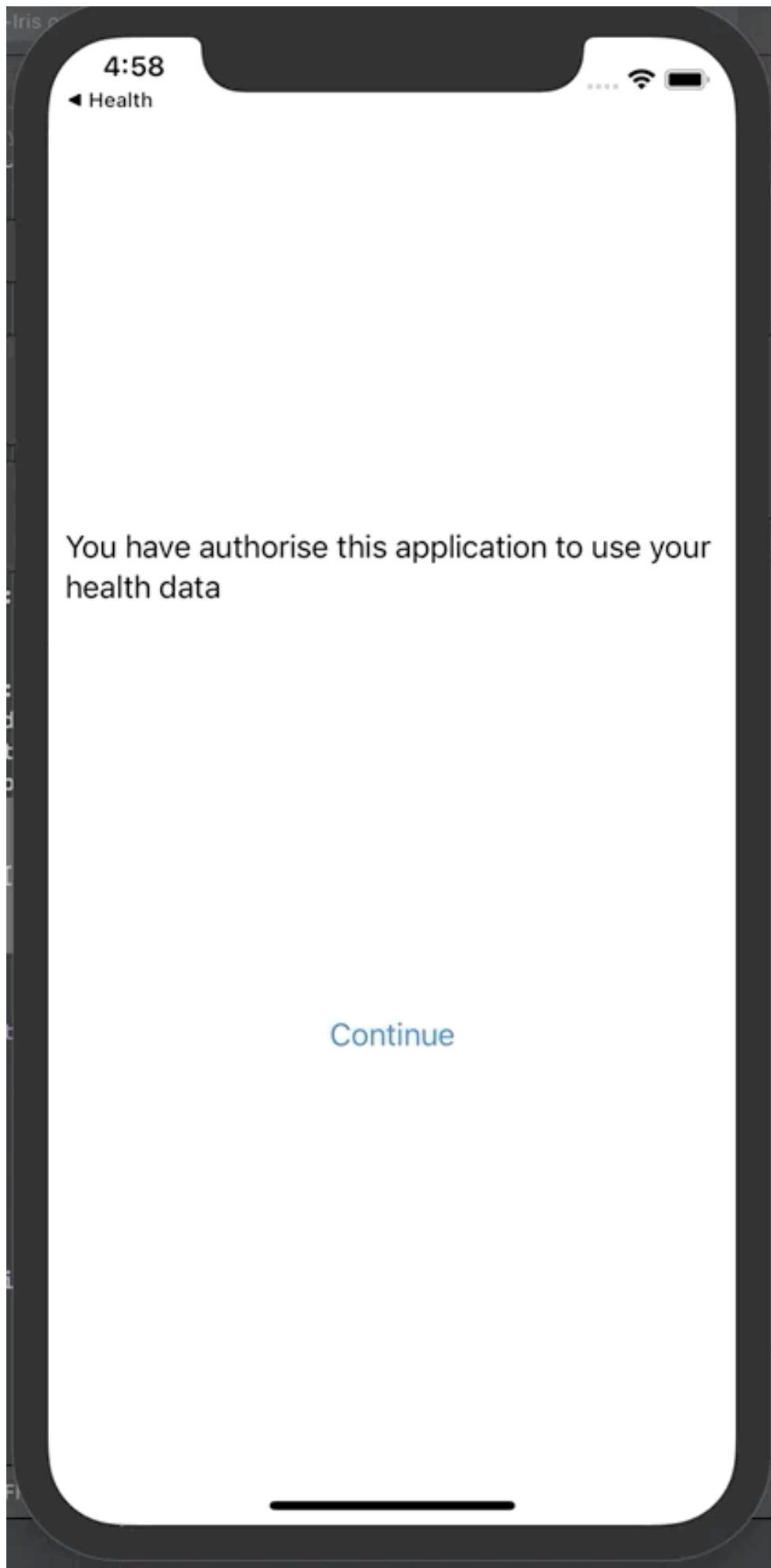
????"Save and test server"?FHIR???????

??????docker???

???????????????????

???????????????

?????????Fhir?????????????Fhir ID?



????????????????:

?: <http://localhost:32783/fhir/portal/patientlist.html>

???Toto"?0?????

