

#WWDC19

# ResearchKit and CareKit Reimagined

Srinath Tupil Muralidharan, Software Engineer

Community

Community

ResearchKit

Community

ResearchKit

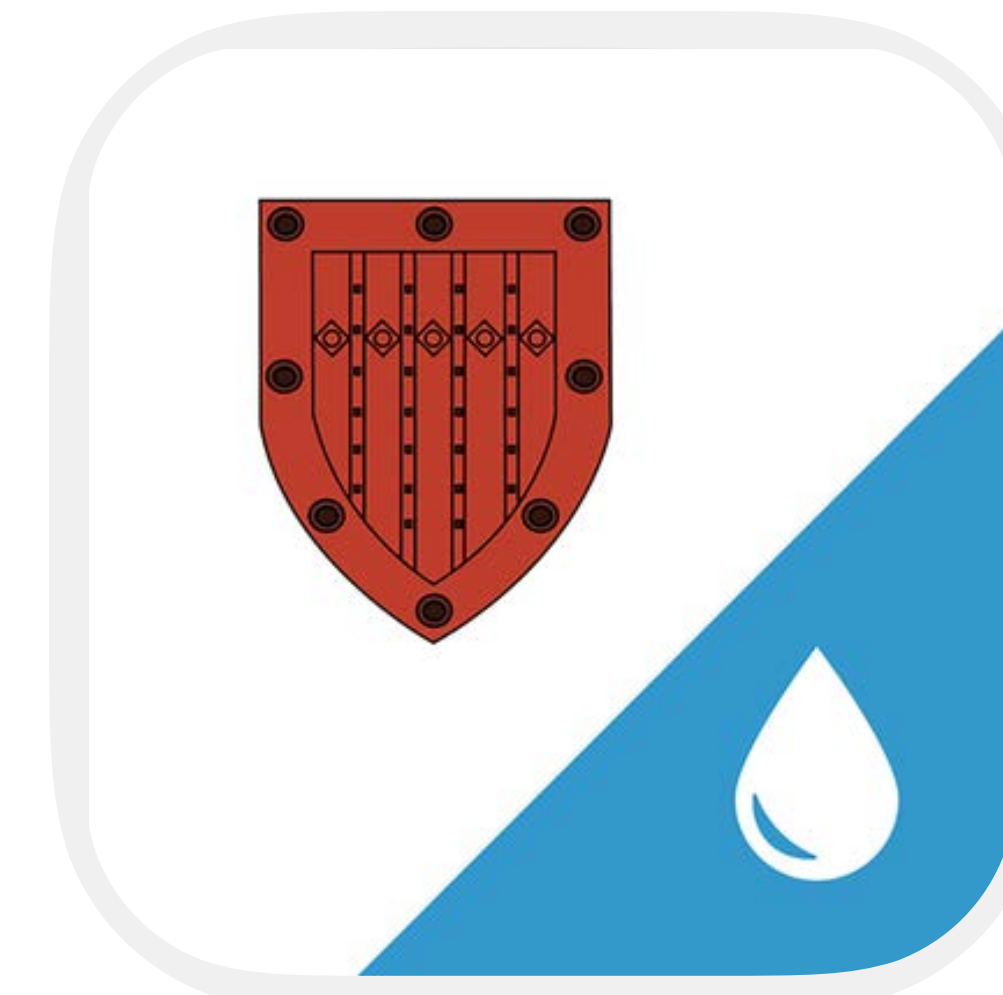
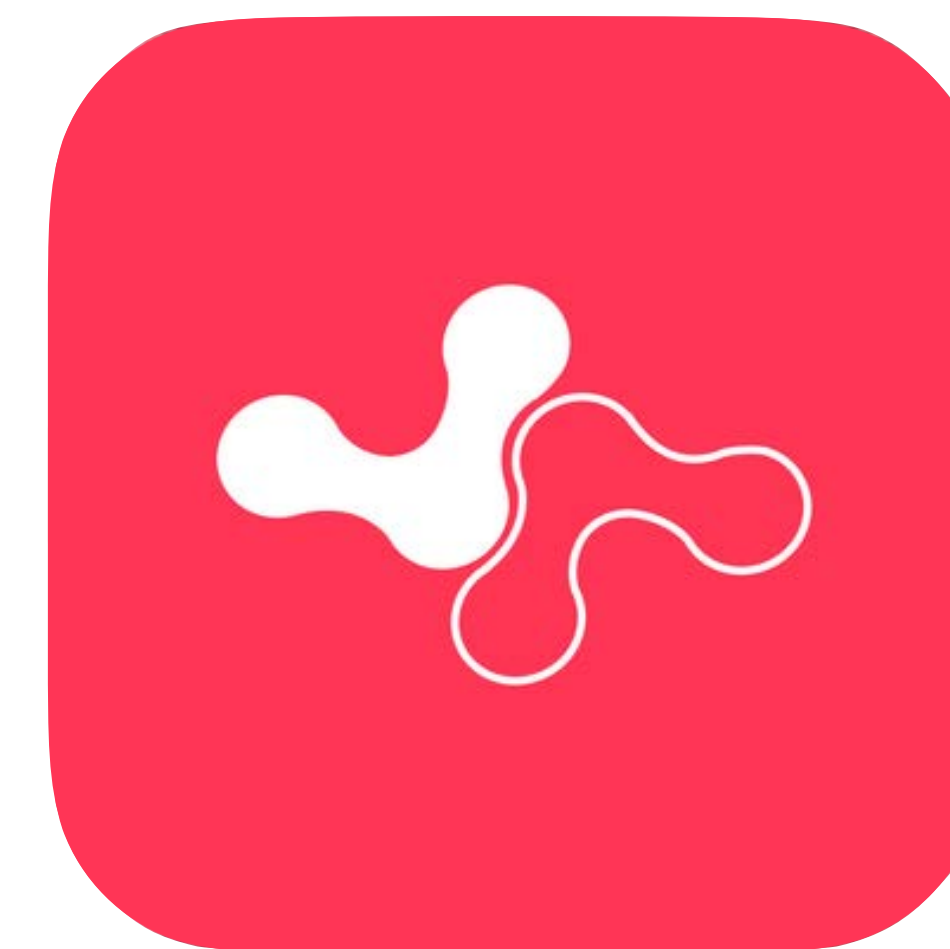
CareKit

MONDAY, JUNE 3

**TODAY**

NEW APPS

## ResearchKit & CareKit

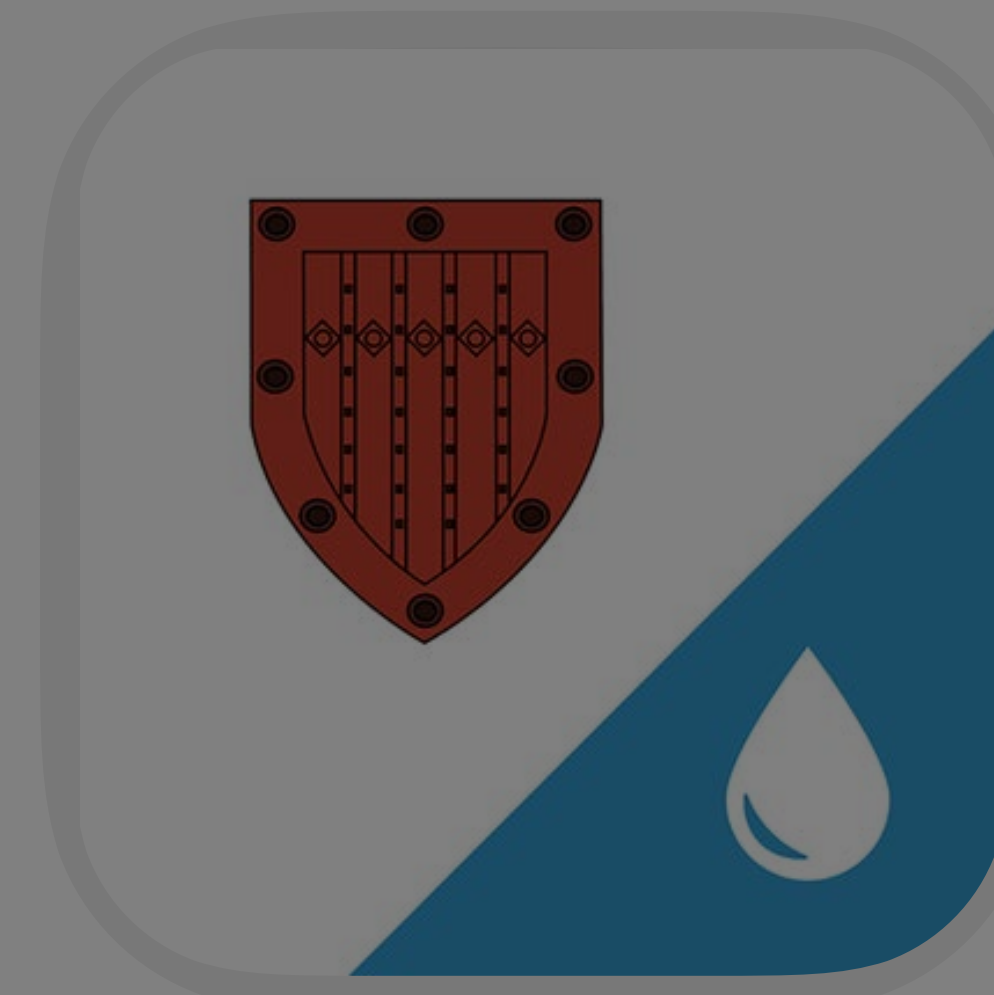
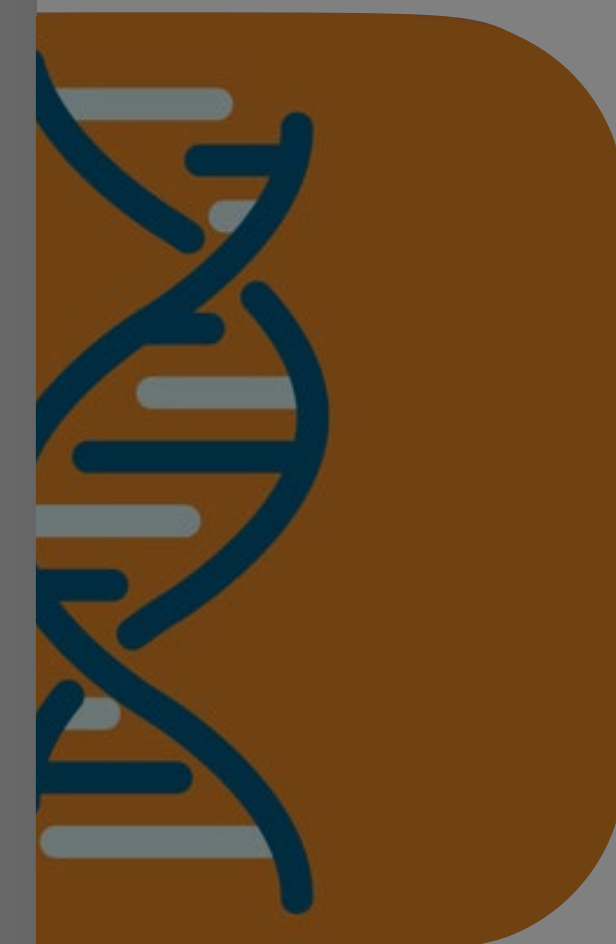
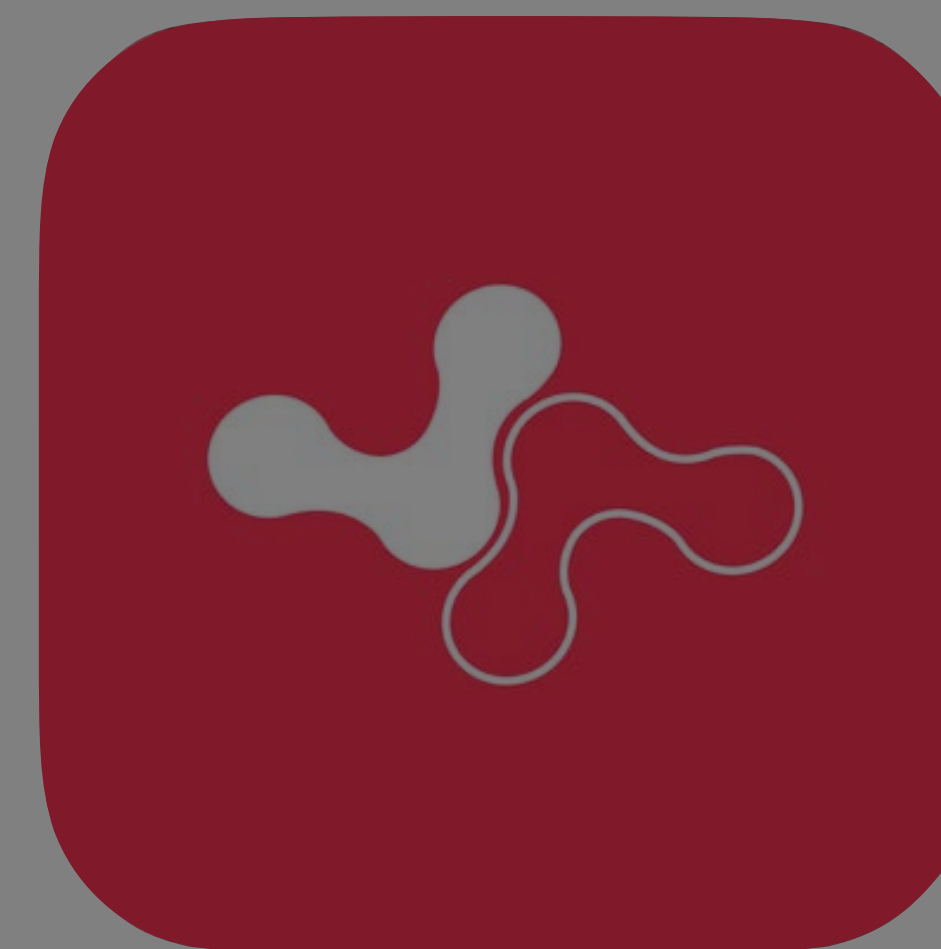


