Building Apps with ResearchKit
Session 213

John Earl Software Engineer
Agenda

What is ResearchKit?
Designing an App-based Study
Building Apps with ResearchKit
Contributing to ResearchKit
What is ResearchKit?
What is ResearchKit?

github.com/researchkit/researchkit
MEDICAL RESEARCH
Volunteers Needed!

Do you have diabetes?
We are seeking volunteers for a study about diabetes and gluten. You must have diabetes, not smoke and be 18-40 years old. Participants will be asked to attend a 2 hour focus group or a 40 minute telephone interview. To volunteer please contact us at [email] or [email].
MEDICAL RESEARCH
Volunteers Needed!

Do you have diabetes?

We are seeking volunteers for a study about diabetes and gluten. You must have diabetes, not smoke and be 15–40 years old. Participants will be asked to attend a 2-hour focus group or a 40-minute telephone interview. To volunteer, please contact us at ______________________ or ______________________.
Medical Research

Limited participation

Subjective and infrequent data

One-way communication
Research Apps

Limited participation
Subjective and infrequent data
One-way communication
Research Apps

Limited participation → Wider reach
Subjective and infrequent data
One-way communication
Research Apps

- Limited participation ➔ Wider reach
- Subjective and infrequent data ➔ Continuous streaming of data
- One-way communication
Research Apps

- Limited participation → Wider reach
- Subjective and infrequent data → Continuous streaming of data
- One-way communication → Feedback for participants
ResearchKit

Open source framework
Easily create research apps
Extends HealthKit
What is your blood pressure?

If you have recently entered a measurement in Health, it will be pre-filled.

**BLOOD PRESSURE**

- Systolic: 115 mm Hg
- Diastolic: 80 mm Hg
Consent

Data Gathering
Collected data may reveal patterns of how health behaviors affect your blood glucose, and also advance clinical research into type 2 diabetes.
Learn more about how data is gathered

Next
Active Tasks

Gait and Balance
Find a place where you can safely walk unassisted for about 20 steps in a straight line.
Put your phone in a pocket or bag and follow the audio instructions.

Get Started
ResearchKit Modules

What is your blood pressure?
If you have recently entered a measurement in Health, it will be pre-filled.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic</td>
<td>115 mm Hg</td>
</tr>
<tr>
<td>Diastolic</td>
<td>80 mm Hg</td>
</tr>
</tbody>
</table>

Data Gathering
Collected data may reveal patterns of how health behaviors affect your blood glucose, and also advance clinical research into type 2 diabetes.

Learn more about how data is gathered

Gait and Balance
Find a place where you can safely walk unassisted for about 20 steps in a straight line.
Put your phone in a pocket or bag and follow the audio instructions.

Get Started
Apps Using ResearchKit
Common Themes

Scheduled activities

• Surveys
• Active tasks
Common Themes

Scheduled activities
- Surveys
- Active tasks

Passive data collection
- HealthKit
- CoreMotion
Common Themes

Scheduled activities
- Surveys
- Active tasks

Passive data collection
- HealthKit
- CoreMotion

Dashboard
Designing an App-based Study
Institutional Review Board or Ethics Committee
Partners HealthCare System
Research Consent Form

General Template
To the Date: February 2016

Principal Investigator: Stanley Zhou, MD, PhD
Non-Principal Investigators: Stanley Zhou, MD, PhD

Description of Subject Population: Individuals 18 or over with type 2 diabetes or pre-diabetes who live in the United States

About this consent form
The following pages explain important information about the research application and how the app is part of a research study.

Please read the form carefully.

Taking part in this research study is voluntary and open to you. If you decide to take part in this research study, you must sign this form to show that you want to take part. We will give you a signed copy of this form to keep. If you have any questions about the research or about this form, please ask us.

People who agree to take part in research are called "subjects." This term will be used throughout the consent form. "Partners HealthCare System" will be used of Partners hospitals (including Massachusetts General Hospital), where the study originated, health care providers, researchers, and institutions. In the context of this consent form, we refer to the Partners system simply as "Partners.