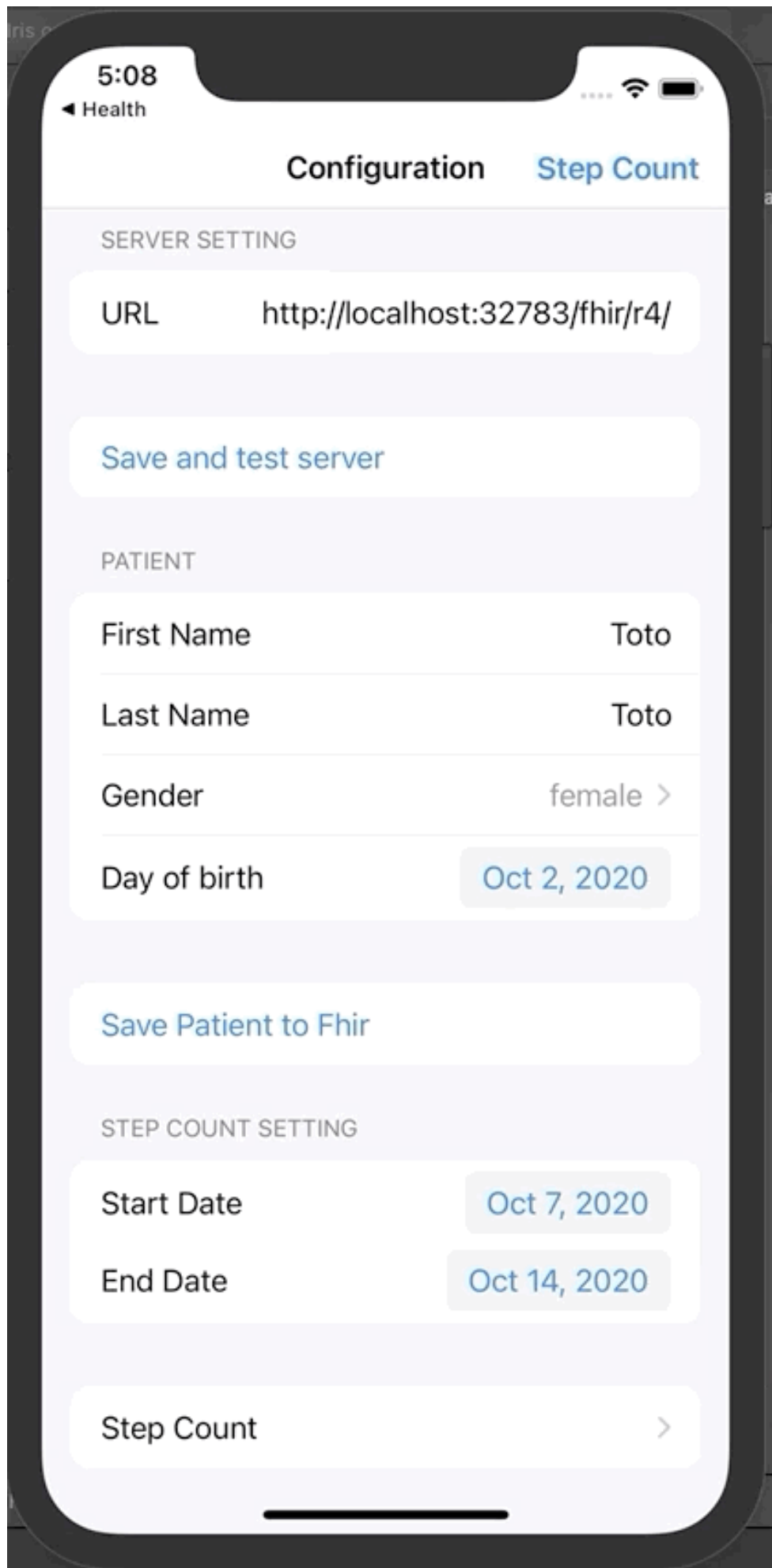
The screenshot shows the InterSystems IRIS FHIR Patient List interface. On the left is a 'Patient List' sidebar with a search bar and two patient entries: 'Toto Toto' (FHIR Patient ID: 195) and 'Adina377 Corkery305' (FHIR Patient ID: 1). The main area displays 'Patient Details' for the selected patient, including fields for FHIR Patient ID (195), SSN, First name (Toto), Last name (Toto), Date of Birth (2020-10-02), Gender (Female), Address, City, State, and Country. There are also sections for Allergy, Activity, and Observation, each with a dropdown menu.