MONDAY, JUNE 3

TODAY

NEW APPS

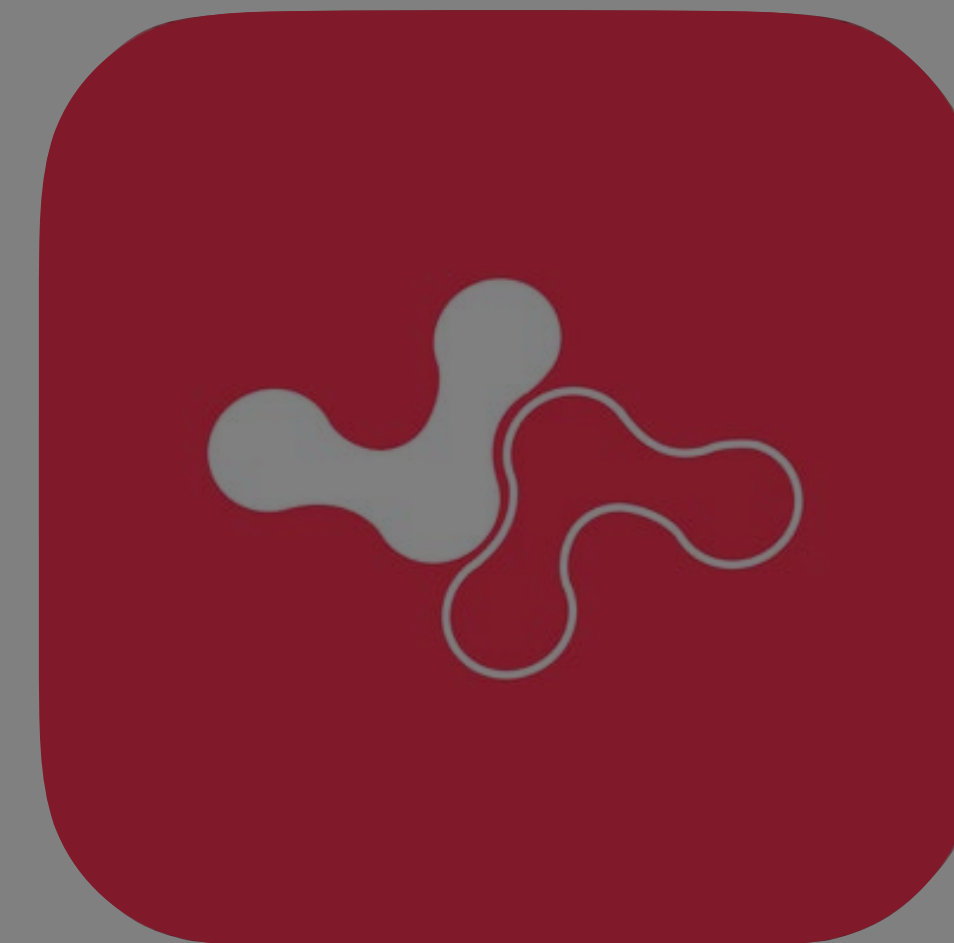
## ResearchKit & CareKit



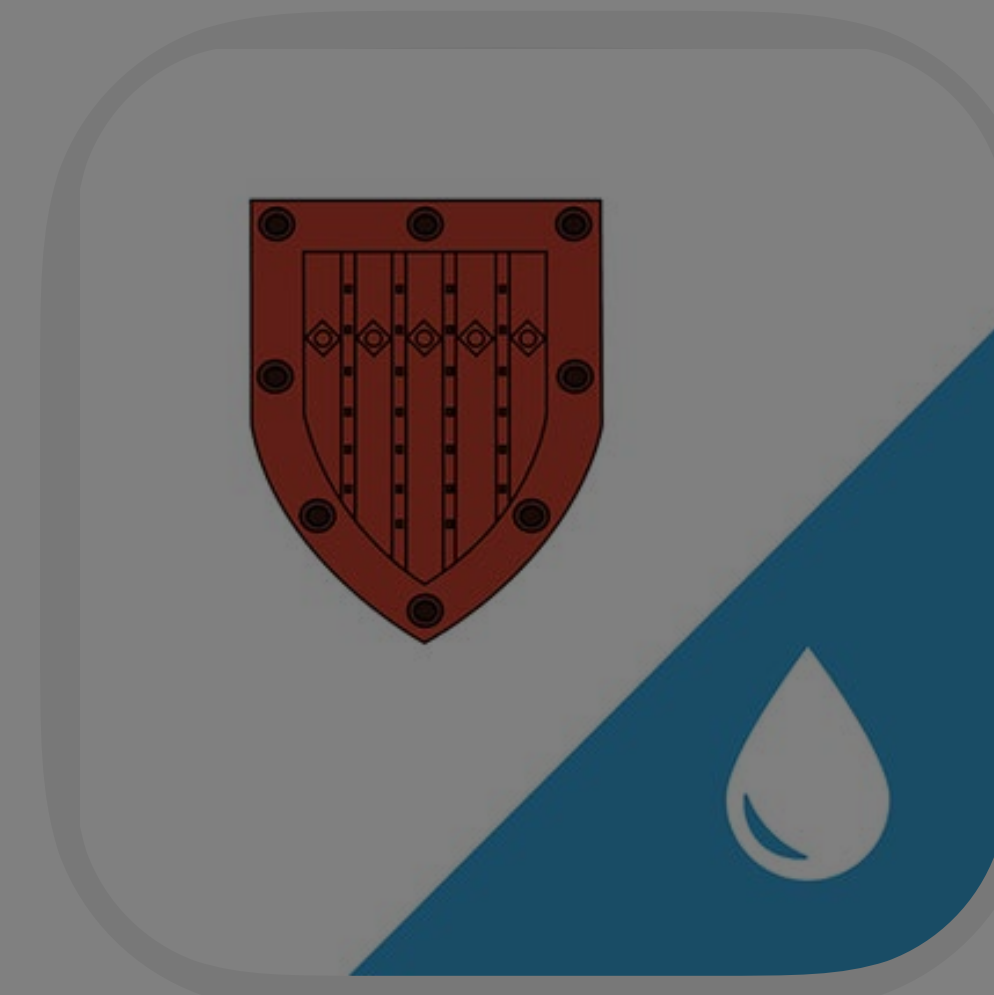
MONDAY, JUNE 3  
**TODAY**

NEW APPS

## ResearchKit & CareKit



FocalView

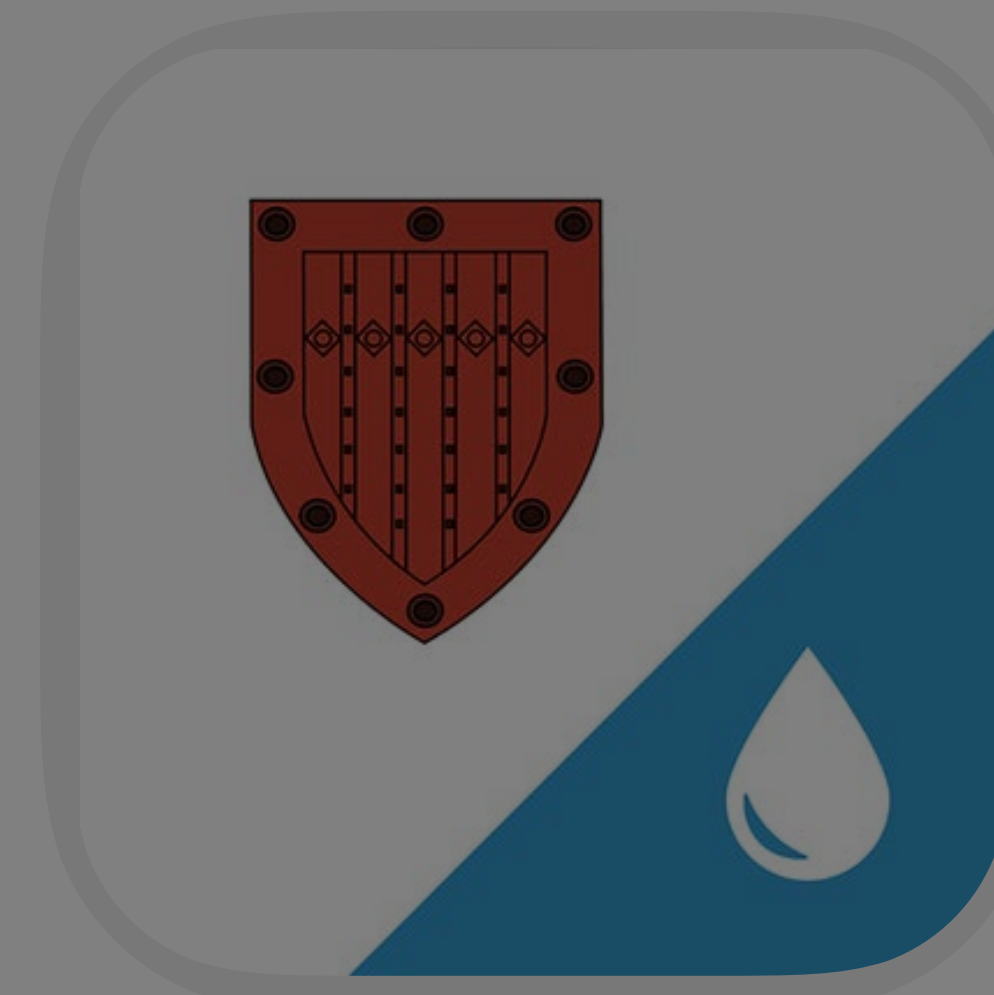
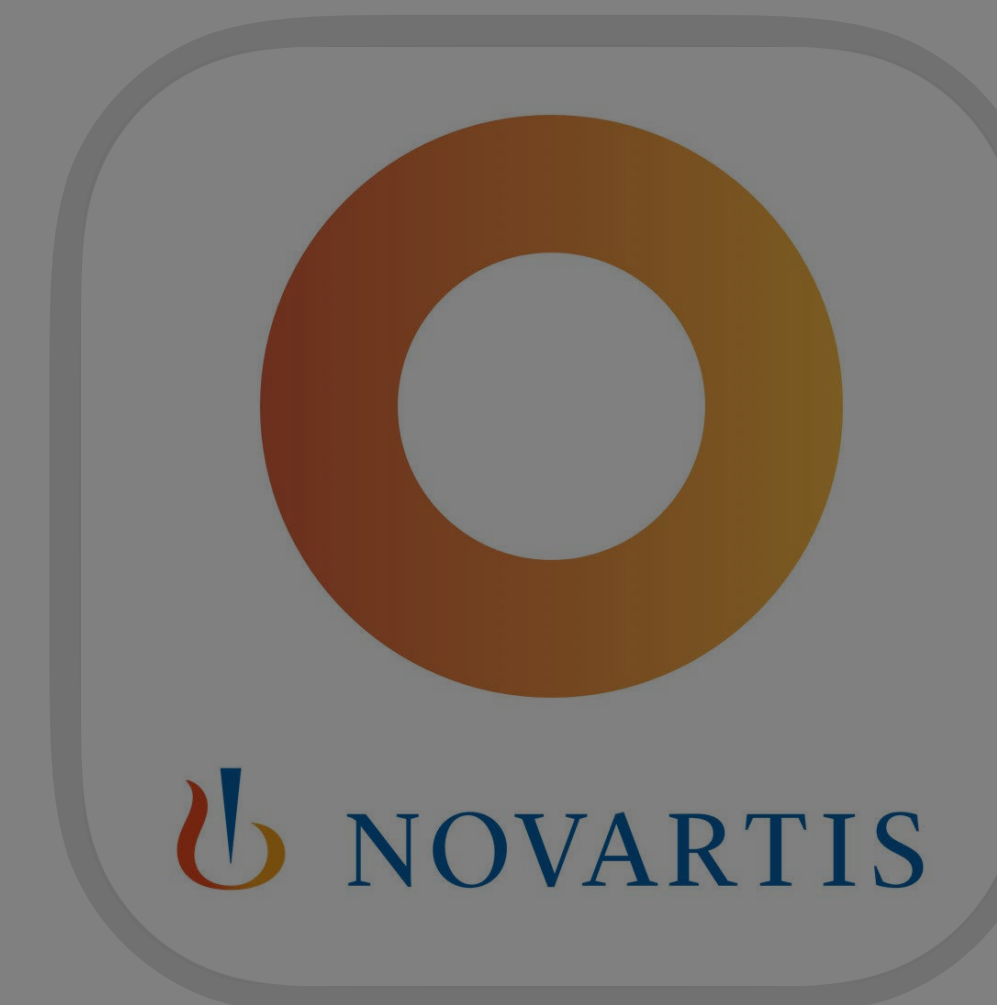
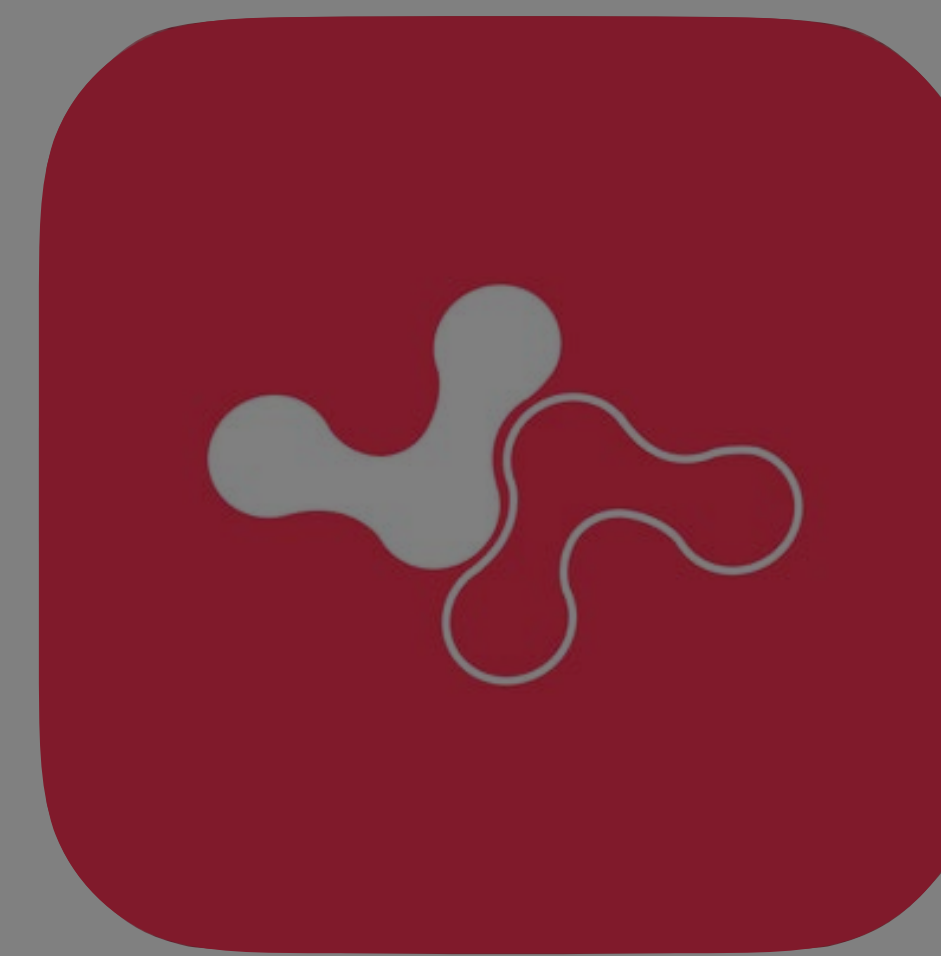


MONDAY, JUNE 3

TODAY

NEW APPS

## ResearchKit & CareKit

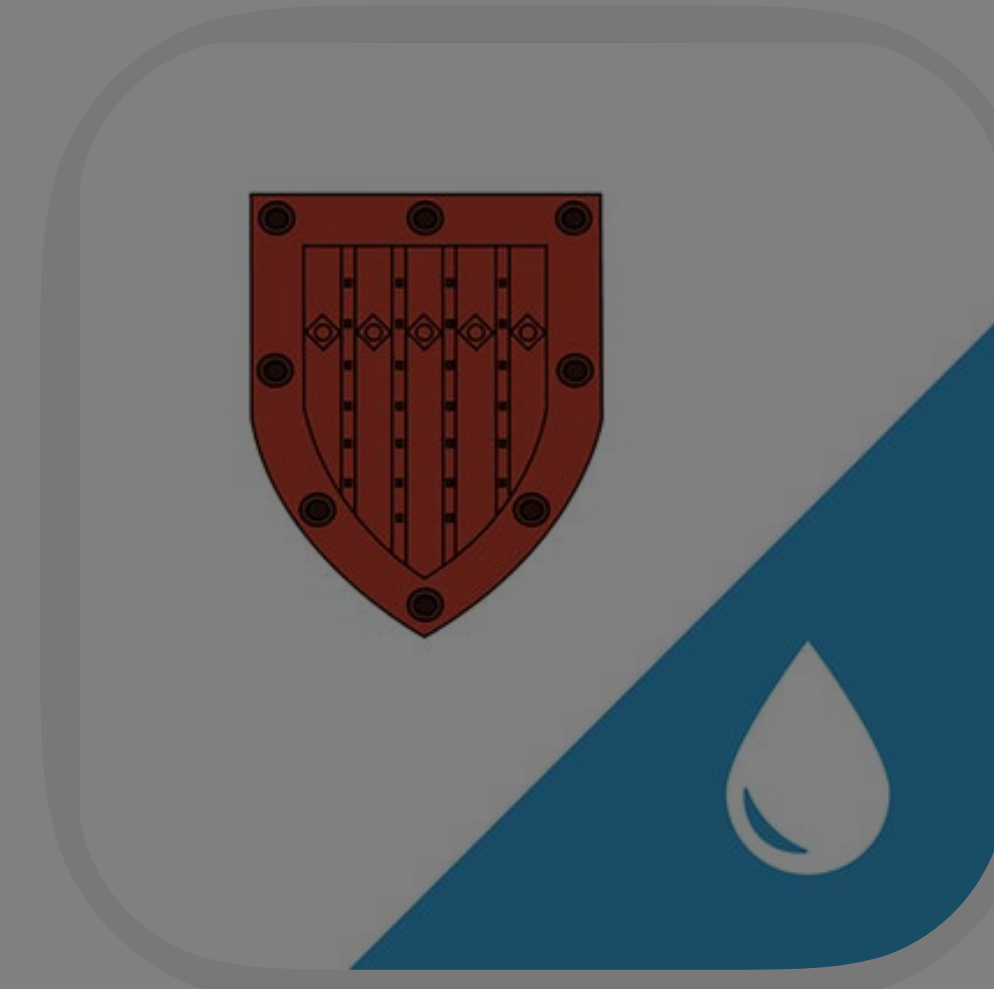
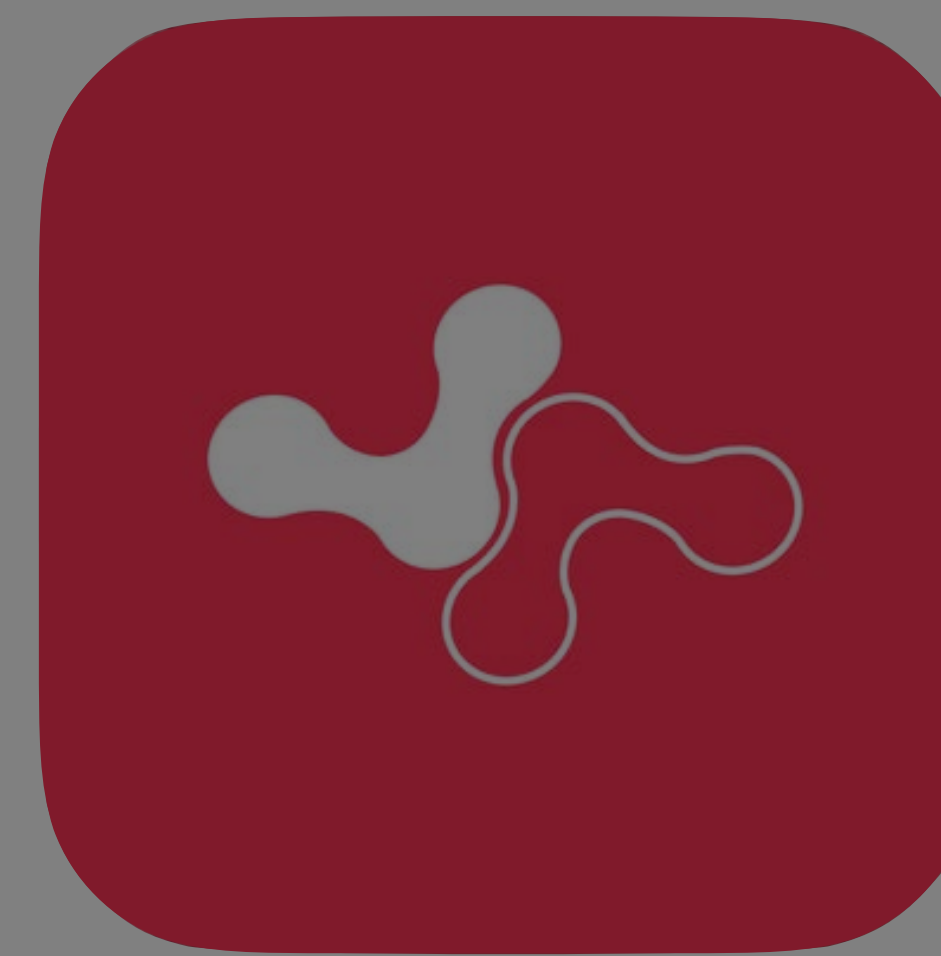




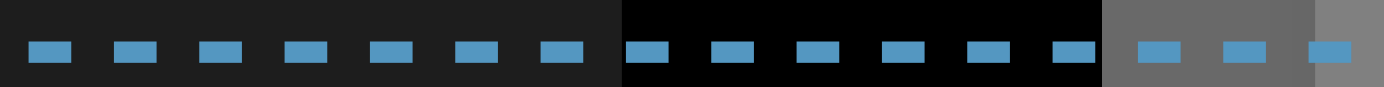
MONDAY, JUNE 3  
**TODAY**

NEW APPS

## ResearchKit & CareKit



MyStudies



MONDAY, JUNE 3

**TODAY**

NEW APPS

**ResearchKit & CareKit**



# PUBLICATIONS

FROM RESEARCHKIT & CAREKIT  
APPLICATIONS

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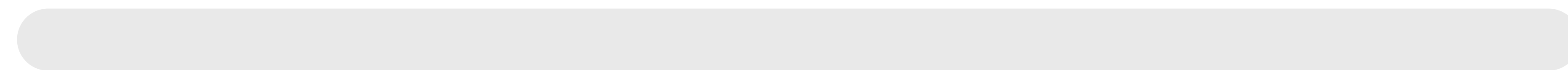
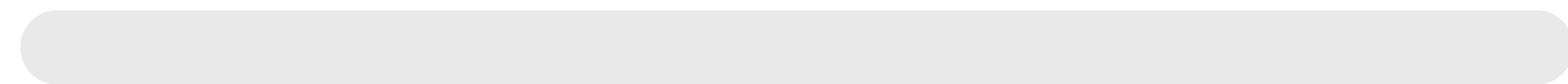
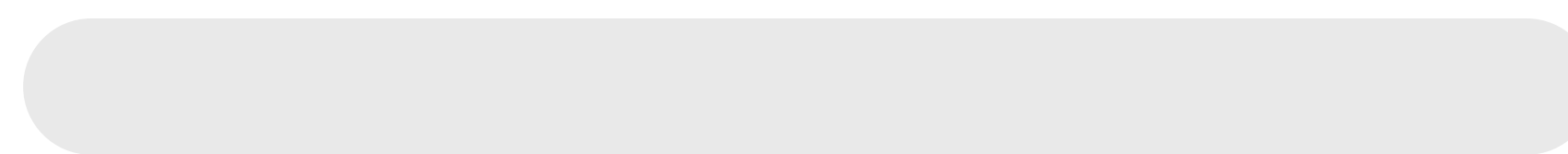
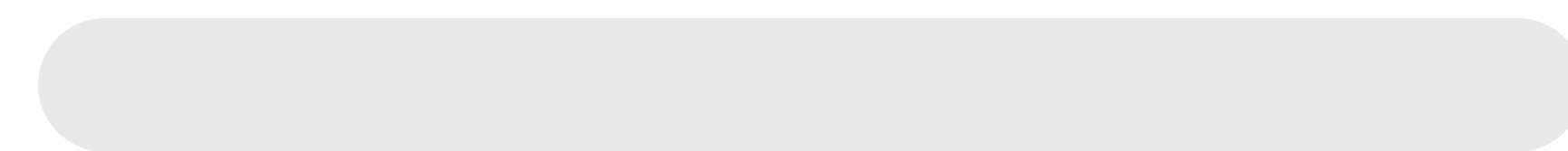
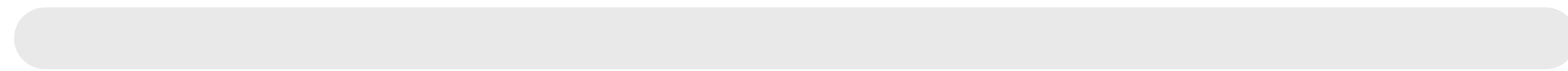
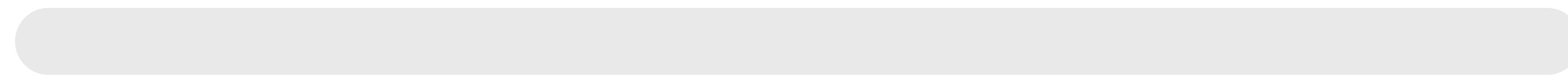
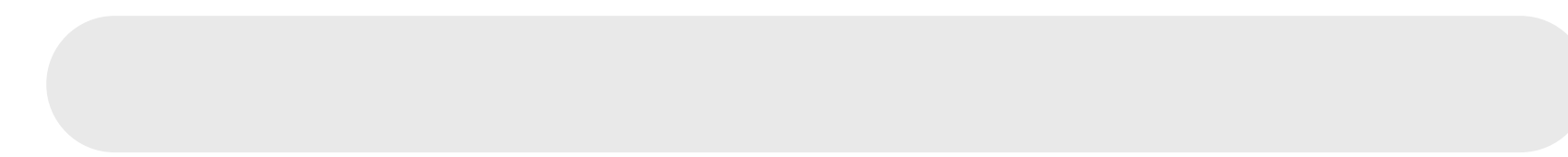
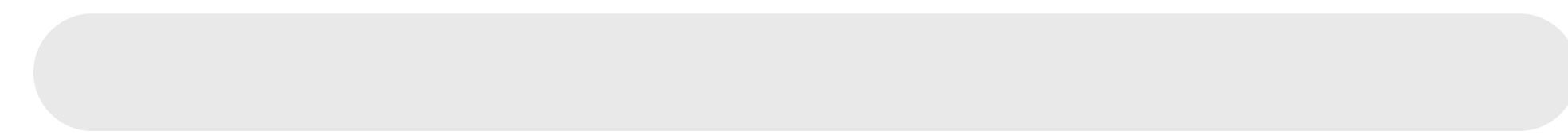
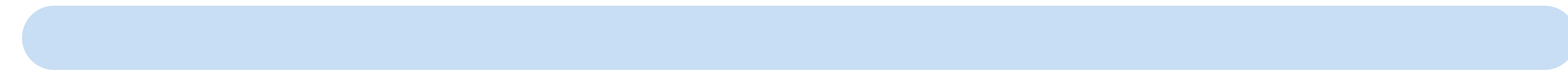
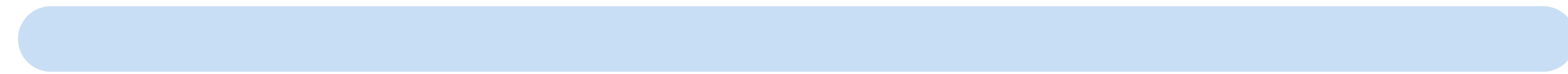
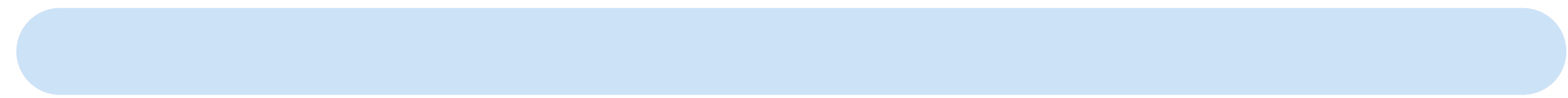
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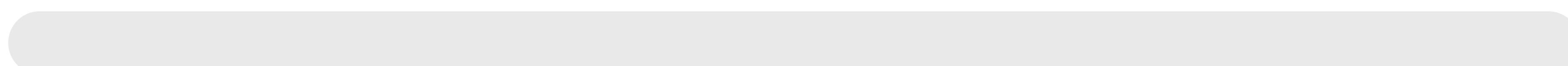
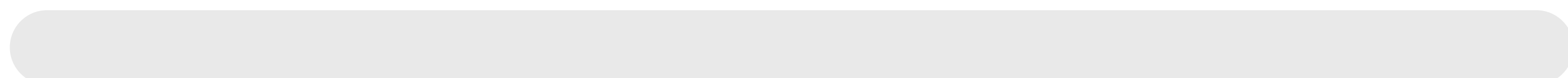
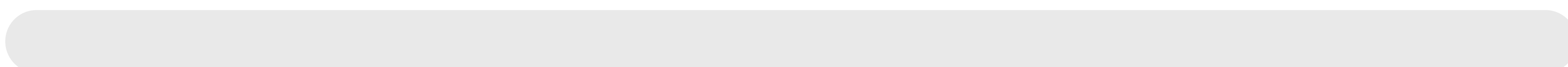
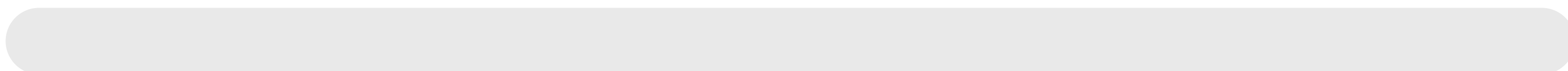
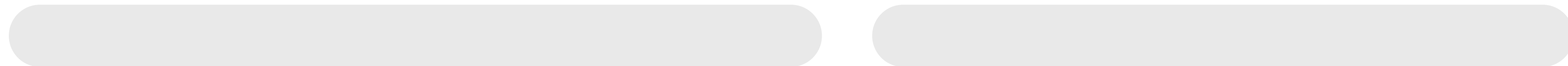
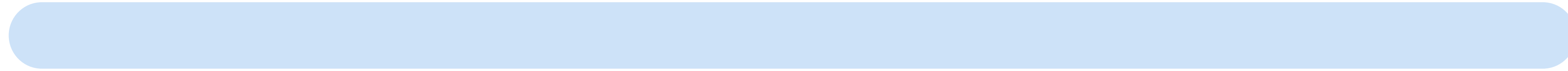
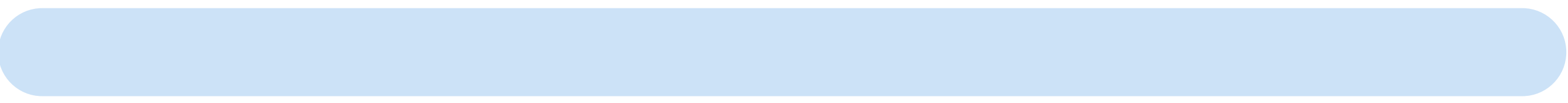


USING MOBILE TECHNOLOGY TO ENGAGE SEXUAL AND GENDER MINORITIES IN CLINICAL RESEARCH

## PRIDE STUDY



**PRIDE STUDY**



THE HEALTHY PREGNANCY RESEARCH PROGRAM:  
TRANSFORMING PREGNANCY RESEARCH THROUGH A  
RESEARCHKIT APP

**PRIDE STUDY**

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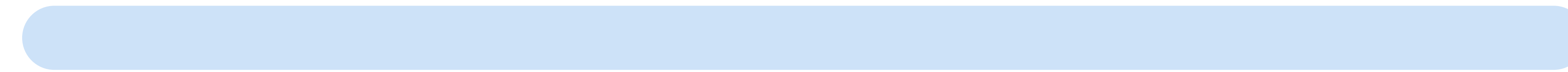
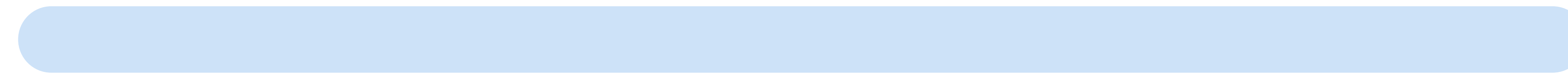
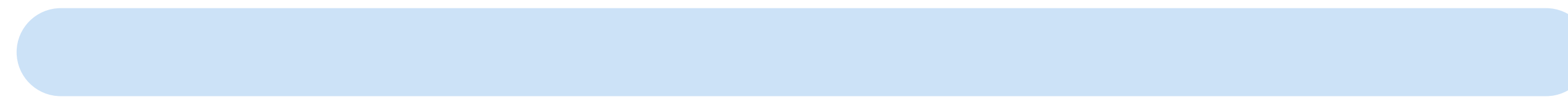
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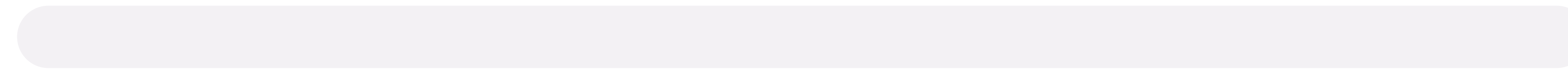
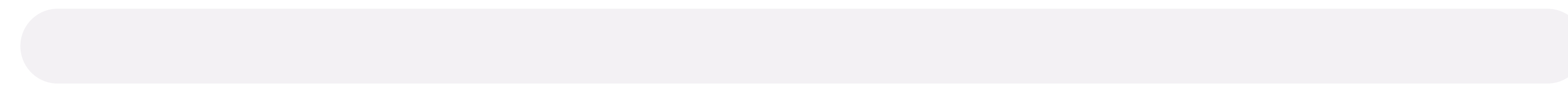
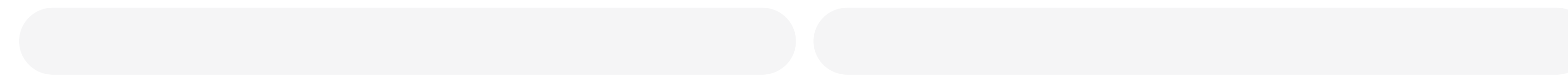
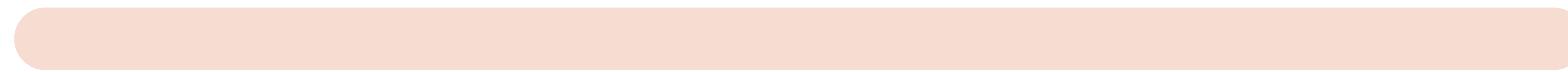
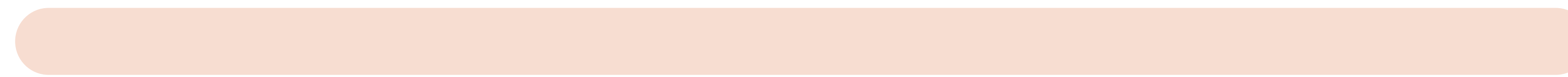
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## PRIDE STUDY