This study is sponsored by the Center for Assessment Technology and Consumer Health (CATCH) at Massachusetts General Hospital in Boston, MA.

What is this research study doing?
Type 2 diabetes is the most common form of diabetes, affecting 23.6 million children and adults in the United States (10.5% of the population). This new intervention is an app that supports people with type 2 diabetes, and also to decrease the rate of progression of pre-diabetes to type 2 diabetes. However, it is common and difficult to make and sustain healthy changes in health behaviors such as health diet, regular exercise, and taking medications regularly.

The study will provide an app that you will be able to use to help with exercise, diet, and medication management.

Participants in the study will:
- Use the app
- Use their mobile device
- Fill out surveys
- Participate in interviews
- Be observed

The study will last for a year. During the study, you will be asked to participate in the study every three months. The study team will write to you once a month to ask how you are doing. The study will be handled by the study team, and you will be able to see the findings of the study.

Participants in the study will receive:
- A $50 gift card as compensation for their time and effort.
- A small reimbursement for any travel expenses they may have during the study.

If you decide to participate in the study, you will be asked to sign this consent form. If you have any questions or concerns, please ask the study team.

If you have any questions or concerns, please contact the study team at 617-634-1000 or email them at catch@partners.org.

Page 1 of 10
Building Apps with ResearchKit
Overview

ORKTask
Overview

ORKTask

ORKStep
Instruction

ORKTaskViewController
Overview

ORKTask

ORKStep
Instruction

ORKTaskViewController

ORKStepViewController

Step
Overview

ORKTask

ORKStep
Instruction

ORKTaskViewController

Step
Result

ORKStepViewController

ORKStepResult
Instruction

ORKTaskResult
Overview
ORKStep
The basic template

Used for:
• An instruction
• Survey question
• Multi-question form
• A countdown timer
• A memory game
• …and so on
ORKStep
The basic template

Used for:
• An instruction
• Survey question
• Multi-question form
• A countdown timer
• A memory game
• …and so on

Step Content
ORKStep
The basic template

Used for:
• An instruction
• Survey question
• Multi-question form
• A countdown timer
• A memory game
• …and so on

Step Content

Forward Navigation
ORKStep
Steps in code

class ORKStep : NSObject {

class ORKStep : NSObject {
    var identifier: String { get }
}
ORKStep
Steps in code

class ORKStep : NSObject {

    var identifier: String { get }

    var title: String?

    Title

    Your question here.
    Additional text can go here.

    1 2 3 4 5 6 7 8 9 10
    Low Value High Value

    Next
    Skip this question
ORKStep
Steps in code

class ORKStep : NSObject {
    var identifier: String { get }
    var title: String?
    var text: String?

    Your question here.
    Additional text can go here.

class ORKStep : NSObject {
    var identifier: String { get }
    var title: String?  
    var text: String?  
    var optional: Bool
...
}
Overview

Outline of main classes

ORKTask
ORKStep
  Instruction
  Question
  Form
ORKStepViewController
Step
ORKTaskViewController
Result
ORKTaskResult
ORKStepResult
  Instruction
  Question
  Form
ORKStepViewController
ORKStepResult
  Instruction
  Question
  Form
ORKStepViewController
ORKStepResult
  Instruction
  Question
Overview

Outline of main classes

ORKTask

ORKTaskResult

ORKStep

ORKStepResult

Instruction

ORKStepResult

Question

ORKStepResult

Question

ORKStepResult

Form
ORKTask
Tasks link steps together

protocol ORKTask : NSObjectProtocol {

ORKTask
Tasks link steps together

protocol ORKTask : NSObjectProtocol {
    var identifier: String { get }
}
ORKTask
Tasks link steps together

protocol ORKTask : NSObjectProtocol {
    var identifier: String { get }
    func stepAfterStep(step: ORKStep?,
                        withResult result: ORKTaskResult) -> ORKStep?
protocol ORKTask : NSObjectProtocol {
    var identifier: String { get }
    func stepAfterStep(step: ORKStep?,
                          withResult result: ORKTaskResult) -> ORKStep?
    func stepBeforeStep(step: ORKStep?,
                         withResult result: ORKTaskResult) -> ORKStep?
    ...
}