??????????:

??iOS?????????"Step count"?

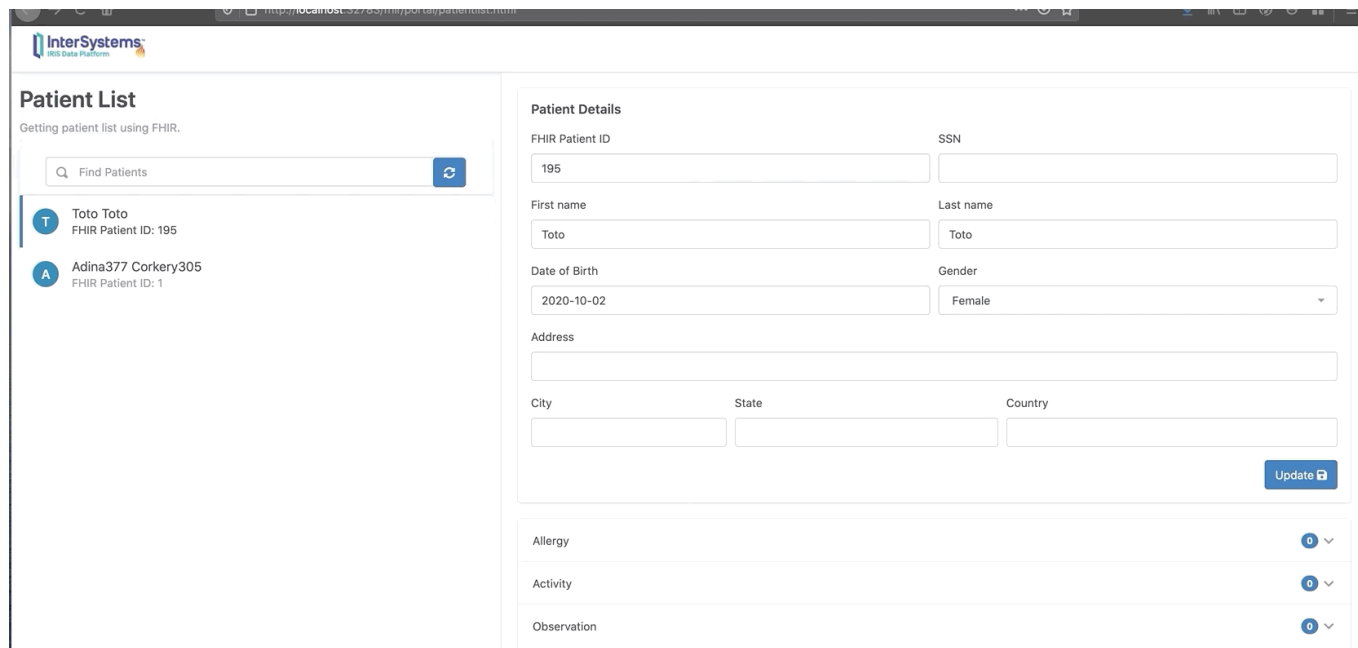
????????????????????????????????????2?????

?????????????????????????InterSystems IRIS FHIR?