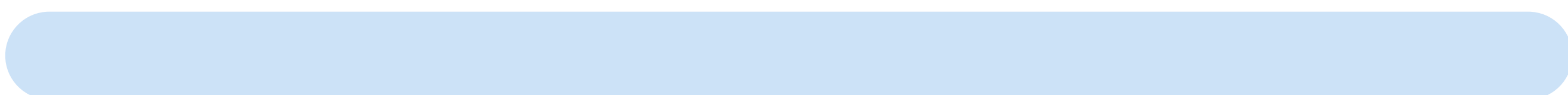
## HEALTHY PREGNANCY







PERSONAL TOUCH: IMPROVING TOUCHSCREEN USABILITY  
BY PERSONALIZING ACCESSIBILITY SETTINGS BASED ON  
INDIVIDUAL USER'S TOUCHSCREEN INTERACTION

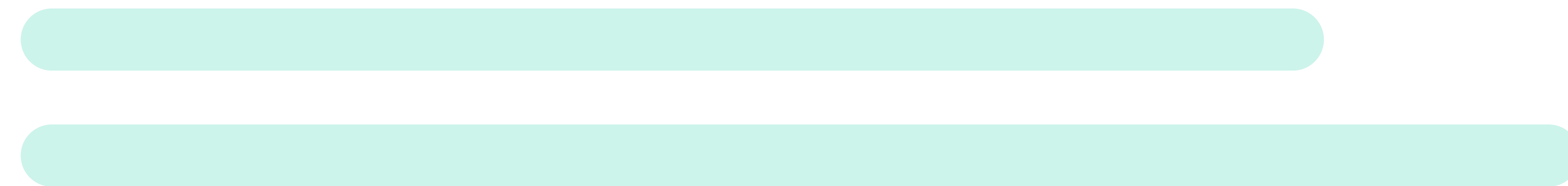
**PRIDE STUDY** 



**HEALTHY PREGNANCY** 



**PERSONAL TOUCH** 

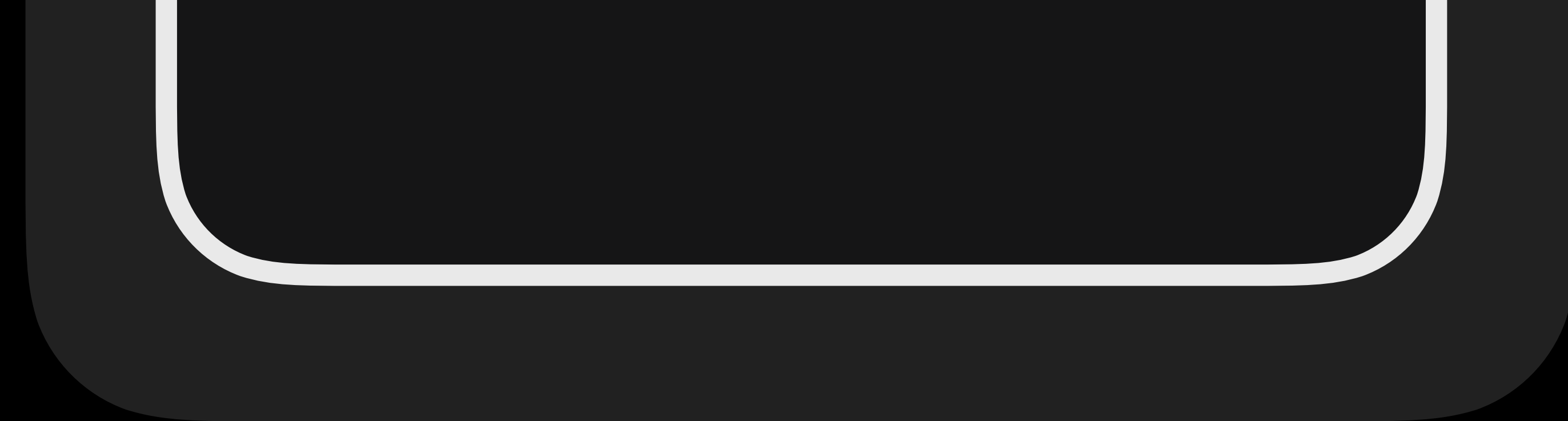
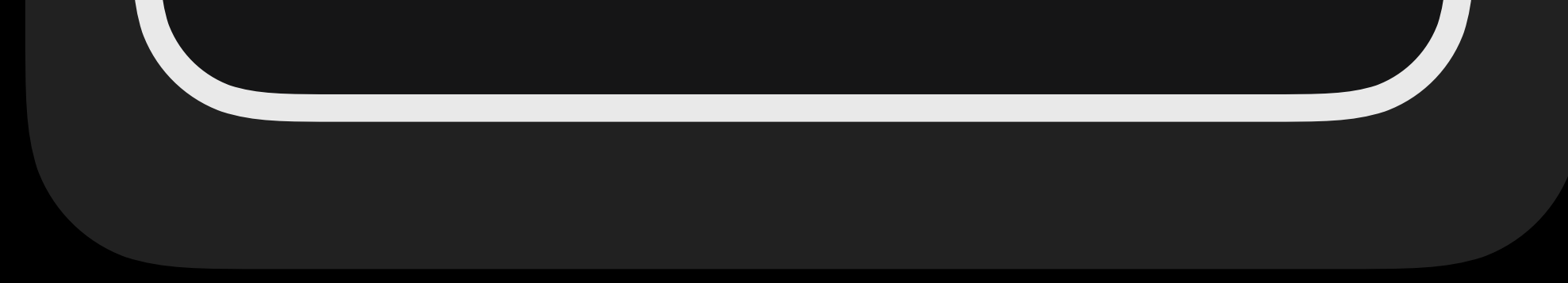
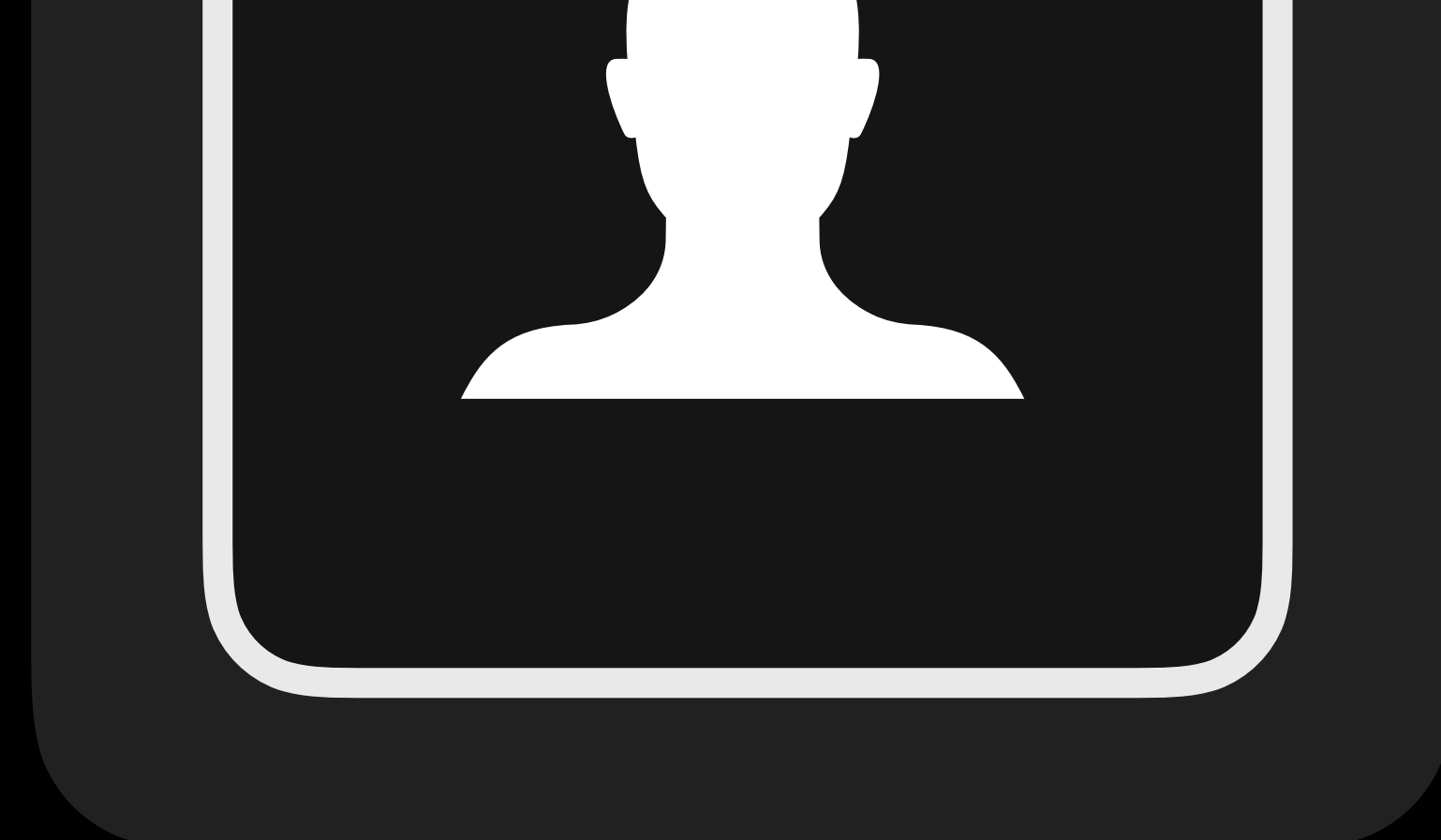
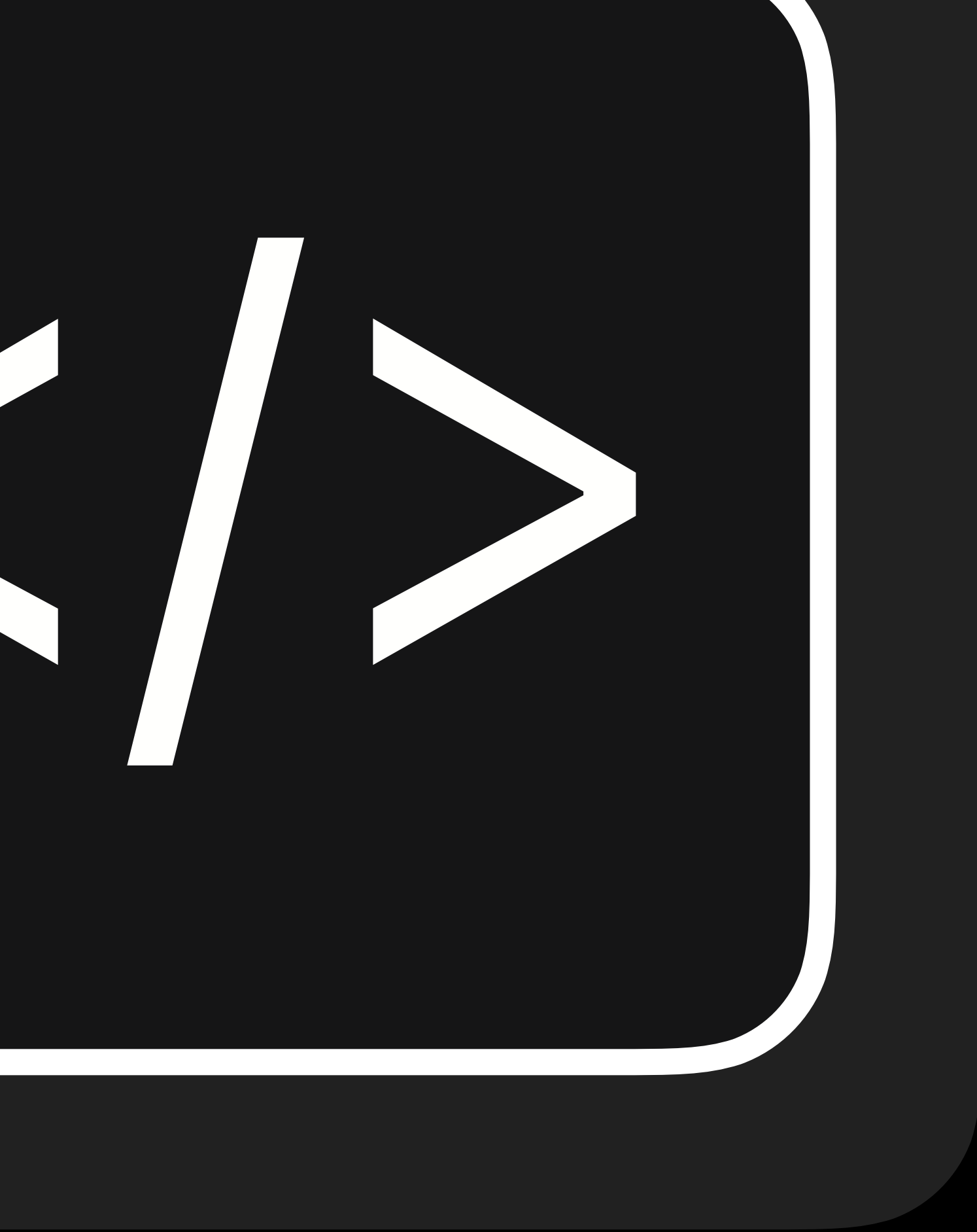


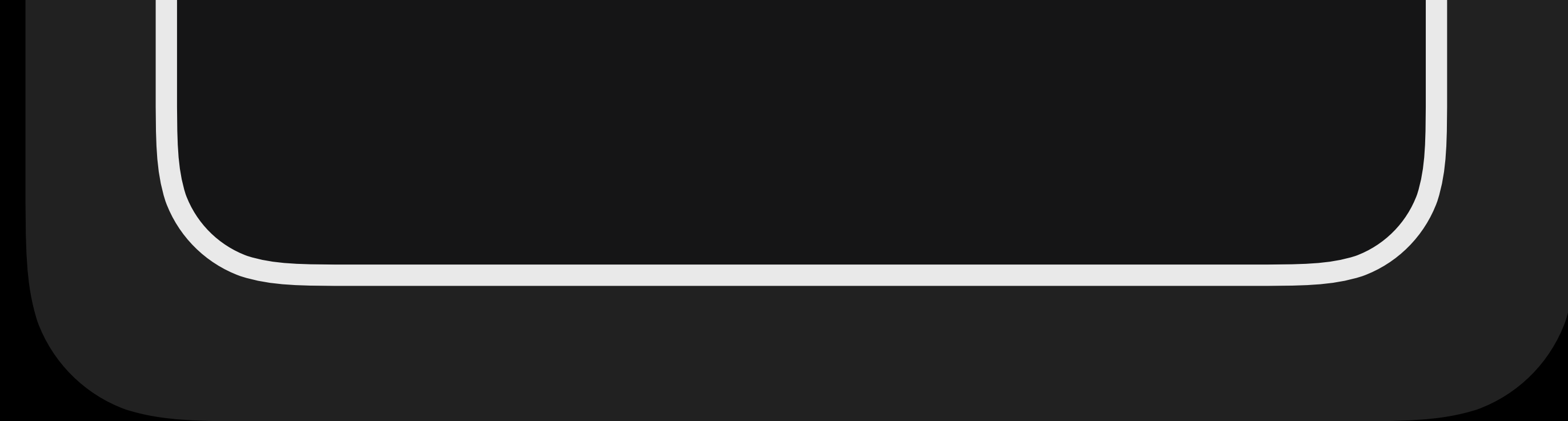
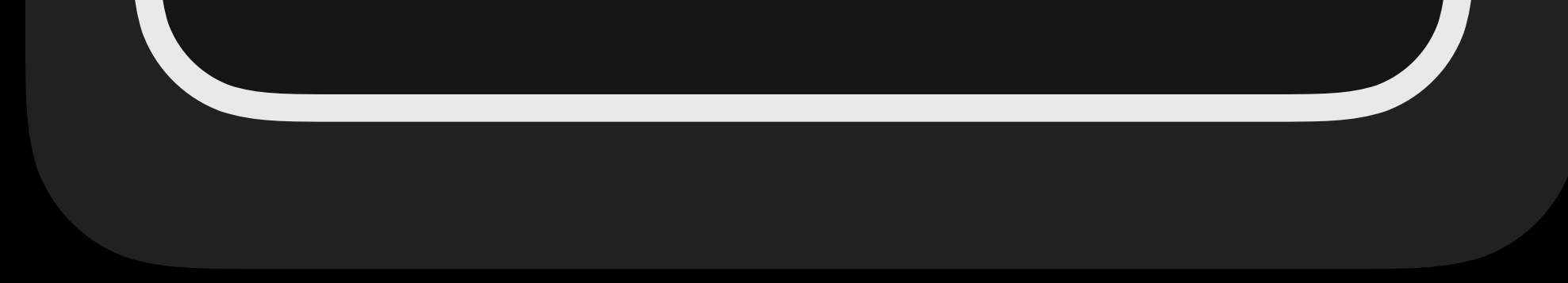
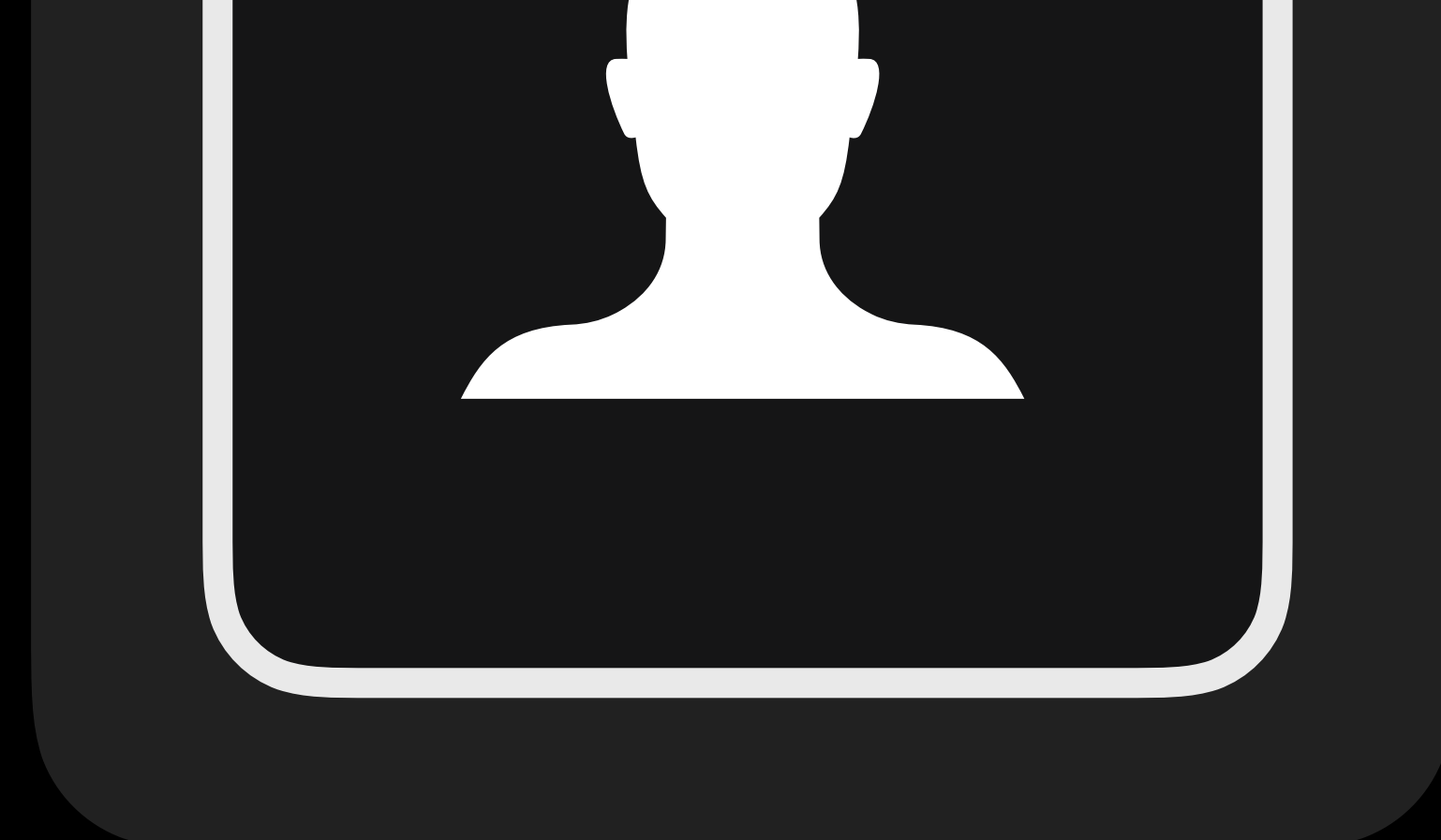
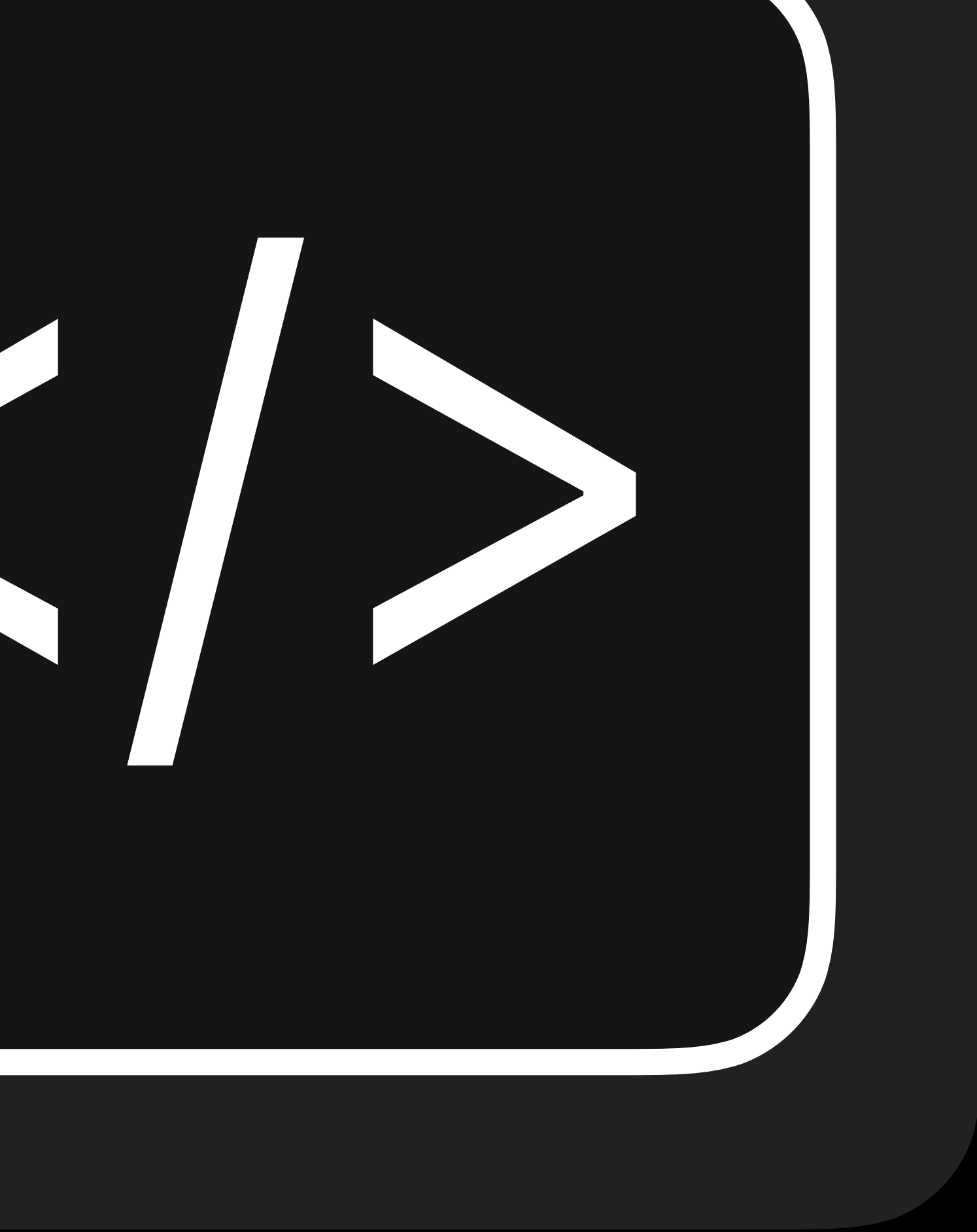