ORKTask
Tasks link steps together
ORKTask

Tasks link steps together

protocol ORKTask : NSObjectProtocol {
    var identifier: String { get }
    func stepAfterStep(step: ORKStep?,
                       withResult result: ORKTaskResult) -> ORKStep?
    func stepBeforeStep(step: ORKStep?,
                         withResult result: ORKTaskResult) -> ORKStep?
    ...
}

class ORKOrderedTask : ORKTask {

ORKTask
Tasks link steps together

protocol ORKTask : NSObjectProtocol {
    var identifier: String { get }
    func stepAfterStep(step: ORKStep?,
                        withResult result: ORKTaskResult) -> ORKStep?
    func stepBeforeStep(step: ORKStep?,
                         withResult result: ORKTaskResult) -> ORKStep?
    ...
}

class ORKOrderedTask : ORKTask {
    init(identifier: String, steps: [ORKStep])
ORKTask

Tasks link steps together

protocol ORKTask : NSObjectProtocol {
    var identifier: String { get }
    func stepAfterStep(step: ORKStep?,
        withResult result: ORKTaskResult) -> ORKStep?
    func stepBeforeStep(step: ORKStep?,
        withResult result: ORKTaskResult) -> ORKStep?
    ...
}

class ORKOrderedTask : ORKTask {
    init(identifier: String, steps: [ORKStep])
    var steps: [ORKStep] { get }
    ...
}
Overview

ORKTask
- ORKStep
  - Instruction
- ORKStep
  - Question
- ORKStep
  - Form
- ORKStep
  - Question

ORKTaskViewController

ORKStepViewController
- Step
- Result

ORKStepViewController

ORKTaskResult
- ORKStepResult
  - Instruction
- ORKStepResult
  - Question
- ORKStepResult
  - Form
- ORKStepResult
  - Question
Overview

ORKTask

ORKStep
  Instruction

ORKStep
  Question

ORKStep
  Form

ORKStep
  Question

ORKStepViewController

ORKTaskViewController

ORKTaskResult

ORKStepResult
  Instruction

ORKStepResult
  Question

ORKStepResult
  Form

ORKStepResult
  Question
ORKTaskViewController
For presenting tasks

let task = …
ORKTaskViewController
For presenting tasks

let task = ...
let taskViewController = ORKTaskViewController(task: task,
                                             taskRunUUID: nil)
ORKTaskViewController
For presenting tasks

let task = ...
let taskViewController = ORKTaskViewController(task: task,
                                                  taskRunUUID: nil)

taskViewController.delegate = self
ORKTaskViewController
For presenting tasks

let task = …
let taskViewController = ORKTaskViewController(task: task,
                                                taskRunUUID: nil)

taskViewController.delegate = self

taskViewController.outputDirectory = …
ORKTaskViewController
For presenting tasks

let task = …
let taskViewController = 
    ORKTaskViewController(task: task,
    taskRunUUID: nil)

taskViewController.delegate = self

taskViewController.outputDirectory = …

presentViewController(taskViewController,
    animated: true,
    completion: nil)
ORKTaskViewController
For presenting tasks

```swift
let task = ...
let taskViewController = ORKTaskViewController(task: task, taskRunUUID: nil)

taskViewController.delegate = self

taskViewController.outputDirectory = ...

presentViewController(taskViewController, animated: true, completion: nil)
```
ORKTaskViewController
For presenting tasks

let task = …
let taskViewController = ORKTaskViewController(task: task, taskRunUUID: nil)

taskViewController.delegate = self

taskViewController.outputDirectory = …
presentViewController(taskViewController, animated: true, completion: nil)
Overview