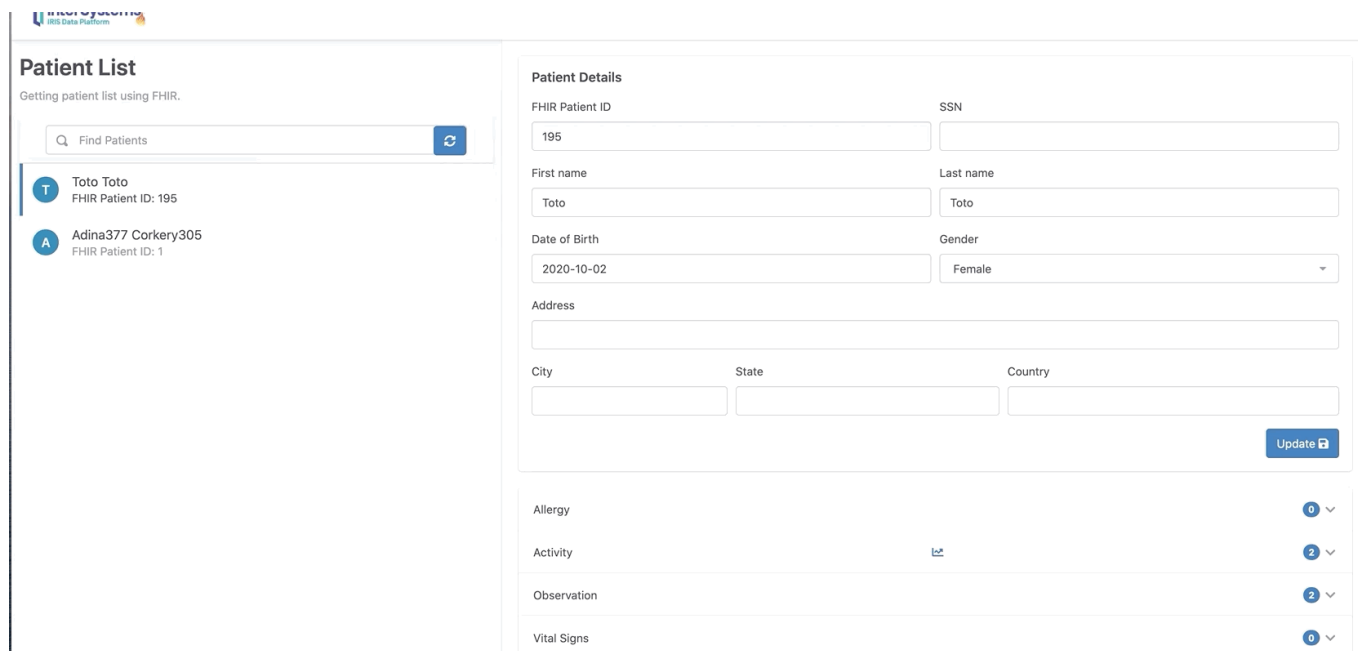


?????????????????:

?????????Toto?????????????????



???????“chart”?????????????



????

iOS

?demo?????SwiftUI????

<https://developer.apple.com/xcode/swiftui/>

iOS?co??????

????????????

??SwiftFhirIrisManager ???

????????????@EnvironmentObject????????????????

???????? : <https://www.hackingwithswift.com/quick-start/swiftui/how-to-use-envirom...>

??requestAuthorization?????:

```

// Request authorization to access HealthKit.
func requestAuthorization() {
    // Requesting authorization.
    /// - Tag: RequestAuthorization

    let writeDataTypes: Set<HKSampleType> = dataTypesToWrite()
    let readDataTypes: Set<HKObjectType> = dataTypesToRead()

    // request authorization
    healthStore.requestAuthorization(toShare: writeDataTypes, read: readDataTypes
) { (success, error) in
        if !success {
            // Handle the error here.
        } else {

            DispatchQueue.main.async {
                self.authorizedHK = true
            }

        }
    }
}

```

??healthStore?HKHealthStore()????

HKHealthStore???iOS??healthdata????

dataTypesToWrite?dataTypesToRead????????????????

????????Info.plist xml????????????:

```

<key>NSHealthClinicalHealthRecordsShareUsageDescription</key>
<string>Read data for IrisExporter</string>
<key>NSHealthShareUsageDescription</key>
<string>Send data to IRIS</string>
<key>NSHealthUpdateUsageDescription</key>
<string>Write date for IrisExporter</string>

```

????FHIR????

????????????Smart-On-FHIR?????FHIR? : <https://github.com/smart-on-fhir/Swift-FHIR>

?????FHIROpenServer?.

```

private func test() {
    progress = true

    let url = URL(string: self.url)

    swiftIrisManager.fhirServer = FHIROpenServer(baseURL : url! , auth: nil)

    swiftIrisManager.fhirServer.getCapabilityStatement() { FHIRError in

        progress = false
        showingPopup = true

        if FHIRError == nil {
            showingSuccess = true
            textSuccess = "Connected to the fhir repository"
        } else {
            textError = FHIRError?.description ?? "Unknow error"
            showingSuccess = false
        }

        return
    }
}

```

???????swiftIrisManager?????????fhirServer?