COMING SOON

# Investigator Support Pilot

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## Apple Watch Limited Grant Program





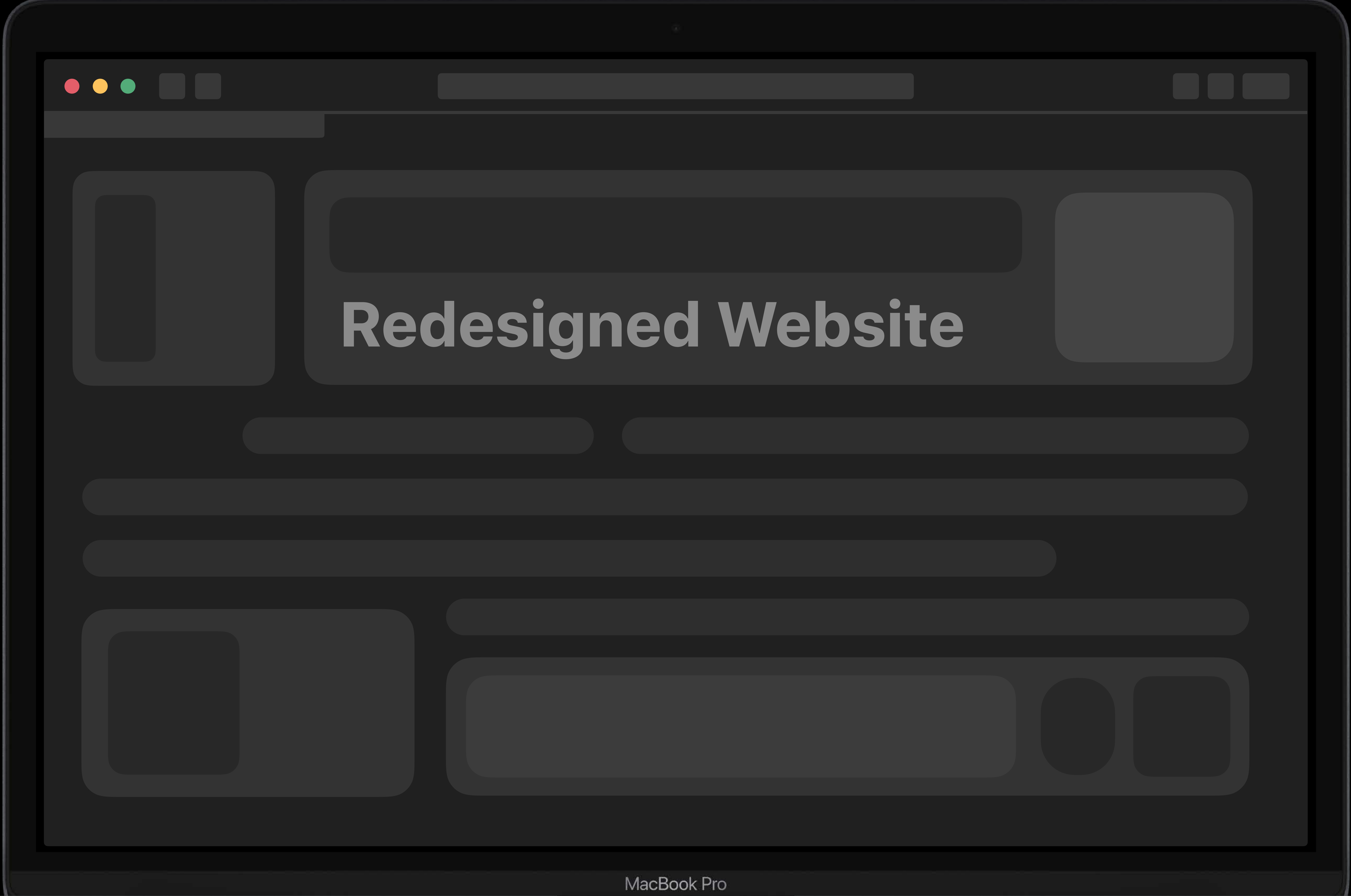
COMING SOON

# Investigator Support Pilot

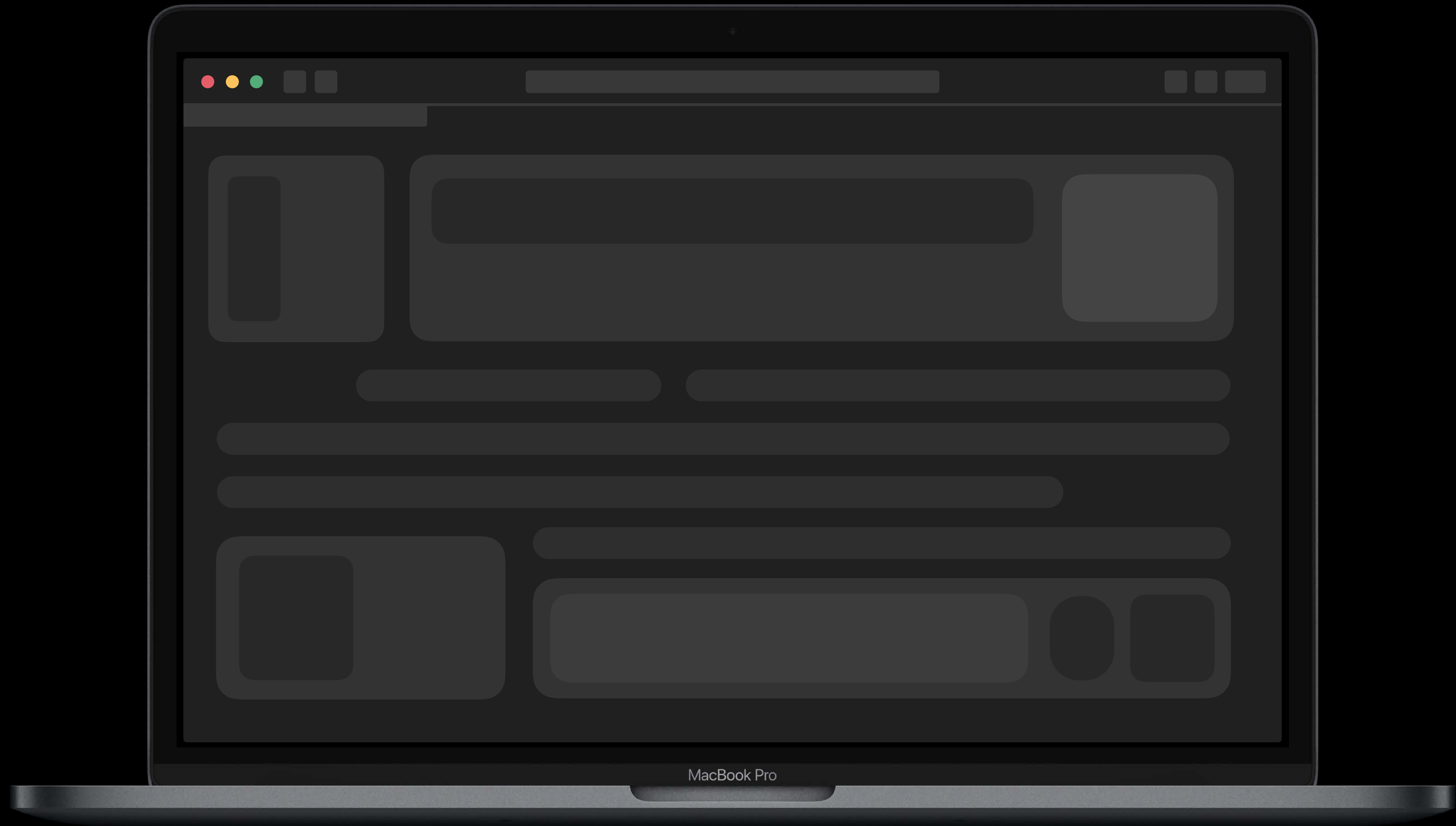
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Simple  
Submission  
Process

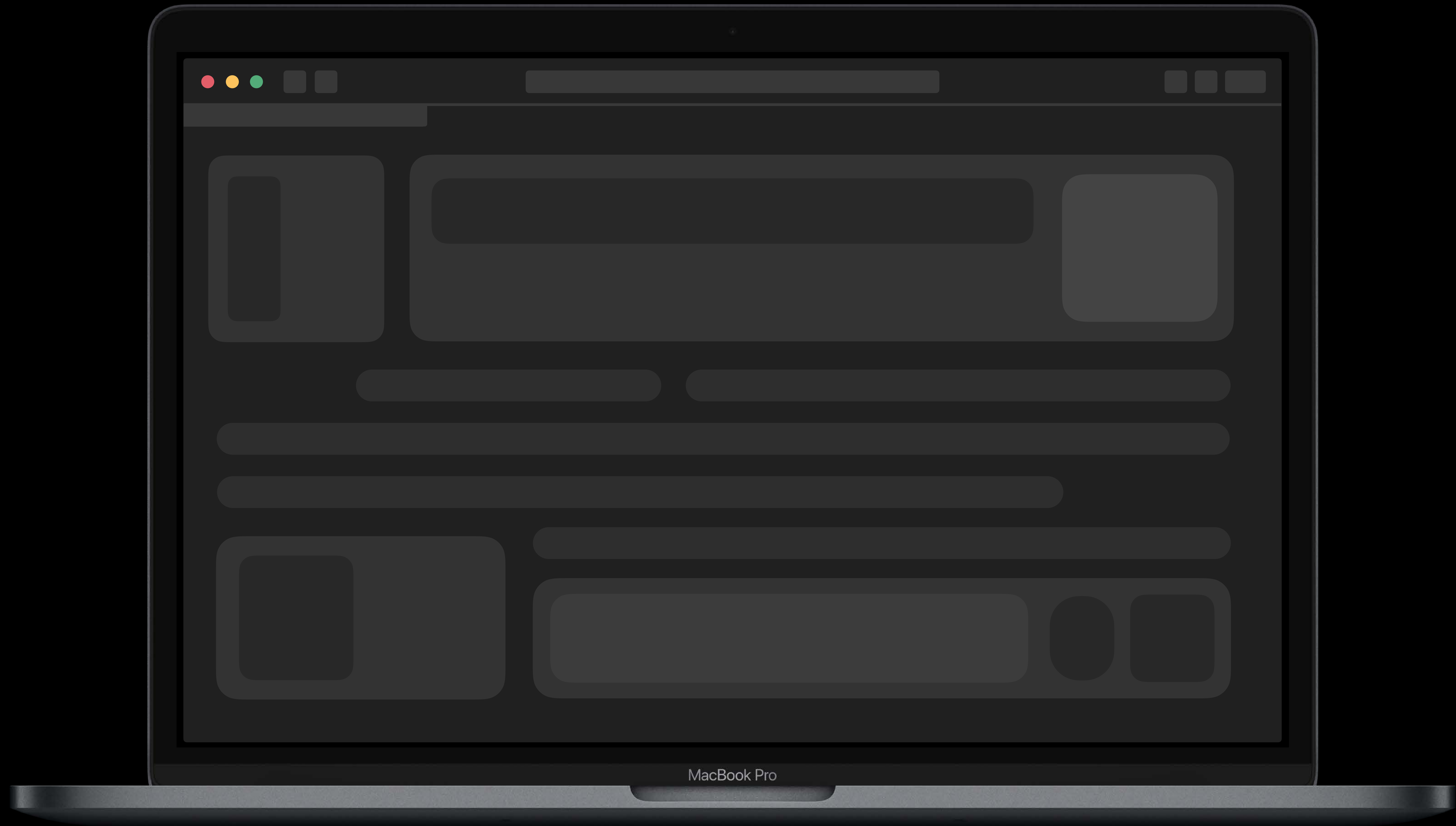




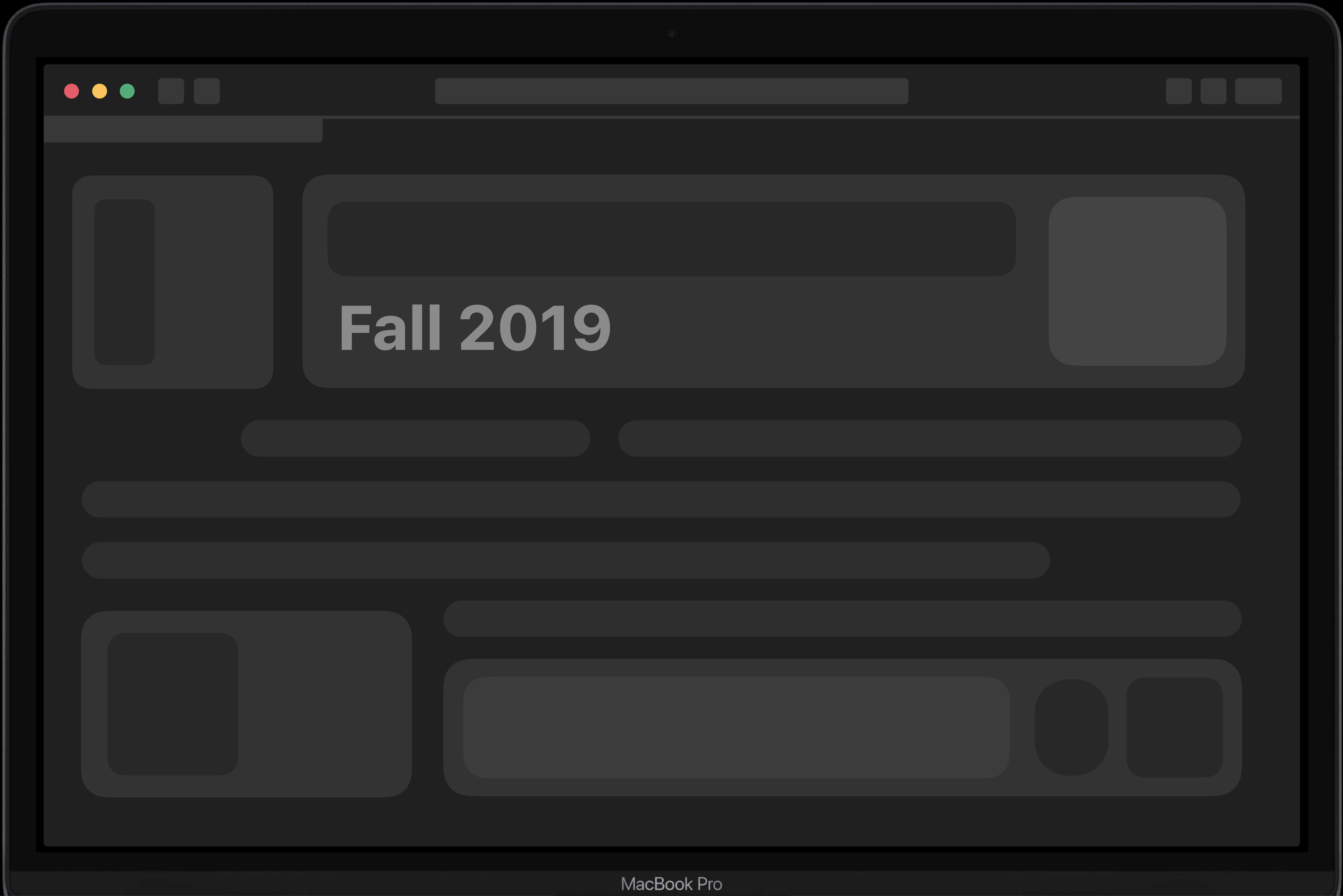
MacBook Pro



MacBook Pro



MacBook Pro



Fall 2019

MacBook Pro

**ResearchKit**



**UI Updates**



**Active Tasks**



**UI Updates**



**Active Tasks**



9:41



# Let's Talk About Your Sleep

QUESTION 1 OF 3

**Do you have any of the following sleep disorders?**



For more detailed descriptions tap the info button.

Insomnia

Obstructive Sleep Apnea (OSA)

Restless Leg Syndrome (RLS)

Narcolepsy

QUESTION 2 OF 3

**How many caffeinated drinks do you consume each day?**

Type the number of drinks you consume on a typical day for each of the following caffeinated beverages.

Coffee  required

Tea  required

9:41



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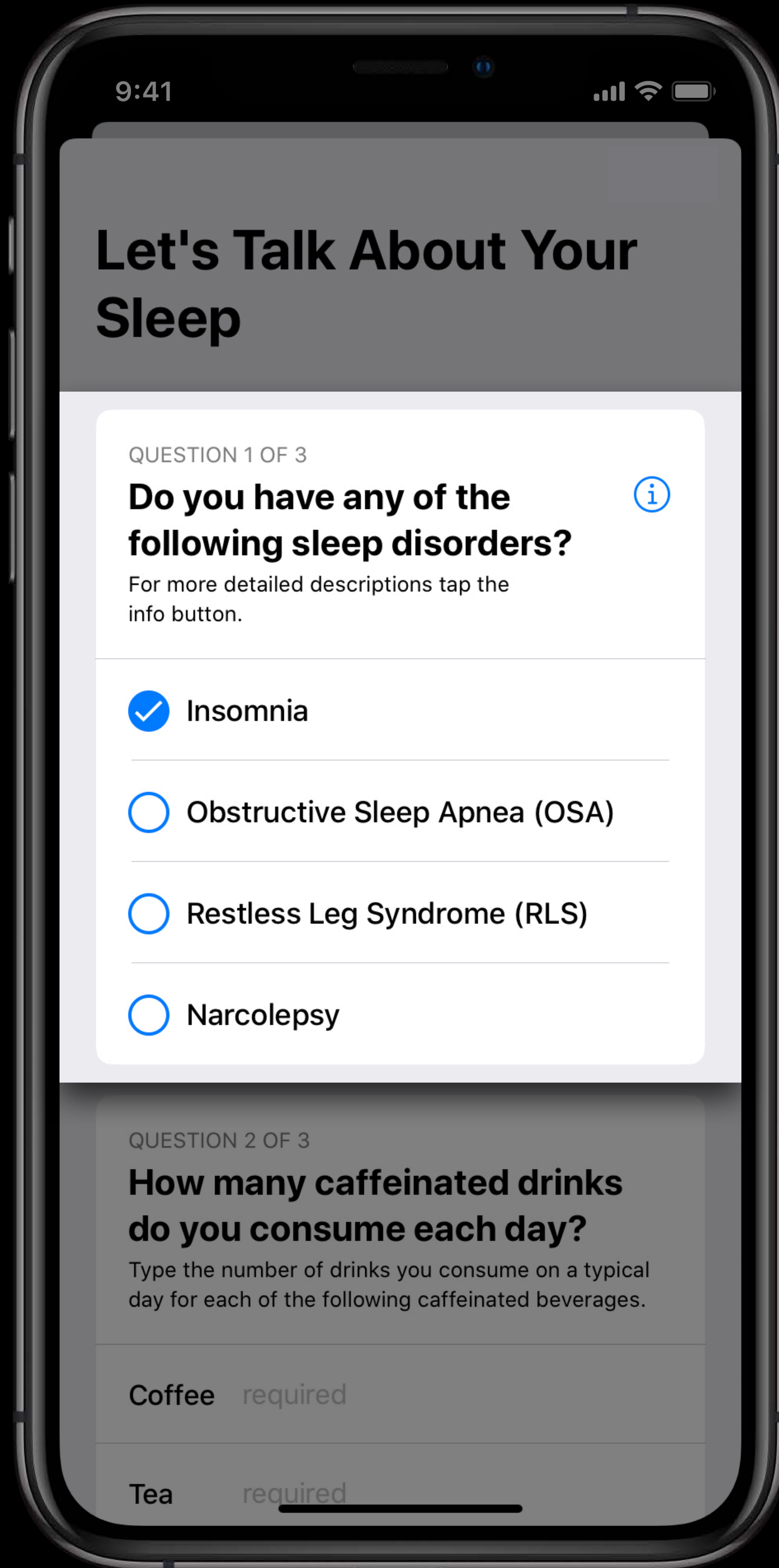
**How many caffeinated drinks do you consume each day?**

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New Styling



9:41



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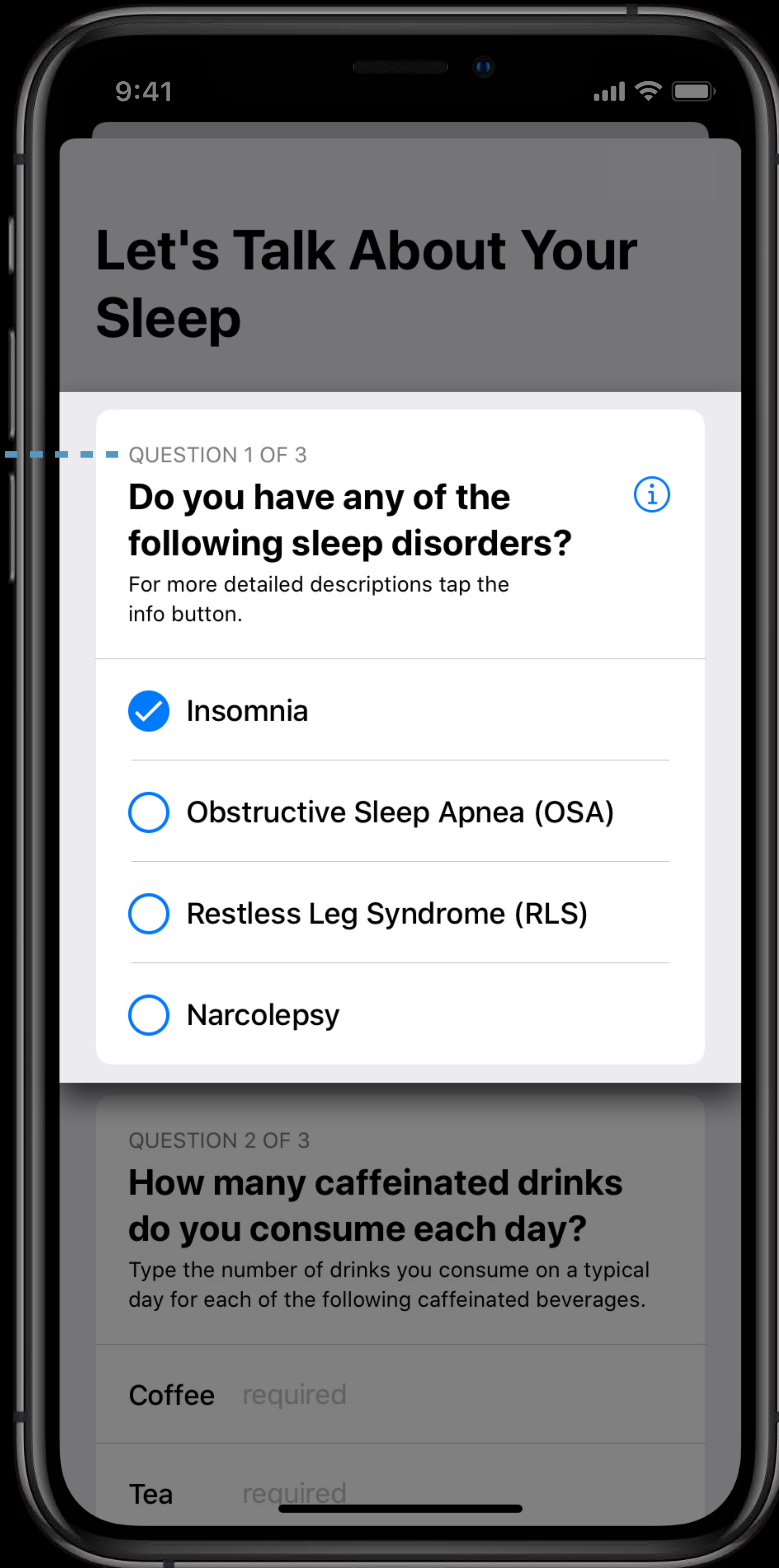
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9:41