ORKTask
  ORKStep
    Instruction
  ORKStep
    Question
  ORKStep
    Form

ORKTaskViewController
  Step
  Result

ORKStepViewController
  ORKStep
    Instruction
  ORKStep
    Question
  ORKStep
    Form

ORKTaskResult
  ORKStepResult
    Question
  ORKStepResult
    Question
Getting Results
When your task is done

```swift
func taskViewController(taskViewController: ORKTaskViewController,
    didFinishWithReason reason: ORKTaskViewControllerFinishReason,
    error: NSError?) {
```
func taskViewController(taskViewController: ORKTaskViewController, 
        didFinishWithReason reason: ORKTaskViewControllerFinishReason, 
        error: NSError?) {

    if reason == .Saved {
        let restorationData = taskViewController.restorationData
        // Save it for later
        return
    }
}
func taskViewController(taskViewController: ORKTaskViewController, 
    didFinishWithReason  reason: ORKTaskViewControllerFinishReason, 
    error: NSError?) {

    if reason == .Saved {
        let restorationData = taskViewController.restorationData
        // Save it for later
        return
    }

    let taskResult = taskViewController.result
    // Do stuff with the taskResult

    Getting Results
    When your task is done
Getting Results
When your task is done

```swift
func taskViewController(taskViewController: ORKTaskViewController,
    didFinishWithReason reason: ORKTaskViewControllerFinishReason,
    error: NSError?) {
    if reason == .Saved {
        let restorationData = taskViewController.restorationData
        // Save it for later
        return
    }

    let taskResult = taskViewController.result
    // Do stuff with the taskResult

    taskViewController.dismissViewControllerAnimated(true, completion: nil)
}
```
Survey Steps

ORKInstructionStep
ORKQuestionStep
ORKFormStep
Question Steps

ORKQuestionStep
identifier
Question Steps

ORKQuestionStep

identifier

answerFormat
Question Steps

ORKQuestionStep

- identifier
- answerFormat

ORKAnswerFormat
Question Steps
Forms and Form Items

ORKFormStep

- identifier
- formItems
Forms and Form Items
Forms and Form Items

ORKFormStep
  identifier
  formItems

ORKFormItem
  identifier
  answerFormat

ORKFormItem
  identifier
  answerFormat

ORKTextChoiceAnswerFormat
Forms and Form Items

ORKFormStep
- identifier
- formItems

ORKFormItem
- identifier
- answerFormat
- ORKTextChoiceAnswerFormat

ORKFormItem
- identifier
- answerFormat
- ORKNumericAnswerFormat
ORKOrderedTask

identifier

steps
Question Results

ORKOrderedTask

- identifier
- steps

ORKTaskResult

- identifier
- results
Question Results

ORKOrderedTask

- identifier
- steps

ORKTaskResult

- identifier
- results
Question Results

ORKOrderedTask

- identifier
- steps
  - ORKInstructionStep
    - identifier

ORKTaskResult

- identifier
- results
Question Results
Question Results

ORKOrderedTask
  identifier
  steps
    ORKInstructionStep
      identifier
    ORKQuestionStep
      identifier
      answerFormat
  ORKStepResult
    identifier
    results
  ORKQuestionResult
    identifier
    answer

ORKTaskResult
  identifier
  results
    ORKStepResult
      identifier
      results
    ORKQuestionResult
      identifier
      answer
Form Results

ORKOrderedTask
  identifier
  steps
    ORKFormStep
      identifier
      formItems
        ORKFormItem
          identifier
          answerFormat
        ORKFormItem
          identifier
          answerFormat
Form Results

ORKOrderedTask

- identifier
- steps
  - ORKFormStep
    - identifier
    - formItems
  - ORKFormItem
    - identifier
    - answerFormat

ORKTaskResult

- identifier
- results

ORKFormItem

- identifier
- answerFormat
Form Results

ORKOrderedTask
- identifier
- steps
  - ORKFormStep
    - identifier
    - formItems

ORKTaskResult
- identifier
- results
  - ORKStepResult
    - identifier
    - results

ORKFormItem
- identifier
- answerFormat

ORKFormItem
- identifier
- answerFormat
Form Results
Demo
Surveys
Informed Consent

What is it?
Informed Consent

What is it?