?????getCapabilityStatement()

???????FHIR?????capabilityStatement?????????????FHIR??????

?????????HTTPS?????????Apple??????????

?????HTTP?????????Info.plist xml??????????:

```

<key>NSAppTransportSecurity</key>
<dict>
  <key>NSExceptionDomains</key>
  <dict>
    <key>localhost</key>
    <dict>
      <key>NSIncludesSubdomains</key>
      <true/>
      <key>NSExceptionAllowsInsecureHTTPLoads</key>
      <true/>
    </dict>
  </dict>
</dict>
</dict>

```

????????????FHIR?????

????????????????????????????

```
Patient.search(["family": "\(self.lastName)"]).perform(fhirServer)
```

???????????????

?????????????????????????????OAuth2?JWT????patientId????????????????????????????????

??:

```
func createPatient(callback: @escaping (Patient?, Error?) -> Void) {
    // Create the new patient resource
    let patient = Patient.createPatient(given: firstName, family: lastName, dateOf
fBirth: birthDay, gender: gender)

    patient?.create(fhirServer, callback: { (error) in
        callback(patient, error)
    })
}
```

???HealthKit?????

????healthkit?? store?HKHealthStore()???????

???????????????

??predicate?????????

```
//Last week
let startDate = swiftFhirIrisManager.startDate
//Now
let endDate = swiftFhirIrisManager.endDate

print("Collecting workouts between \(startDate) and \(endDate)")

let predicate = HKQuery.predicateForSamples(withStart: startDate, end: endDate, options: HKQueryOptions.strictEndDate)
```

?????????????????HKQuantityType.quantityType(forIdentifier: .stepCount)??predicate?????????

```
func queryStepCount(){

    //Last week
    let startDate = swiftFhirIrisManager.startDate
    //Now
    let endDate = swiftFhirIrisManager.endDate

    print("Collecting workouts between \(startDate) and \(endDate)")

    let predicate = HKQuery.predicateForSamples(withStart: startDate, end: endDate, options: HKQueryOptions.strictEndDate)
```

```

let query = HKSampleQuery(sampleType: HKQuantityType.quantityType(forIdentifier: .stepCount)!, predicate: predicate, limit: HKObjectQueryNoLimit, sortDescriptors: nil) { (query, results, error) in

    guard let results = results as? [HKQuantitySample] else {
        return
    }

    process(results, type: .stepCount)

}

healthStore.execute(query)
}

```

???HealthKit?????FHIR

?????????????????HealthKitToFHIR

<https://github.com/microsoft/healthkit-to-fhir>

?????????????????HKQuantitySample???FHIR Observation????

```

let observation = try! ObservationFactory().observation(from: item)
let patientReference = try! Reference(json: ["reference" : "Patient/\(patientId)"])
observation.category = try! [CodeableConcept(json: [
    "coding": [
        [
            "system": "http://terminology.hl7.org/CodeSystem/observation-category",
            "code": "activity",
            "display": "Activity"
        ]
    ]
])]
observation.subject = patientReference
observation.status = .final
print(observation)
observation.create(self.fhirServer, callback: { (error) in
    if error != nil {
        completion(error)
    }
})
})

```

??item?HKQuantitySample?????????stepCount???

??factory?????????????unit"?"type"???FHIR codeableConcept????value"???FHIR valueQuantity?

?PatientId?????????????json fhir???????????

```
let patientReference = try! Reference(json: ["reference" : "Patient/\(patientId)"])
```

????????????? :

```

observation.category = try! [CodeableConcept(json: [
  "coding": [
    [
      "system": "http://terminology.hl7.org/CodeSystem/observation-category",
      "code": "activity",
      "display": "Activity"
    ]
  ]
])
]]

```

????fhir??????observation :

```

observation.create(self.fhirServer, callback: { (error) in
  if error != nil {
    completion(error)
  }
})

```

?? (FHIR)

????????InterSystems??fhir?? :

<https://openexchange.intersystems.com/package/iris-fhir-template>

??

??Henrique??Henrique??jquery??FHIR????????????

<https://openexchange.intersystems.com/package/iris-fhir-portal>

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