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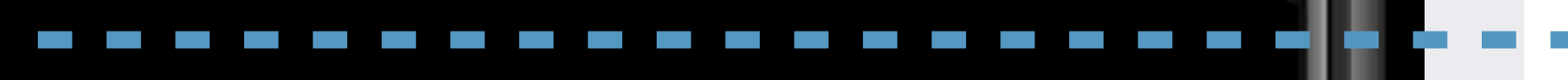
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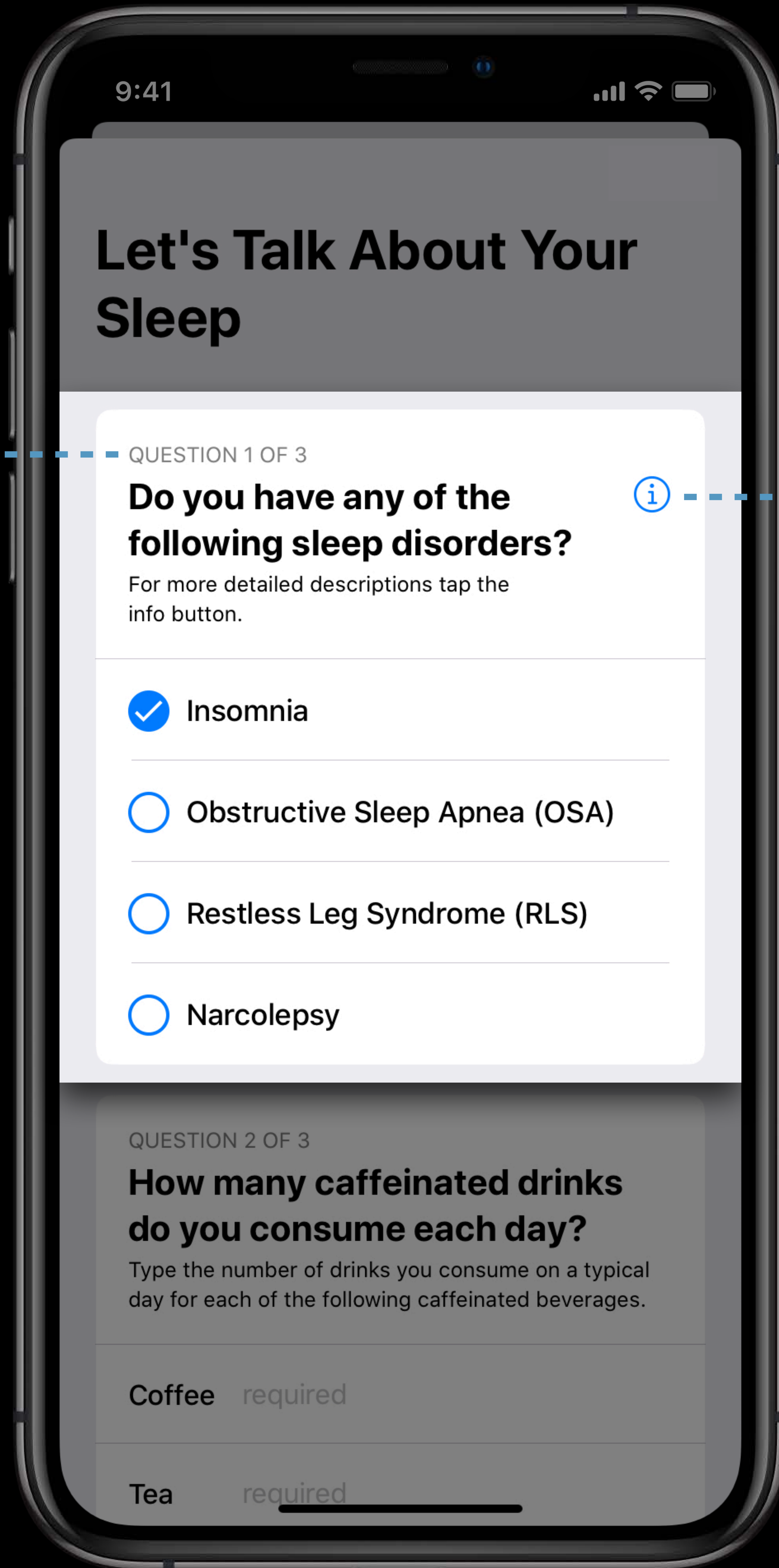
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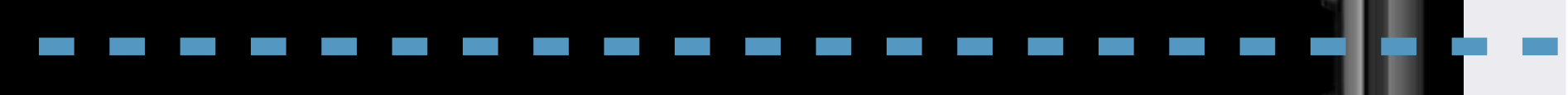
Tea required

Progress Indicator





Progress Indicator



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Learn More Button

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9:41



1 of 1

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9:41



1 of 1

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9:41



Close



## Why Your Sleep Matters

Sleep is an important measure of your overall health and well-being. It is important to understand if you have been diagnosed with or experience any of the following conditions that could have other impacts to your overall health.

### Sleep Disorder Descriptions:

#### Insomnia:

- This condition refers to the inability to initiate sleep, waking up frequently during the night or waking up too early each morning.

#### Obstructive Sleep Apnea (OSA):

Causes breathing to stop and start during

- sleep as the result of the throat muscles relaxing and blocking the airway at irregular

9:41



Close



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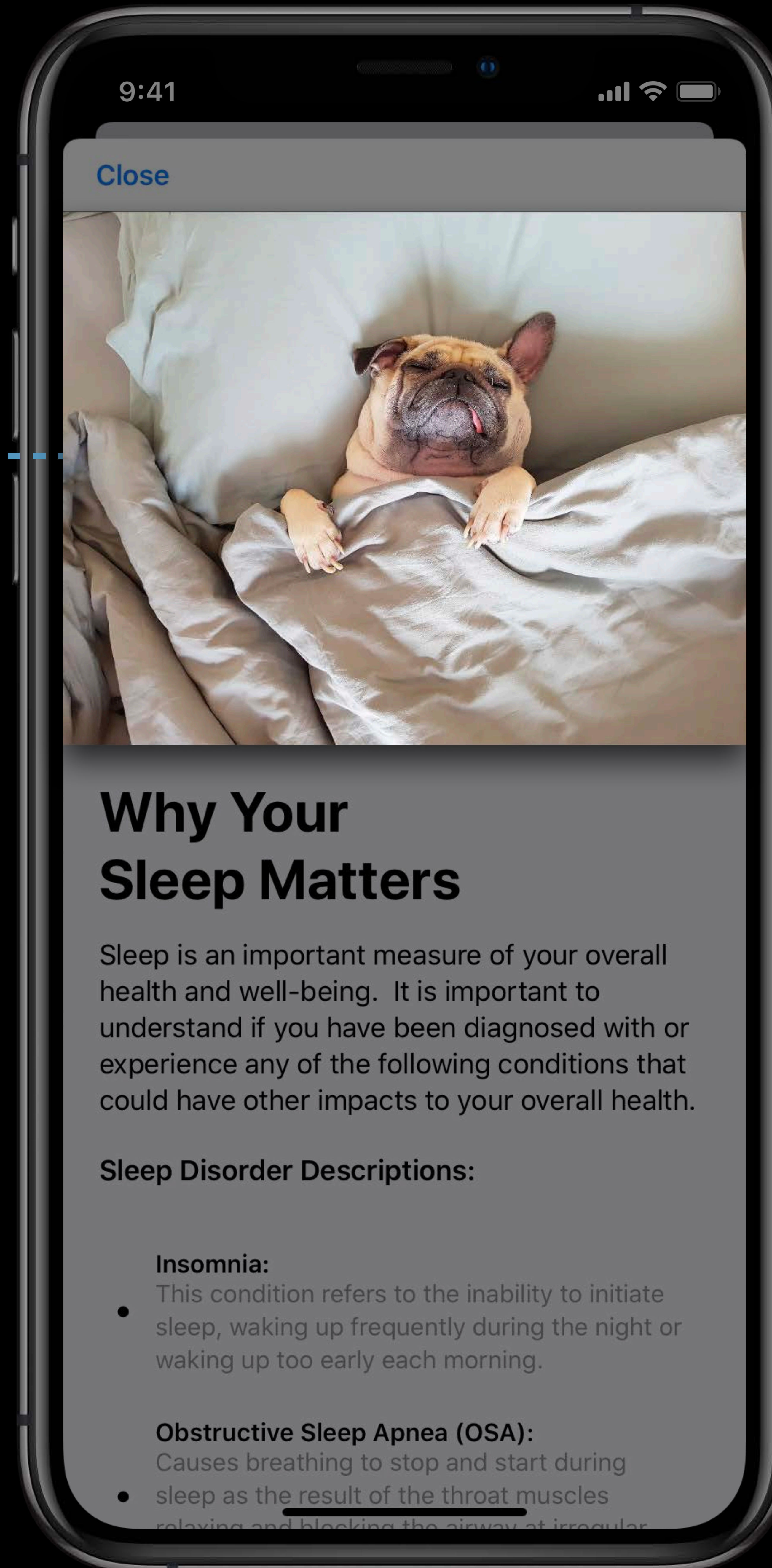
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Top Content Image



9:41



Close



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Close



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9:41



Close



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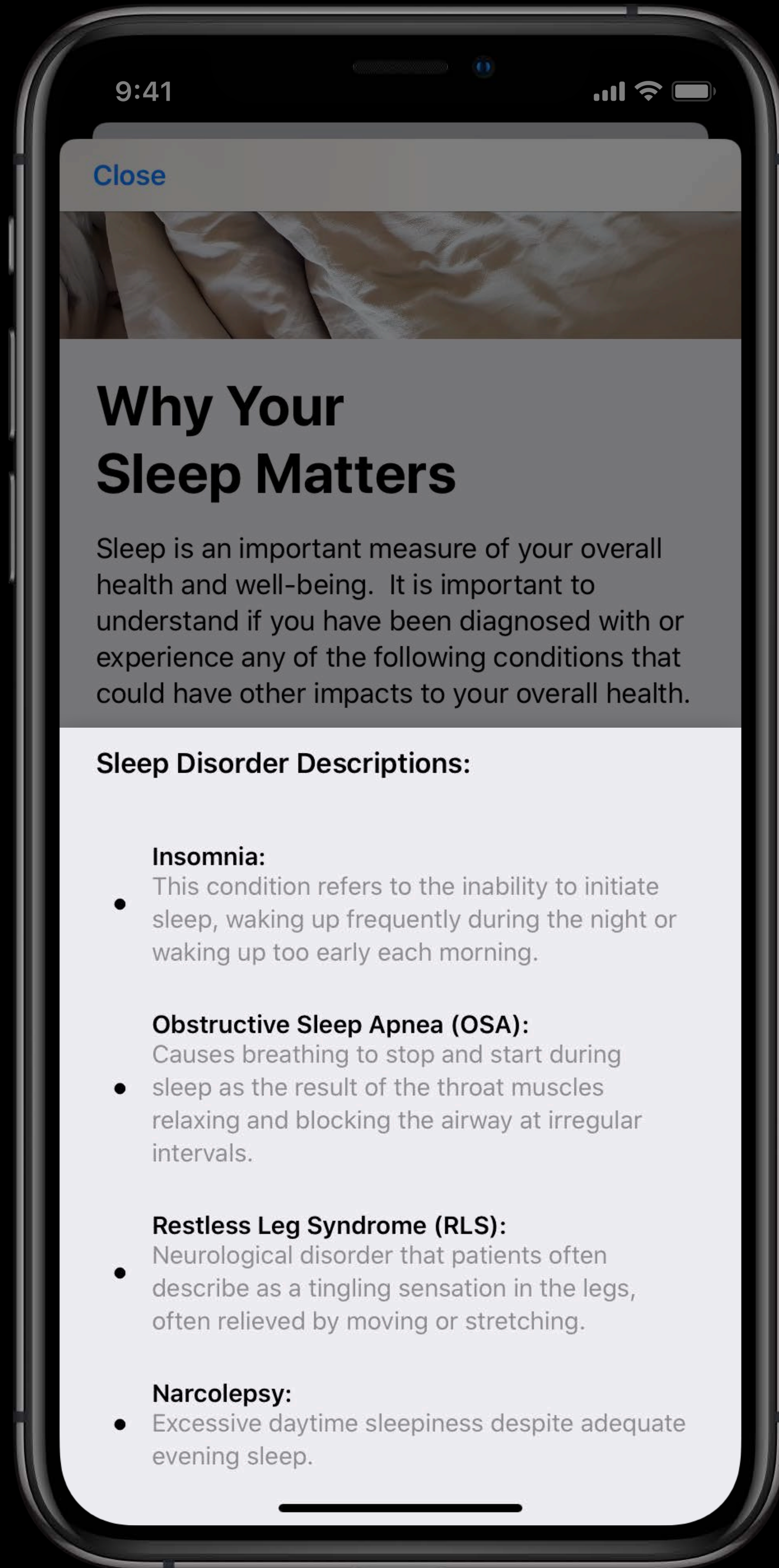
- Causes breathing to stop and start during sleep as the result of the throat muscles relaxing and blocking the airway at irregular intervals.

#### **Restless Leg Syndrome (RLS):**

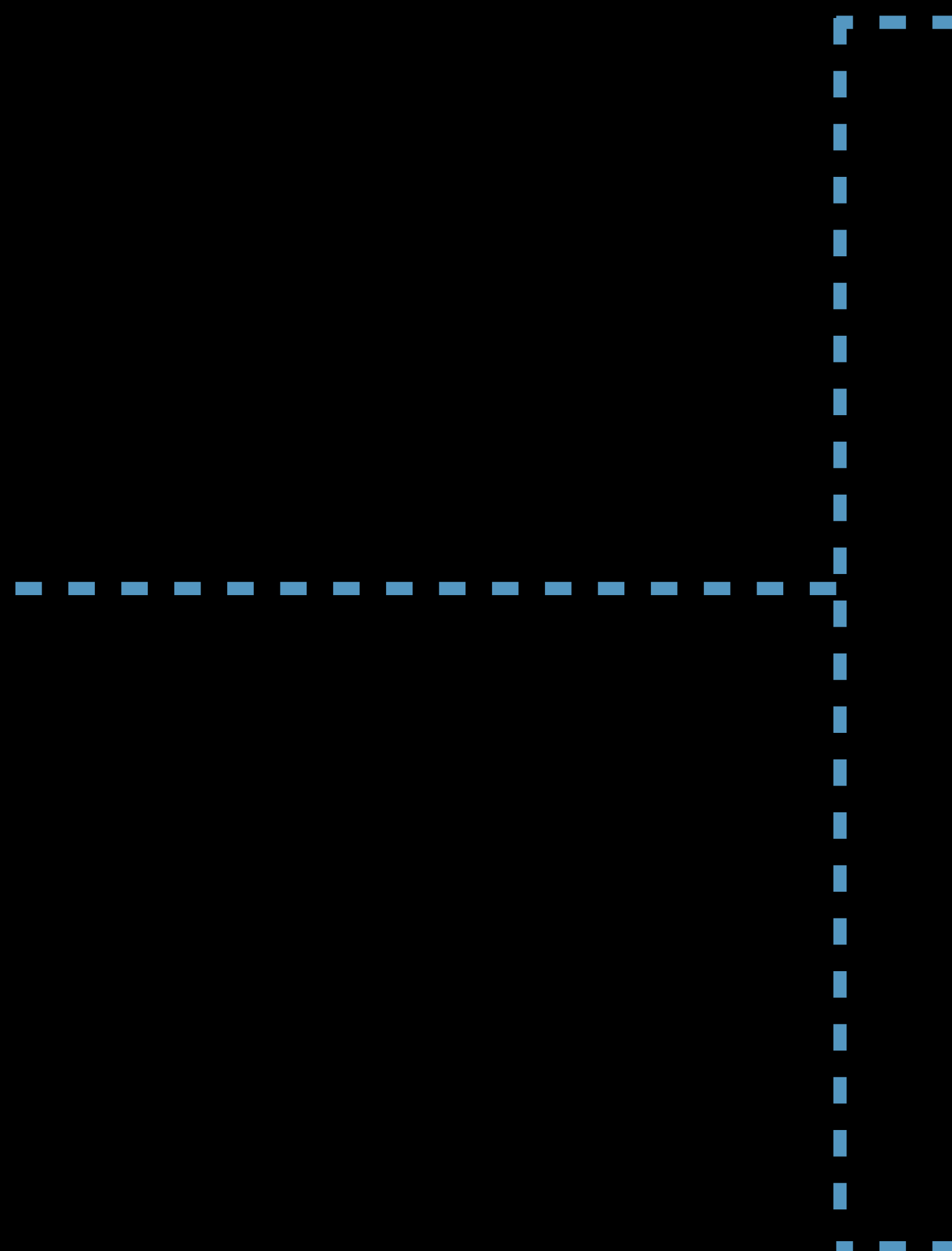
- Neurological disorder that patients often describe as a tingling sensation in the legs, often relieved by moving or stretching.

#### **Narcolepsy:**

- Excessive daytime sleepiness despite adequate evening sleep.



Body Items





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```

```
let learnMoreStep = ORKLearnMoreStep(identifier: "learnMoreStep")
```

```
import ResearchKit

let learnMoreStep = ORKLearnMoreStep(identifier: "learnMoreStep")
learnMoreStep.image = UIImage(named: "Sleep")
```

```
import ResearchKit

let learnMoreStep = ORKLearnMoreStep(identifier: "learnMoreStep")
learnMoreStep.image = UIImage(named: "Sleep")
learnMoreStep.title = "Why Your Sleep Matters"
```

```
import ResearchKit

let learnMoreStep = ORKLearnMoreStep(identifier: "learnMoreStep")
learnMoreStep.image = UIImage(named: "Sleep")
learnMoreStep.title = "Why Your Sleep Matters"
learnMoreStep.text = "Sleep is an important measure of your overall health and well-being."
```

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import ResearchKit

let learnMoreStep = ORKLearnMoreStep(identifier: "learnMoreStep")
learnMoreStep.image = UIImage(named: "Sleep")
learnMoreStep.title = "Why Your Sleep Matters"
learnMoreStep.text = "Sleep is an important measure of your overall health and well-being."

let bodyItem1 = ORKBodyItem(text: "Narcolepsy:",
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```
import ResearchKit

let learnMoreStep = ORKLearnMoreStep(identifier: "learnMoreStep")
learnMoreStep.image = UIImage(named: "Sleep")
learnMoreStep.title = "Why Your Sleep Matters"
learnMoreStep.text = "Sleep is an important measure of your overall health and well-being."

let bodyItem1 = ORKBodyItem(text: "Narcolepsy:",
                             detailText: "Excessive daytime sleepiness.",
                             style: .bulletPoint)

learnMoreStep.bodyItems = [bodyItem1]
```

```
// create a learnMoreItem by passing in a learnMoreStep  
let learnMoreItem = ORKLearnMoreItem(step: learnMoreStep)
```

```
// create a learnMoreItem by passing in a learnMoreStep
let learnMoreItem = ORKLearnMoreItem(step: learnMoreStep)