What study entails
Informed Consent

What is it?

What study entails

Risks and benefits
Informed Consent

What is it?

What study entails

Risks and benefits

Often in person
Informed Consent

What is it?

What study entails
Risks and benefits
Often in person
From ethics review
Informed Consent

What is it?

What study entails

Risks and benefits

Often in person

From ethics review

May need to sign
Informed Consent

What is it?

What study entails
Risks and benefits
Often in person
From ethics review
May need to sign
Often a legal document
Consent Document

ORKVisualConsentStep

ORKConsentReviewStep
Consent Document

ORKVisualConsentStep

ORKConsentReviewStep
Consent Document

ORKConsentDocument

sections

- DataGathering
- Privacy
- DataUse
- TimeCommitment

ORKVisualConsentStep

ORKConsentReviewStep
Consent Document

sections
- DataGathering
- Privacy
- DataUse
- TimeCommitment

signatures
- Investigator’s signature
  - Identifier
  - Name
  - Image

ORKVisualConsentStep
ORKConsentReviewStep
Consent Document

ORKConsentDocument

sections

DataGathering
Privacy
DataUse
TimeCommitment

signatures

Investigator’s signature
Identifier
Name
Image

Participant’s signature
Identifier
Name
Image
Informed Consent Steps

Privacy
Your data will be sent to a secure database, where it will be separated from your personal identity.

Sharing Options
Institution and its partners will receive your study data from your participation in this study.
Sharing your coded study data more broadly (without information such as your name) may benefit this and future research.

Only share my data with Institution and its partners

Review
Review the form below, and tap Agree if you’re ready to continue.

Example Consent
Welcome

- Lorem
- Ipsum
- Dolor

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam auctor, mi in varius, nisi risus placerat metus, vel scavët perspiciatis.

Example text:

Quisque id tellus vel tellus aliquet pharetra. Nulla facilis euismod, auctor eget, suscipit vel, ut tellus. Donec feugiat, tortor ac dictum sodales, est nulla auctor tellus, at lacinia dolor dui a nibh.

Disagree Agree
Visual Consent Step

One screen per section
Animated transitions
Customizable
Visual Consent Step

// Create a section
let consentSection = ORKConsentSection(type: .DataGathering)
// Create a section
let consentSection = ORKConsentSection(type: .DataGathering)
consentSection.title = "Sensor Data"
Visual Consent Step

// Create a section
let consentSection = ORKConsentSection(type: .DataGathering)
consentSection.title = "Sensor Data"
consentSection.summary = "We gather data using sensors ..."
Visual Consent Step

// Create a section
let consentSection = ORKConsentSection(type: .DataGathering)
consentSection.title = "Sensor Data"
consentSection.summary = "We gather data using sensors ..."
consentSection.content = ... // "Learn More" content (+ `htmlContent`)
// Create a section
let consentSection = ORKConsentSection(type: .DataGathering)
consentSection.title = "Sensor Data"
consentSection.summary = "We gather data using sensors ..."
consentSection.content = ... // "Learn More" content (+ `htmlContent`)
consentSection.customImage = UIImage(named: "CustomImage")
consentSection.customAnimationURL = ... // File URL to video for transition
Visual Consent Step

// Create a section
let consentSection = ORKConsentSection(type: .DataGathering)
consentSection.title = "Sensor Data"
consentSection.summary = "We gather data using sensors ..."
consentSection.content = ...  // "Learn More" content (+ `htmlContent`)
consentSection.customImage = UIImage(named: "CustomImage")
consentSection.customAnimationURL = ... // File URL to video for transition

let consentDocument = ORKConsentDocument()
consentDocument.sections = [consentSection, ...]  // Attach to a document
// Create a section
let consentSection = ORKConsentSection(type: .DataGathering)
consentSection.title = "Sensor Data"
consentSection.summary = "We gather data using sensors ..."
consentSection.content = ... // "Learn More" content (+ `htmlContent`)
consentSection.customImage = UIImage(named: "CustomImage")
consentSection.customAnimationURL = ... // File URL to video for transition

let consentDocument = ORKConsentDocument()
consentDocument.sections = [consentSection, ...] // Attach to a document

let visualConsentStep =
    ORKVisualConsentStep(identifier: "visualConsent",
                         document: consentDocument)
Sharing Consent Step