// group one or more answer formats under a section
let section = ORKFormItem(sectionTitle: "Do you have any of the following sleep disorders?",
    detailText: "For more detailed instructions tap the info button.",
    learnMoreItem: learnMoreItem,
    showsProgress: true)
```



9:41



Close



## Why Your Sleep Matters

Sleep is an important measure of your overall health and well-being. It is important to understand if you have been diagnosed with or experience any of the following conditions that could have other impacts to your overall health.

### Sleep Disorder Descriptions:

#### **Insomnia:**

- This condition refers to the inability to initiate sleep, waking up frequently during the night or waking up too early each morning.

#### **Obstructive Sleep Apnea (OSA):**

Causes breathing to stop and start during

- sleep as the result of the throat muscles relaxing and blocking the airway at irregular intervals.

#### **Restless Leg Syndrome (RLS):**

- Neurological disorder that patients often describe as a tingling sensation in the legs, often relieved by moving or stretching.

#### **Narcolepsy:**

- Excessive daytime sleepiness despite adequate evening sleep.

9:41



Close



## Why Your Sleep Matters

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### Sleep Disorder Descriptions:

#### **Insomnia:**

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- Neurological disorder that patients often describe as a tingling sensation in the legs, often relieved by moving or stretching.

#### **Narcolepsy:**

- Excessive daytime sleepiness despite adequate evening sleep.

# Let's Talk About Your Sleep

QUESTION 1 OF 3

**Do you have any of the following sleep disorders?**



For more detailed descriptions tap the info button.

- Insomnia
- Obstructive Sleep Apnea (OSA)
- Restless Leg Syndrome (RLS)
- Narcolepsy

QUESTION 2 OF 3

**How many caffeinated drinks do you consume each day?**

Type the number of drinks you consume on a typical day for each of the following caffeinated beverages.

Coffee required

Tea required



**UI Updates**



**Active Tasks**



UI Updates



Active Tasks



**Vision**



**Vision**



**Hearing**



**Vision**



**Hearing**



**Speech**





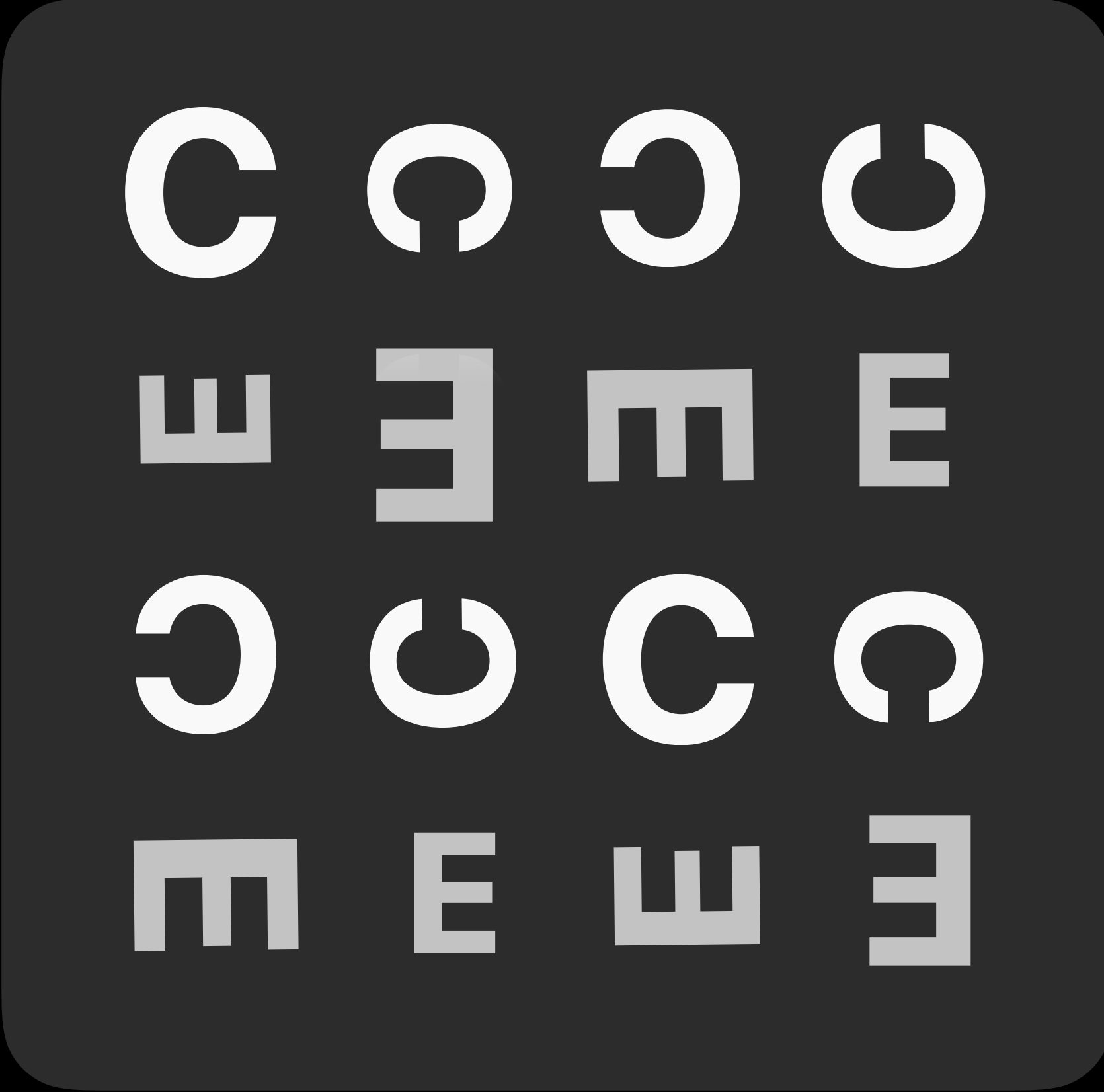
**Vision**



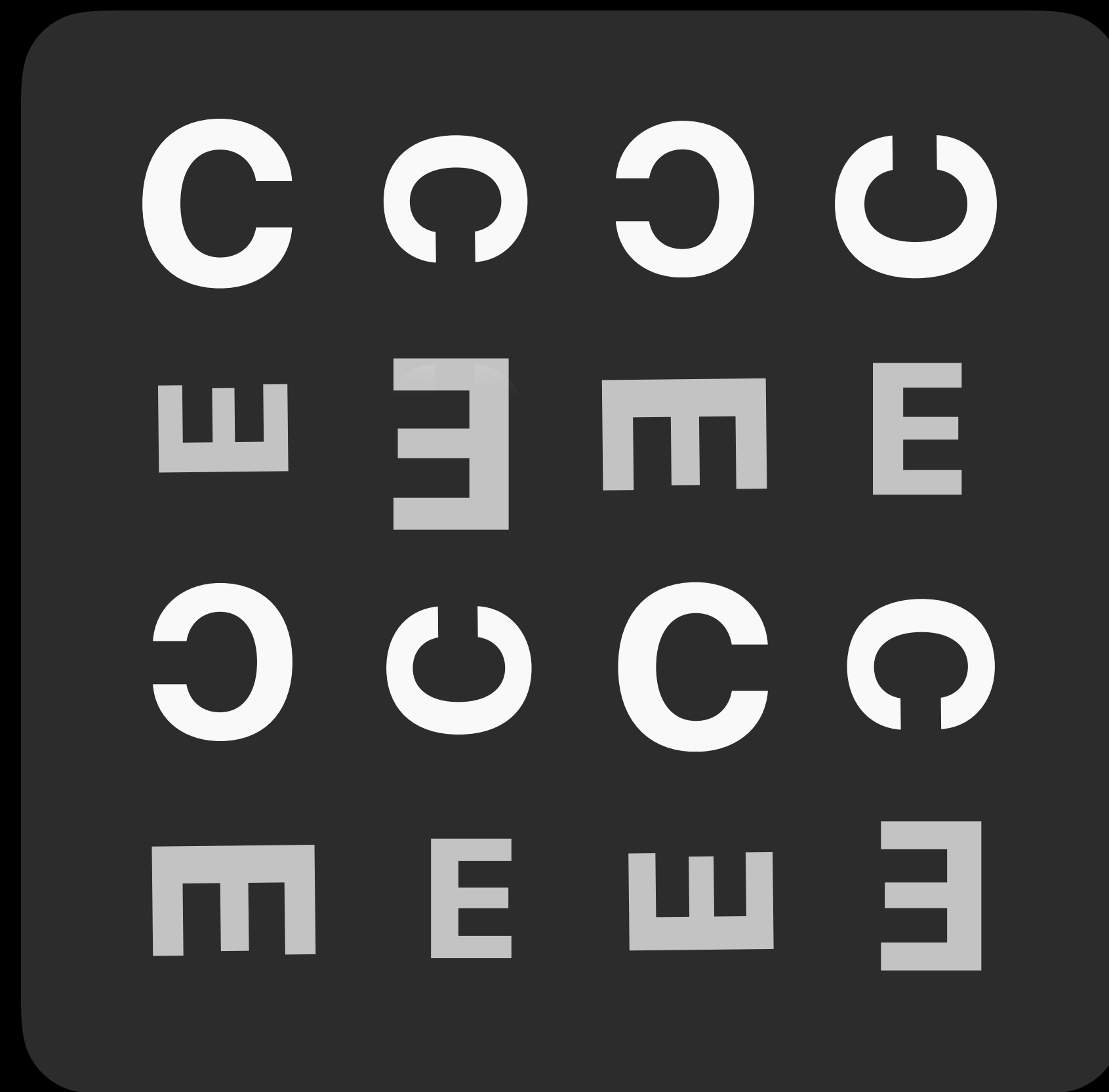
**Hearing**



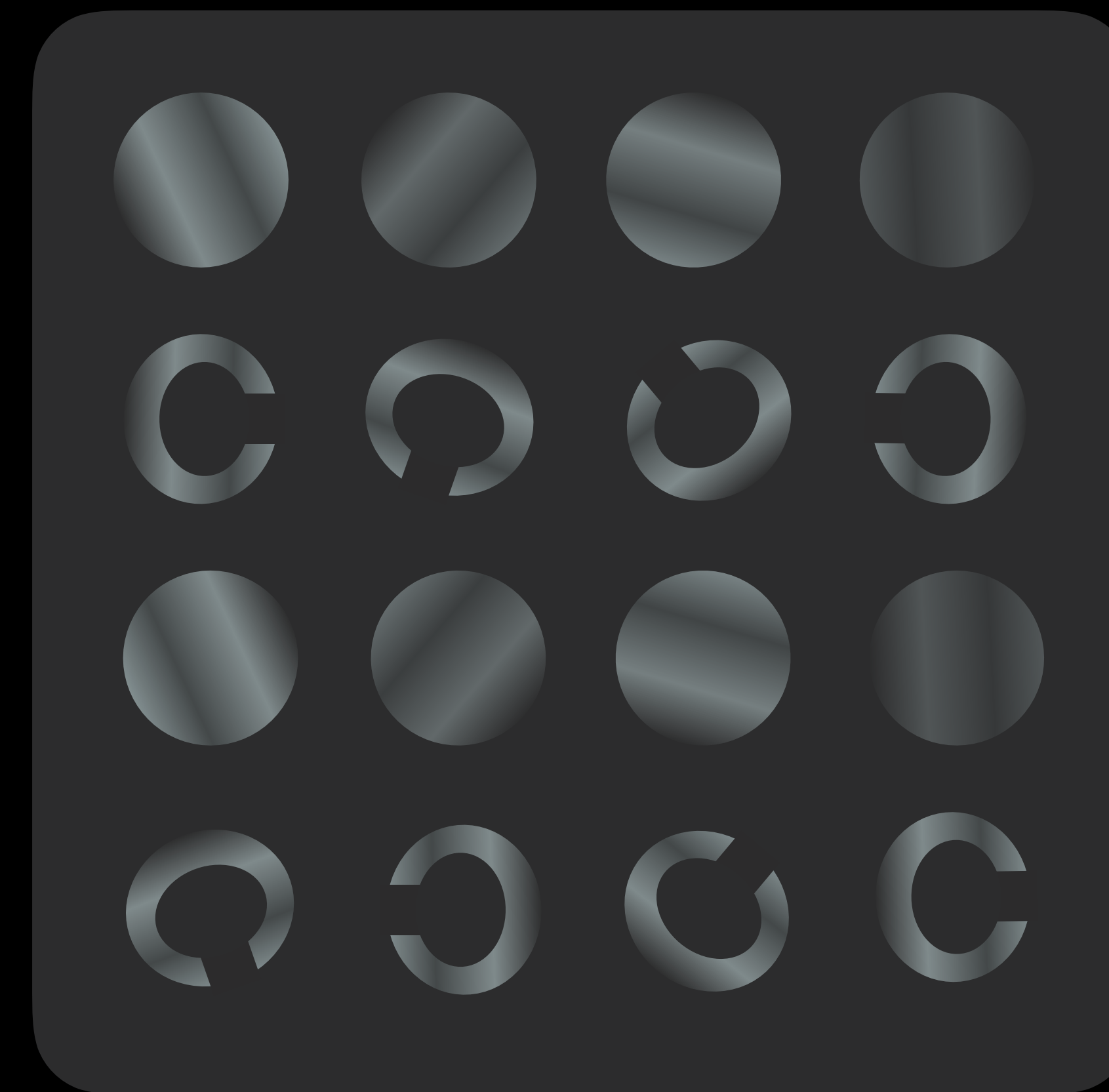
**Speech**



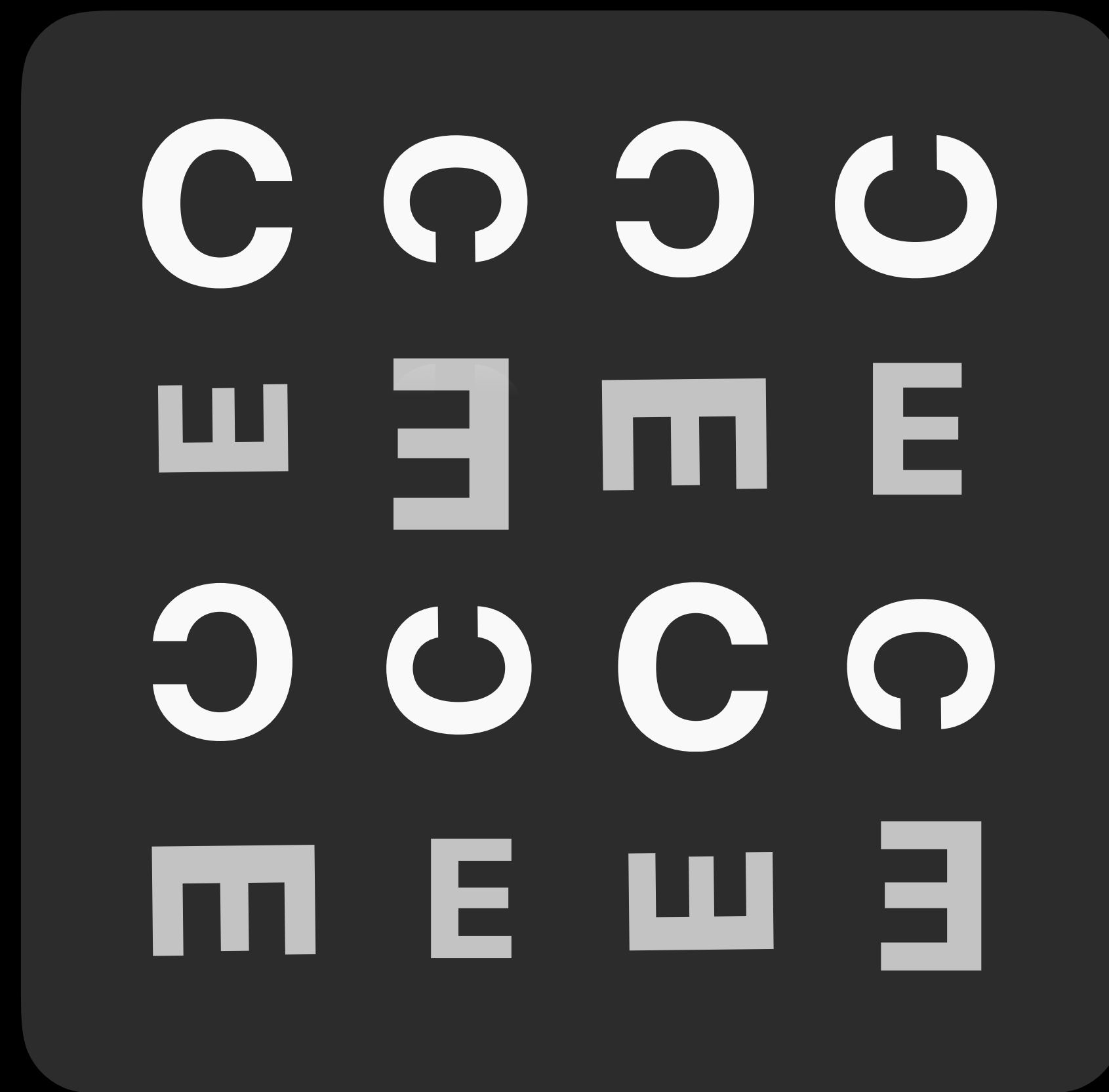
**Visual Acuity**  
Landolt C & Tumbling E



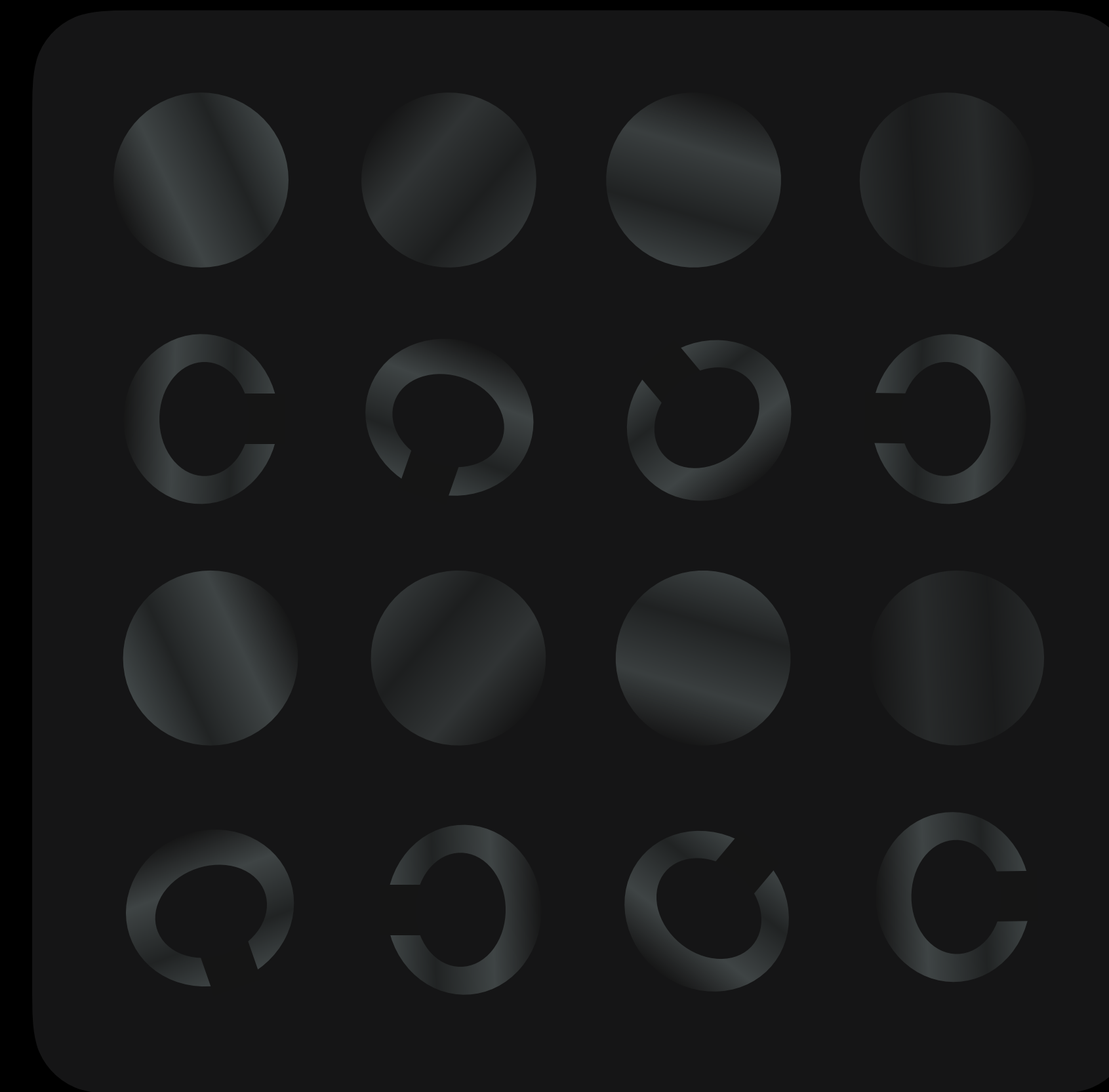
**Visual Acuity**  
Landolt C & Tumbling E



**Contrast Sensitivity**  
Landolt C & Gabor Patch



**Visual Acuity**  
Landolt C & Tumbling E



**Contrast Sensitivity**  
Landolt C & Gabor Patch

# Visual Acuity — Landolt C

Novartis FocalView Contribution



# Visual Acuity — Landolt C

Novartis FocalView Contribution

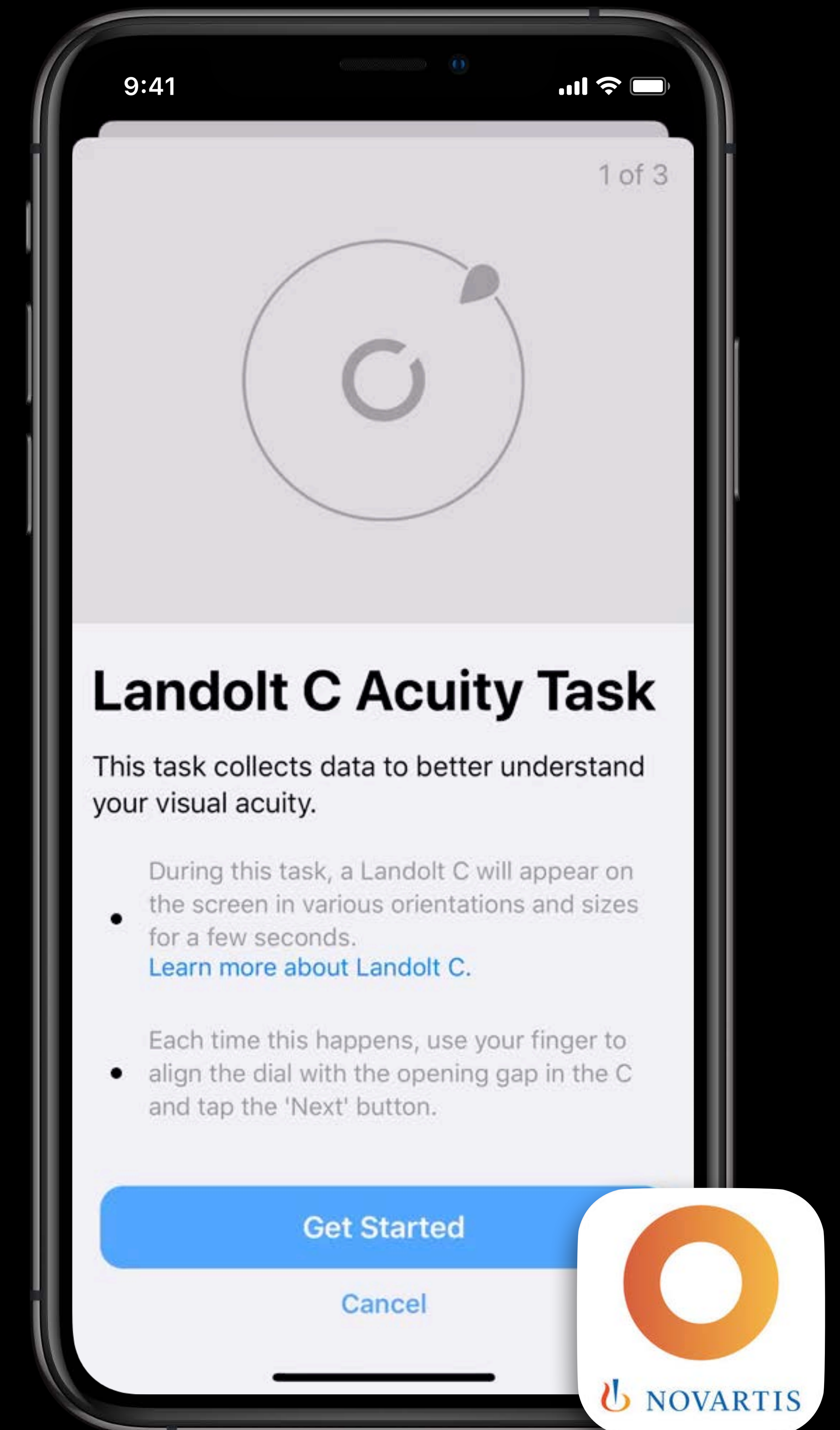


# Visual Acuity — Landolt C

Novartis FocalView Contribution

## Landolt C Stimulus

- Fixed contrast
- Decreasing size
- Random orientations



# Visual Acuity — Landolt C

Novartis FocalView Contribution

## Landolt C Stimulus

- Fixed contrast
- Decreasing size
- Random orientations

## Result

- VAR (visual acuity rating)





```
import ResearchKit

// create a landoltC acuity step
let step = ORKLandoltCStep(identifier: "LandoltCAcuity")
```

```
import ResearchKit

// create a landoltC acuity step
let step = ORKLandoltCStep(identifier: "LandoltCAcuity")
step.testType = .acuity
```

```
import ResearchKit

// create a landoltC acuity step
let step = ORKLandoltCStep(identifier: "LandoltCAcuity")
step.testType = .acuity

// create an active task by passing in the step
let task = ORKOrderedTask(identifier: "LandoltCAcuityTask", steps: [step])
```

```
import ResearchKit

// create a landoltC acuity step
let step = ORKLandoltCStep(identifier: "LandoltCAcuity")
step.testType = .acuity

// create an active task by passing in the step
let task = ORKOrderedTask(identifier: "LandoltCAcuityTask", steps: [step])

let taskVC = ORKTaskViewController(task: task, taskRun: UUID())
```

```
import ResearchKit

// create a landoltC acuity step
let step = ORKLandoltCStep(identifier: "LandoltCAcuity")
step.testType = .acuity

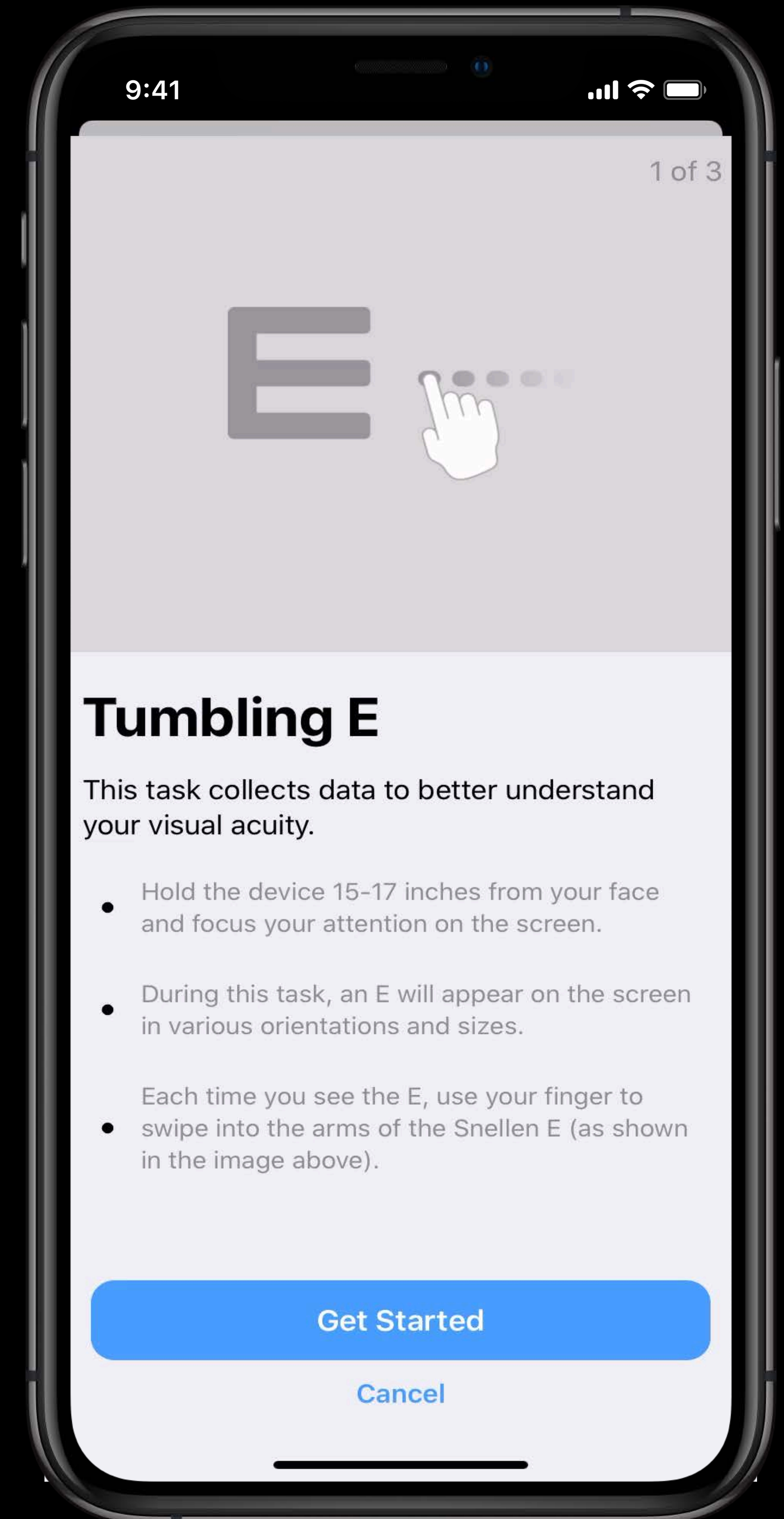
// create an active task by passing in the step
let task = ORKOrderedTask(identifier: "LandoltCAcuityTask", steps: [step])

let taskVC = ORKTaskViewController(task: task, taskRun: UUID())

present(taskVC, animated: true, completion: nil)
```

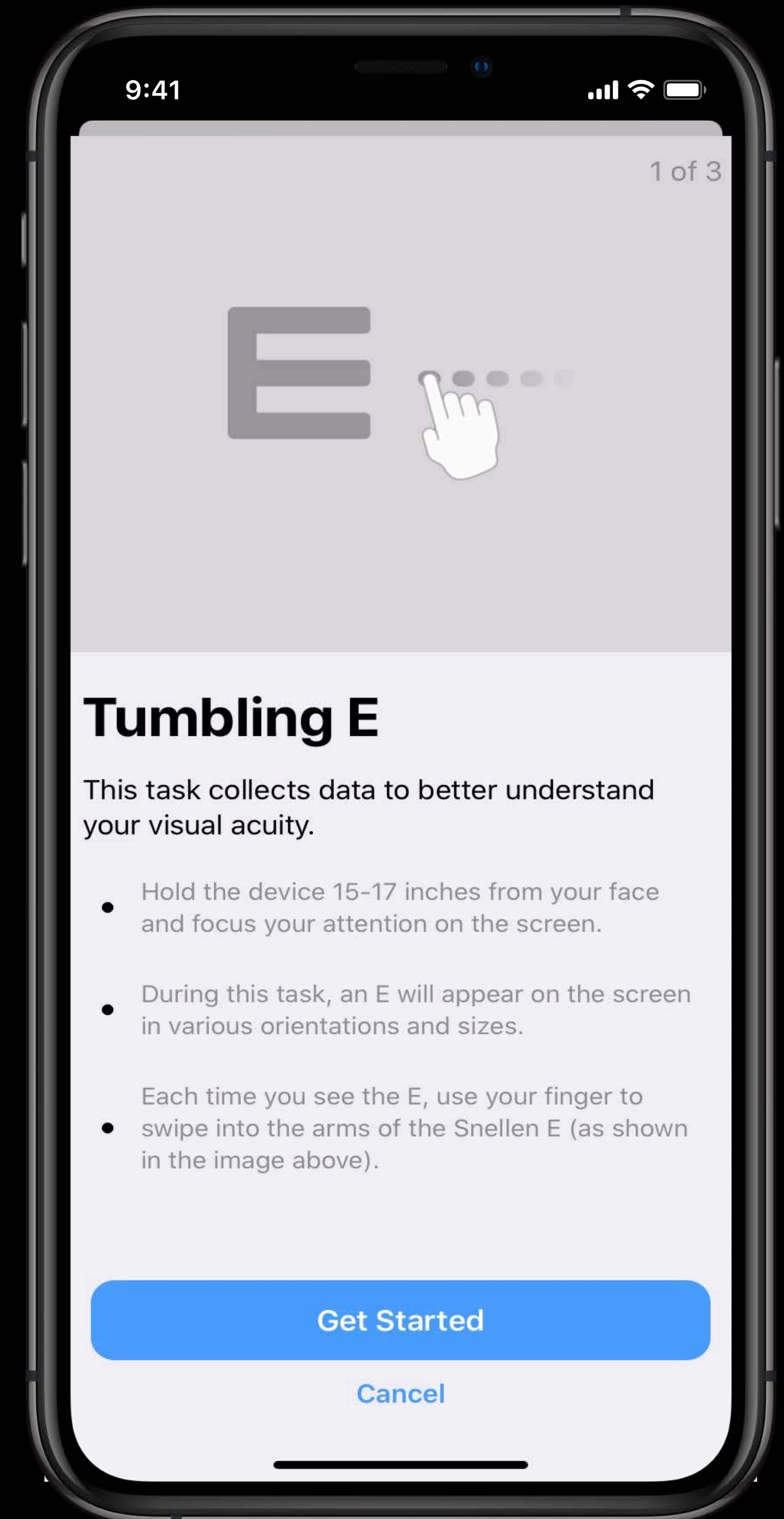
# Visual Acuity — Tumbling E

COMING SOON



# Visual Acuity — Tumbling E

COMING SOON

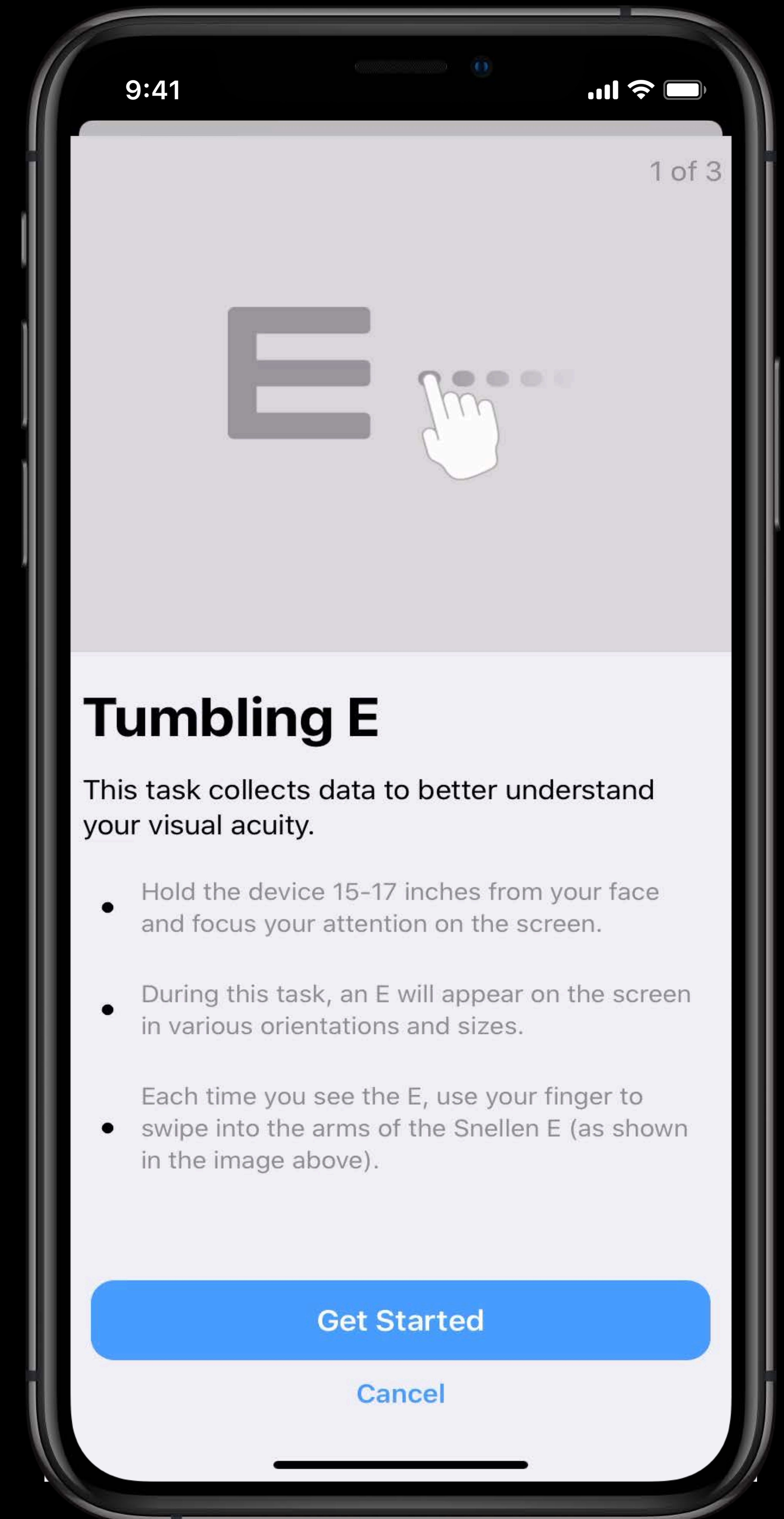


# Visual Acuity — Tumbling E

COMING SOON

## Tumbling E Stimulus

- Leverages TrueDepth camera
- Fixed contrast
- Decreasing size
- Random orientations





# Visual Acuity — Tumbling E

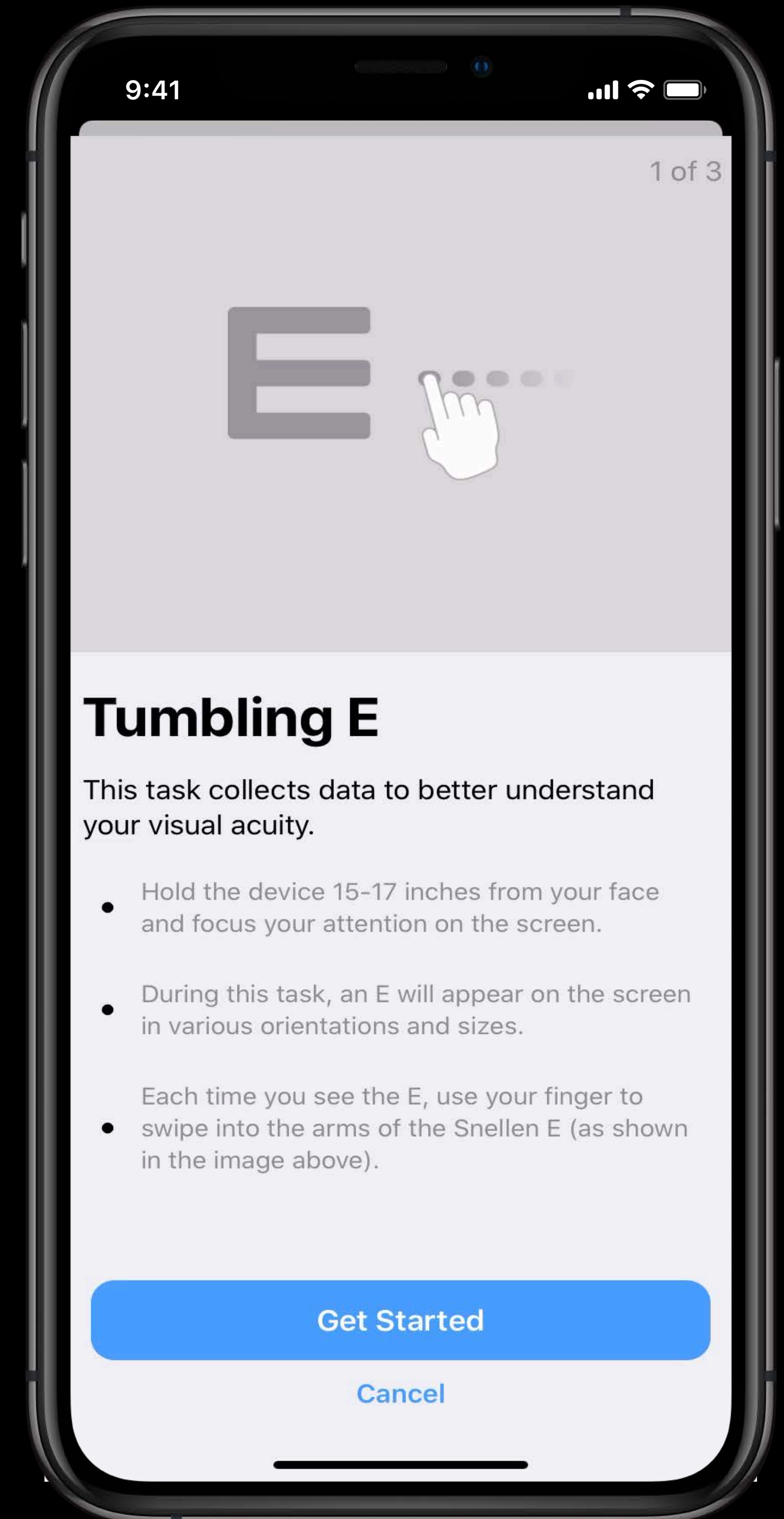
COMING SOON

## Tumbling E Stimulus

- Leverages TrueDepth camera
- Fixed contrast
- Decreasing size
- Random orientations

## Result

- logMAR (minimum angle of resolution)



```
import ResearchKit

// create a tumblingE acuity step
let step = ORKTumblingEStep(identifier: "TumblingEAcuity")
```

```
import ResearchKit

// create a tumblingE acuity step
let step = ORKTumblingEStep(identifier: "TumblingEAcuity")

// configure min and max viewing distance as determined by the TrueDepth camera
step.minViewingDistance = Measurement(value: 38.0, unit: UnitLength.centimeters)
step.maxViewingDistance = Measurement(value: 42.0, unit: UnitLength.centimeters)
```

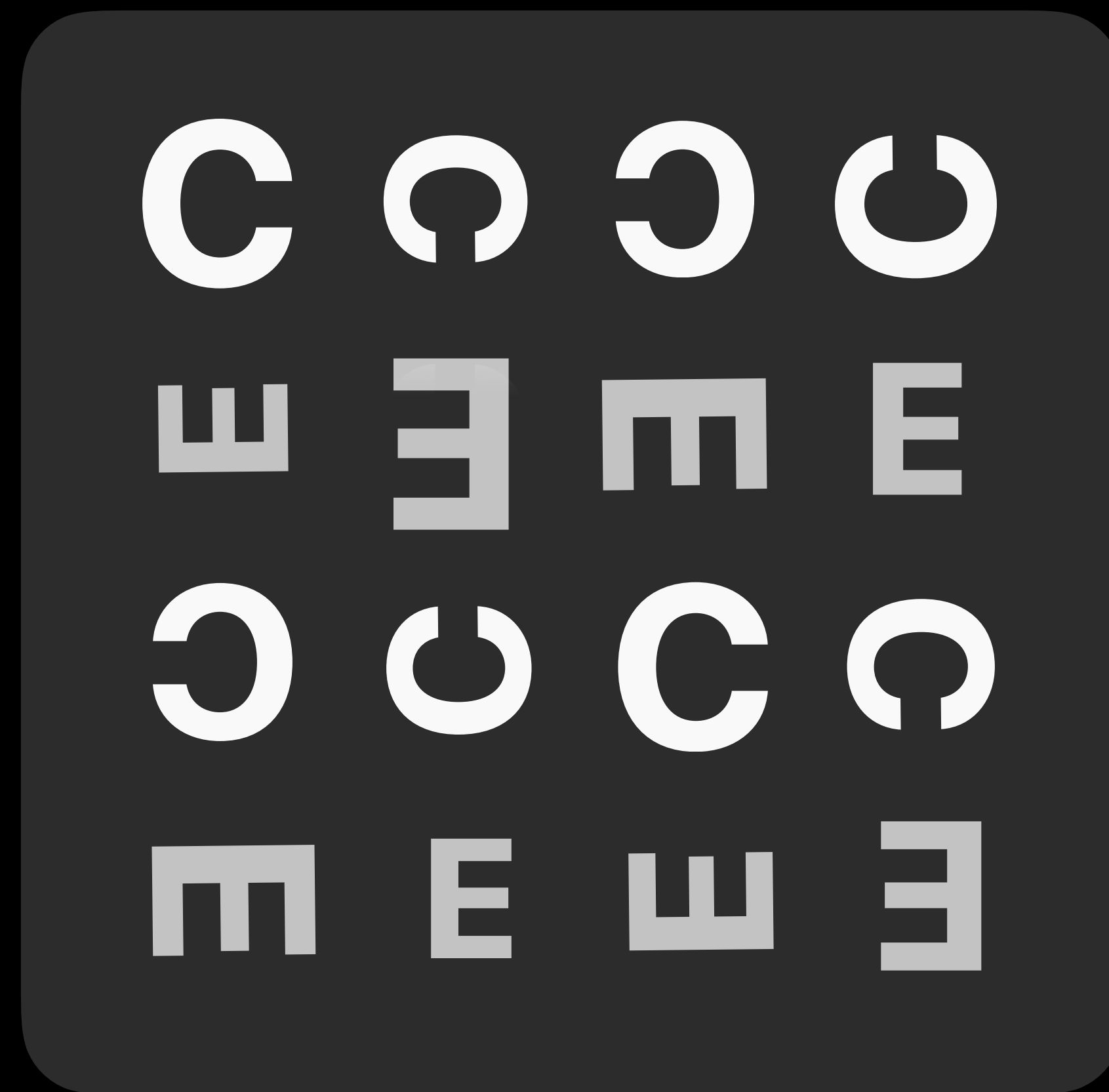
```
import ResearchKit

// create a tumblingE acuity step
let step = ORKTumblingEStep(identifier: "TumblingEAcuity")

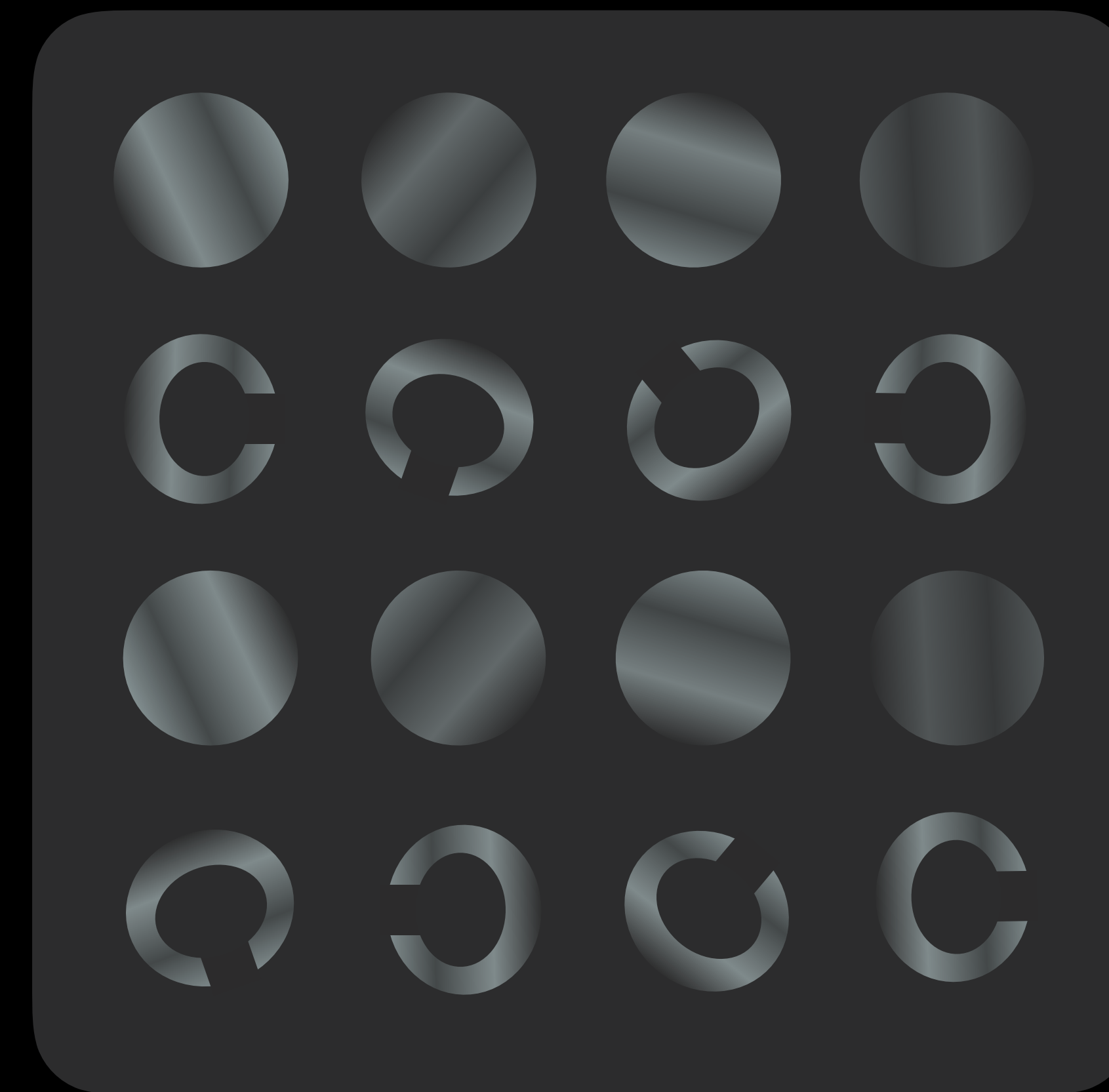
// configure min and max viewing distance as determined by the TrueDepth camera
step.minViewingDistance = Measurement(value: 38.0, unit: UnitLength.centimeters)
step.maxViewingDistance = Measurement(value: 42.0, unit: UnitLength.centimeters)

// create an active task by passing in the step
let task = ORKOrderedTask(identifier: "TumblingEAcuityTask", steps: [step])
let taskVC = ORKTaskViewController(task: task, taskRun: UUID())