Give participants control

- ORKConsentSharingStep
- Supply institution name
- Localized
Consent Review Step

Participant

• Reviews document
• Enters name (optional)
• Signs with touch (optional)
Consent Review Step

let consentDocument = ... // Our consent document from before
Consent Review Step

```swift
let consentDocument = ... // Our consent document from before
let participantSignature = ORKConsentSignature(forPersonWithTitle: "Participant",
                                               dateFormatString: nil,
                                               identifier: "participant")
```
Consent Review Step

let consentDocument = ...  // Our consent document from before
let participantSignature =
    ORKConsentSignature(forPersonWithTitle: "Participant",
                       dateFormatString: nil,
                       identifier: "participant")
participantSignature.requiresSignatureImage = false
Consent Review Step

```swift
let consentDocument = ... // Our consent document from before
let participantSignature = ORKConsentSignature(forPersonWithTitle: "Participant",
                                             dateFormatString: nil,
                                             identifier: "participant")
participantSignature.requiresSignatureImage = false
consentDocument.addSignature(participantSignature)
```
let consentDocument = ... // Our consent document from before
let participantSignature = 
    ORKConsentSignature(forPersonWithTitle: "Participant",
                        dateFormatString: nil,
                        identifier: "participant")
participantSignature.requiresSignatureImage = false
consentDocument.addSignature(participantSignature)

let consentReviewStep = 
    ORKConsentReviewStep(identifier: "consentReview",
                          signature: signature,
                          inDocument: consentDocument)
Demo

Consent
Informed Consent

Things to consider
Informed Consent

Things to consider

“Informed”

   Form factor

   Custom sections

   Questions from participants

   Comprehension quiz
# Informed Consent

## Things to consider

<table>
<thead>
<tr>
<th>“Informed”</th>
<th>“Consent”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form factor</td>
<td>Verifying identity</td>
</tr>
<tr>
<td>Custom sections</td>
<td>Digital signatures</td>
</tr>
<tr>
<td>Questions from participants</td>
<td></td>
</tr>
<tr>
<td>Comprehension quiz</td>
<td></td>
</tr>
</tbody>
</table>
Active Tasks

Interactive
Short
Use Sensors
Active Task Structure

ORKInstructionStep
- Defines Scope

ORKInstructionStep
- Gives Instructions

ORKCountdownStep
- Preparation

ORKActiveStep
- Actual Task

ORKCompletionStep
- Encouragement
Gait and Balance
Find a place where you can safely walk unassisted for about 20 steps in a straight line.
Put your phone in a pocket or bag and follow the audio instructions.

Fitness
Walk outdoors at your fastest possible pace for twenty seconds. When you’re done, sit and rest comfortably for twenty seconds. To begin, tap Get Started.

Voice
Your more specific voice instruction goes here. For example, say ‘Aaaah.’
Tap Get Started to begin.
Spatial Memory

Some of the flowers will light up one at a time. Tap those flowers in the same order they lit up.
To begin, tap Get Started, then watch closely.

Tapping Speed

Rest your phone on a flat surface. Two buttons will appear on your screen for 20 seconds. Using two fingers on the same hand, take turns tapping the buttons as quickly as you can.
Tap Get Started to begin.
**Tone Audiometry**
Before you begin, plug in and put your headphones on.
Tap Get Started to begin.

**Reaction Time**
Shake the device in any direction as soon as the blue dot appears on screen. You will be asked to do this 3 times.
Tap Get Started to begin.
Demo
Active Tasks
Contributing to ResearchKit
ResearchKit Community

Pick or open an issue
Submit a pull request
Work with review team
Change gets merged
Contributions

Active Tasks
Answer formats
Steps
Device support
Back end integrations
Contributions

Active Tasks
Answer formats
Steps
Device support
Back end integrations
Active Tasks

ORKInstructionStep
Defines Scope

ORKCountdownStep
Preparation

ORKActiveStep
Actual Work

ORKCompletionStep
Encouragement

ORKInstructionStep
Gives Instructions
Active Tasks

ORKInstructionStep Defines Scope
ORKInstructionStep Gives Instructions
ORKCountdownStep Preparation
ORKActiveStep Actual Work
ORKCompletionStep Encouragement

Recorder Configurations
ORKRecorderConfiguration Accelerometer
ORKRecorderConfiguration Device Motion
Active Tasks

ORKInstructionStep: Defines Scope
ORKInstructionStep: Gives Instructions
ORKCountdownStep: Preparation
ORKActiveStep: Actual Work
ORKCompletionStep: Encouragement

Recorder Configurations
ORKRecorderConfiguration: Accelerometer
ORKRecorderConfiguration: Device Motion
## Recorders

<table>
<thead>
<tr>
<th>Recorder</th>
<th>Data Collected</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORKAccelerometerRecorder</td>
<td>CMAccelerometerData</td>
<td>frequency</td>
</tr>
<tr>
<td>ORKDeviceMotionRecorder</td>
<td>CMDeviceMotion</td>
<td>frequency</td>
</tr>
<tr>
<td>ORKHealthQuantityTypeRecorder</td>
<td>HKQuantitySample</td>
<td>quantityType, unit</td>
</tr>
<tr>
<td>ORKLocationRecorder</td>
<td>CLLocation</td>
<td>N/A</td>
</tr>
<tr>
<td>ORKPedometerRecorder</td>
<td>CMPedometerData</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Using Recorders

ORKFitnessStep

- identifier
- recorderConfigurations
Using Recorders

ORKFitnessStep
  - identifier
  - recorderConfigurations

ORKFitnessStepVC
  - step
  - recorders
Using Recorders

ORKFitnessStep
- identifier
- recorderConfigurations

ORKFitnessStepVC
- step
- recorders

ORKHealthQuantityRC
- identifier
Using Recorders

ORKFitnessStep
- identifier
- recorderConfigurations

ORKFitnessStepVC
- step
- recorders

ORKHealthQuantityRC
- identifier
- quantityType
- unit
Using Recorders

ORKFitnessStep
- identifier
- recorderConfigurations

ORKFitnessStepVC
- step
- recorders

ORKHealthQuantityRC
- identifier
- quantityType
- unit

ORKPedometerRC
- identifier
Using Recorders

ORKFitnessStep
- identifier
- recorderConfigurations

ORKFitnessStepVC
- step
- recorders

ORKHealthQuantityRC
- identifier
- quantityType
- unit

ORKHealthQuantityR
- configuration

ORKPedometerRC
- identifier

ORKPedometerR
- configuration
Using Recorders
Making a Custom Active Step

Subclass ORKActiveStep

Subclass ORKActiveStepViewController

Build UI

Configure recorders (if needed)

Add result classes (if needed)
ResearchKit is open source
Go and clone it
Contribute!
ResearchKit is open source
Go and clone it
Contribute!

It is an open project — will become what YOU make it
More Information

ResearchKit
ResearchKit Framework on GitHub
researchkit.org
github.com/researchkit/researchkit

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## Related Sessions

<table>
<thead>
<tr>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>What’s New in HealthKit</td>
<td>Pacific Heights</td>
<td>Tuesday 11:00AM</td>
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<tr>
<td>HealthKit and ResearchKit Lab</td>
<td>Frameworks Lab C</td>
<td>Thursday 11:00AM</td>
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<tr>
<td>Health, Fitness and Research Get Together</td>
<td>Buena Vista Park</td>
<td>Wednesday 6:00PM</td>
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