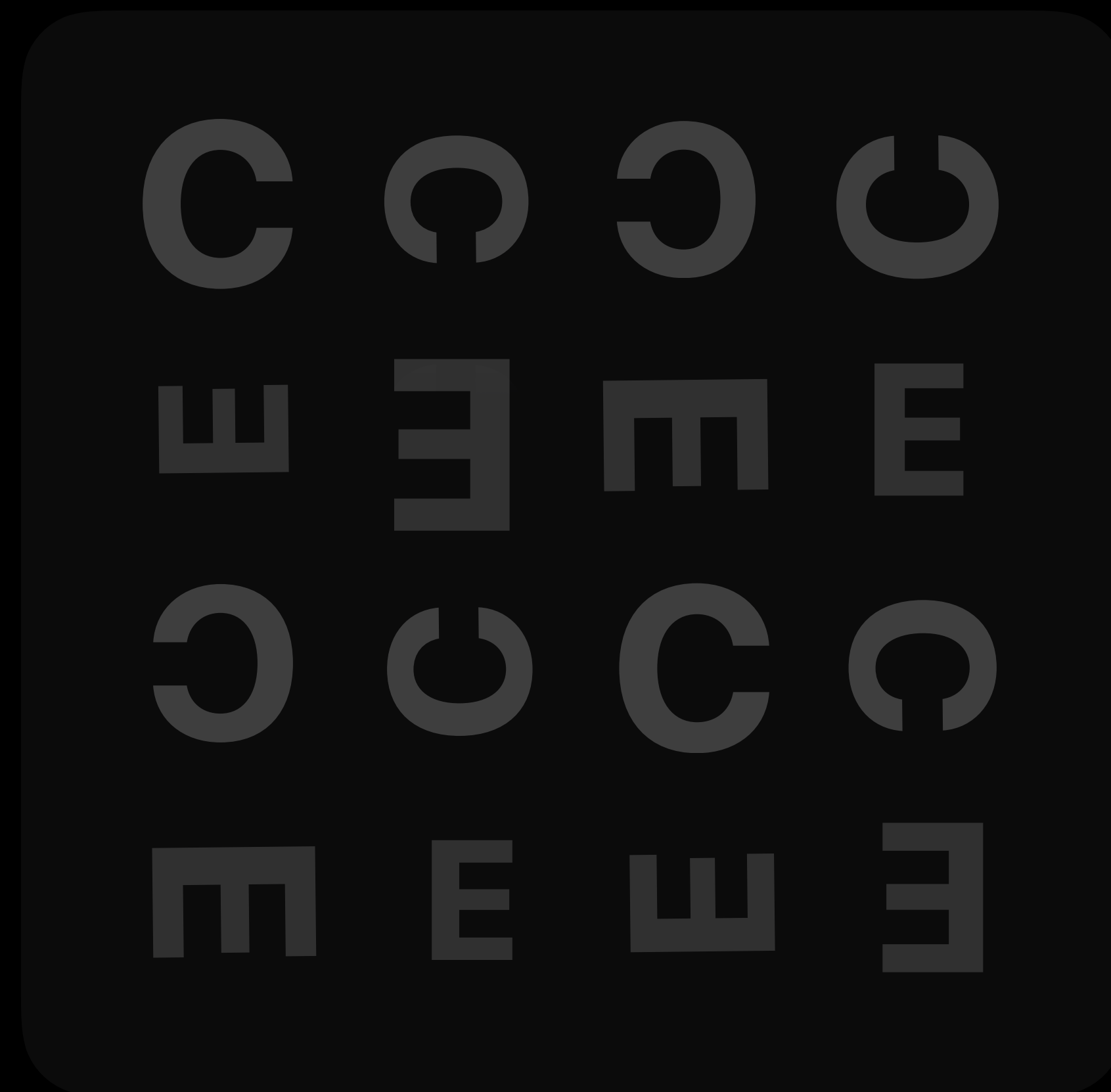
present(taskVC, animated: true, completion: nil)
```



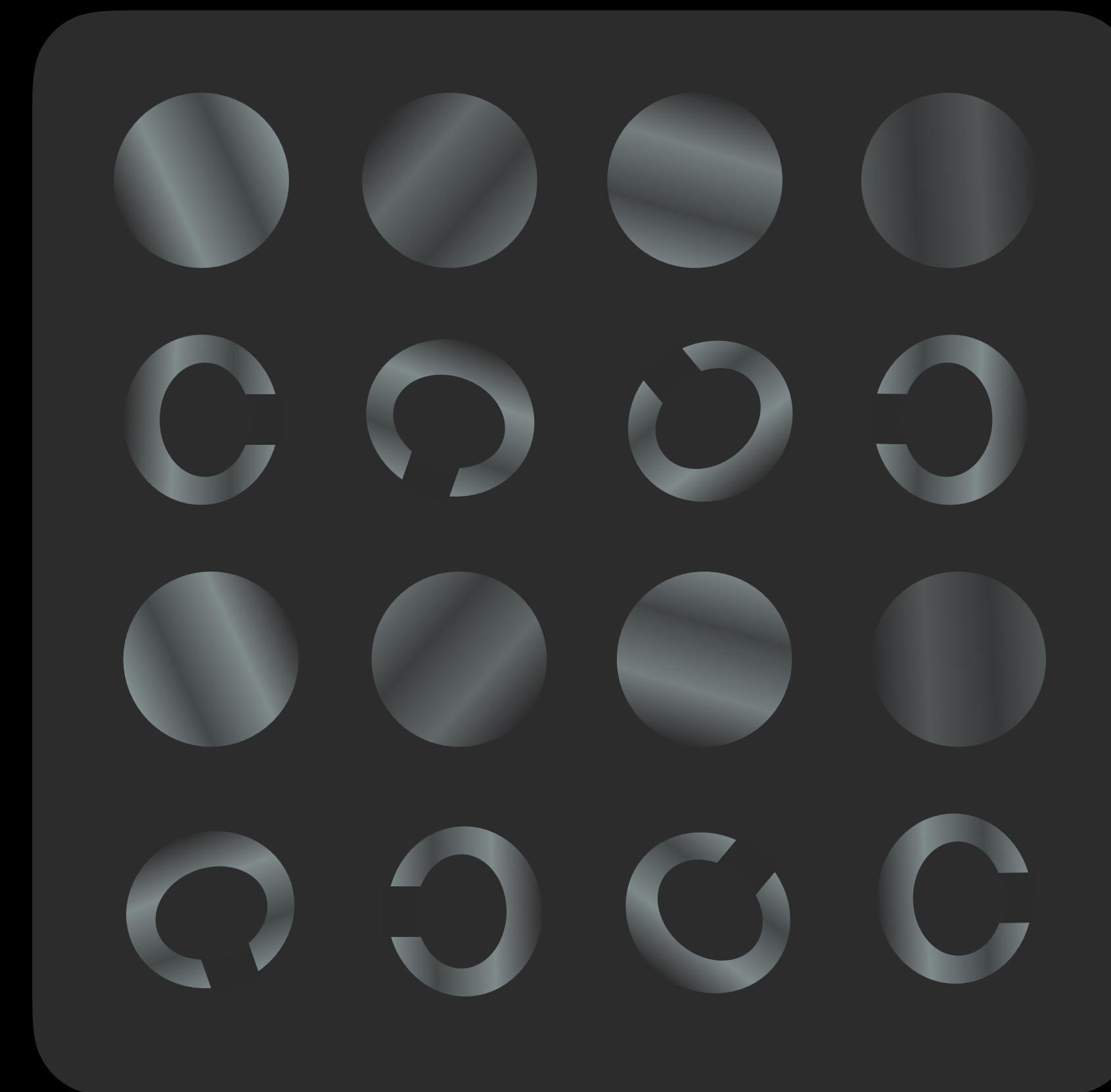
**Visual Acuity**  
Landolt C & Tumbling E



**Contrast Sensitivity**  
Landolt C & Gabor Patch



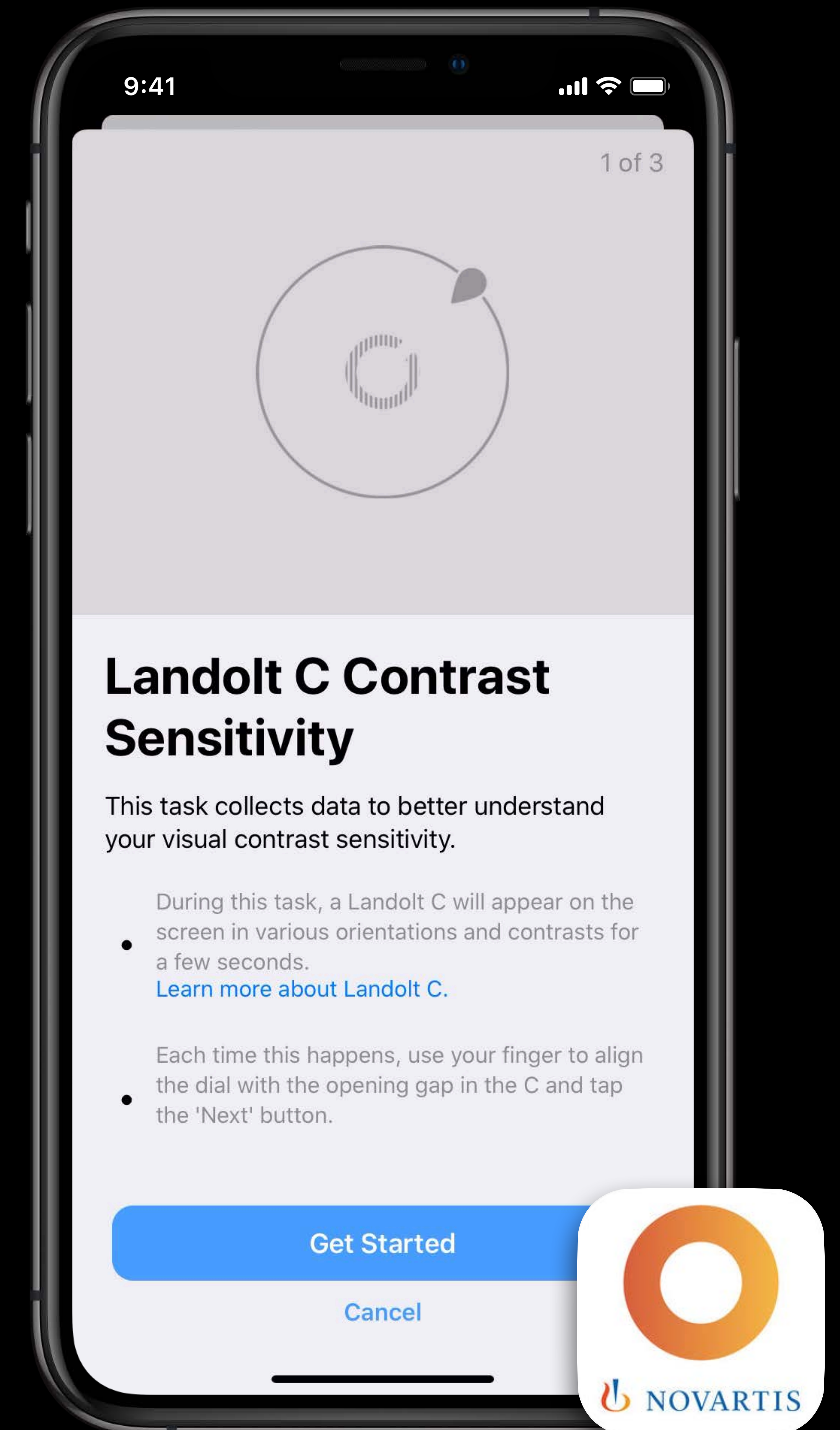
**Visual Acuity**  
Landolt C & Tumbling E



**Contrast Sensitivity**  
Landolt C & Gabor Patch

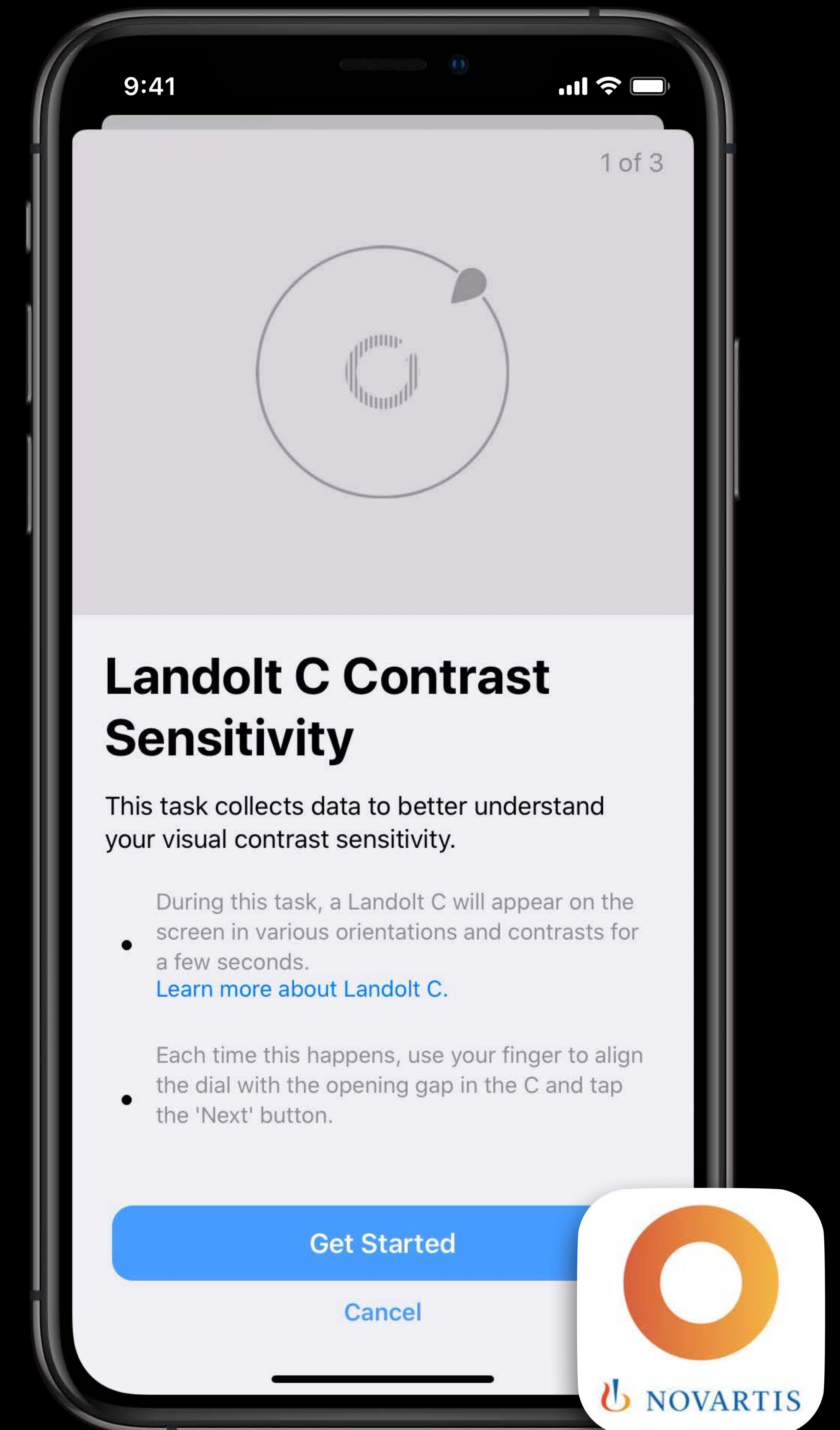
# Contrast Sensitivity — Landolt C

Novartis FocalView Contribution



# Contrast Sensitivity — Landolt C

Novartis FocalView Contribution



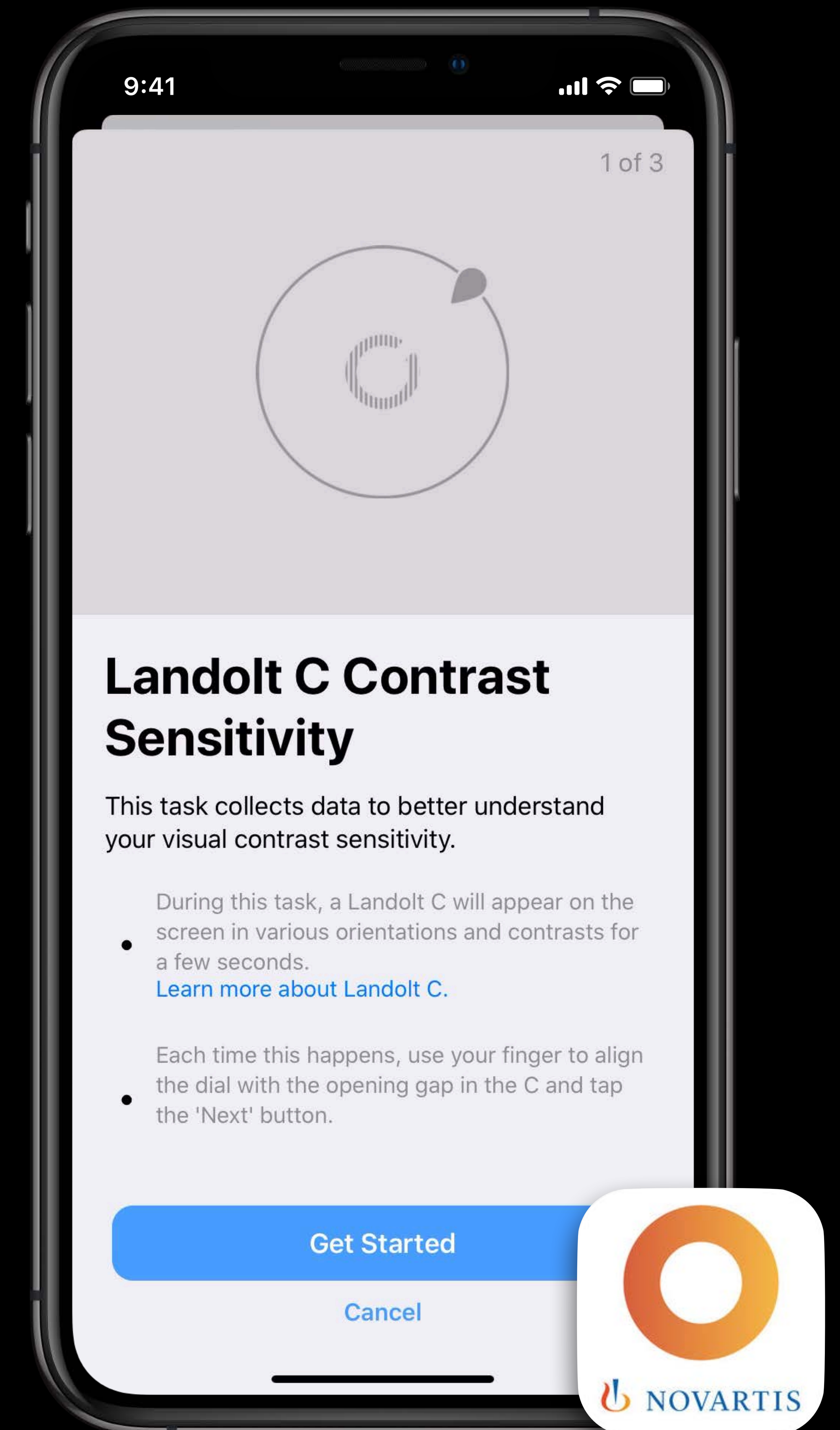


# Contrast Sensitivity — Landolt C

Novartis FocalView Contribution

## Landolt C Stimulus

- Fixed size
- Decreasing contrast
- Random orientations



# Contrast Sensitivity — Landolt C

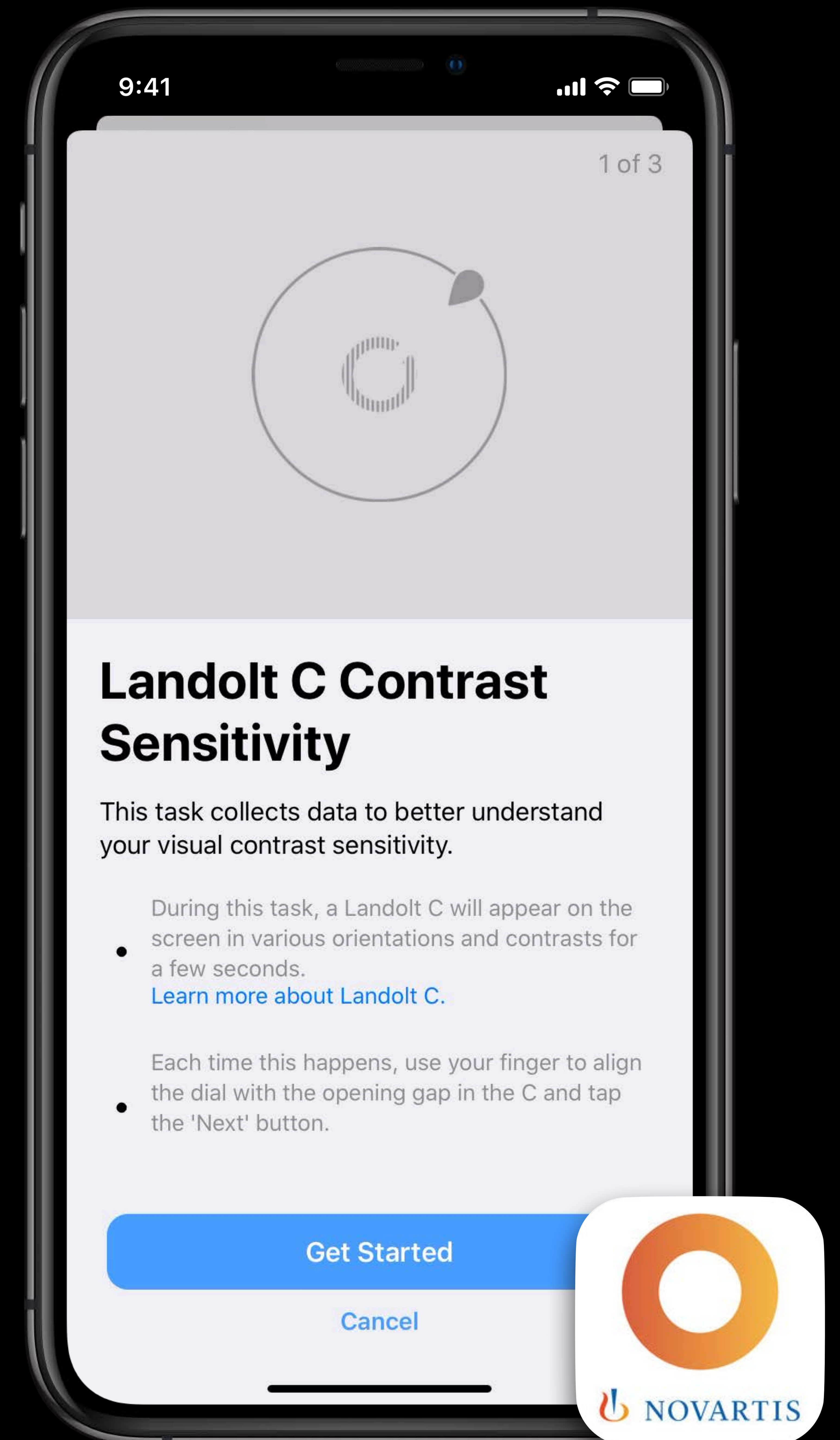
Novartis FocalView Contribution

## Landolt C Stimulus

- Fixed size
- Decreasing contrast
- Random orientations

## Result

- VAR (Visual Acuity Rating)



```
import ResearchKit

// create a landoltC peak contrast sensitivity step
let step = ORKLandoltCStep(identifier: "ContrastSensitivity")
step.testType = .contrastSensitivity
```

```
import ResearchKit

// create a landoltC peak contrast sensitivity step
let step = ORKLandoltCStep(identifier: "ContrastSensitivity")
step.testType = .contrastSensitivity

// create an active task by passing in the step
let task = ORKOrderedTask(identifier: "ContrastSensitivityTask", steps: [step])
let taskVC = ORKTaskViewController(task: task, taskRun: UUID())

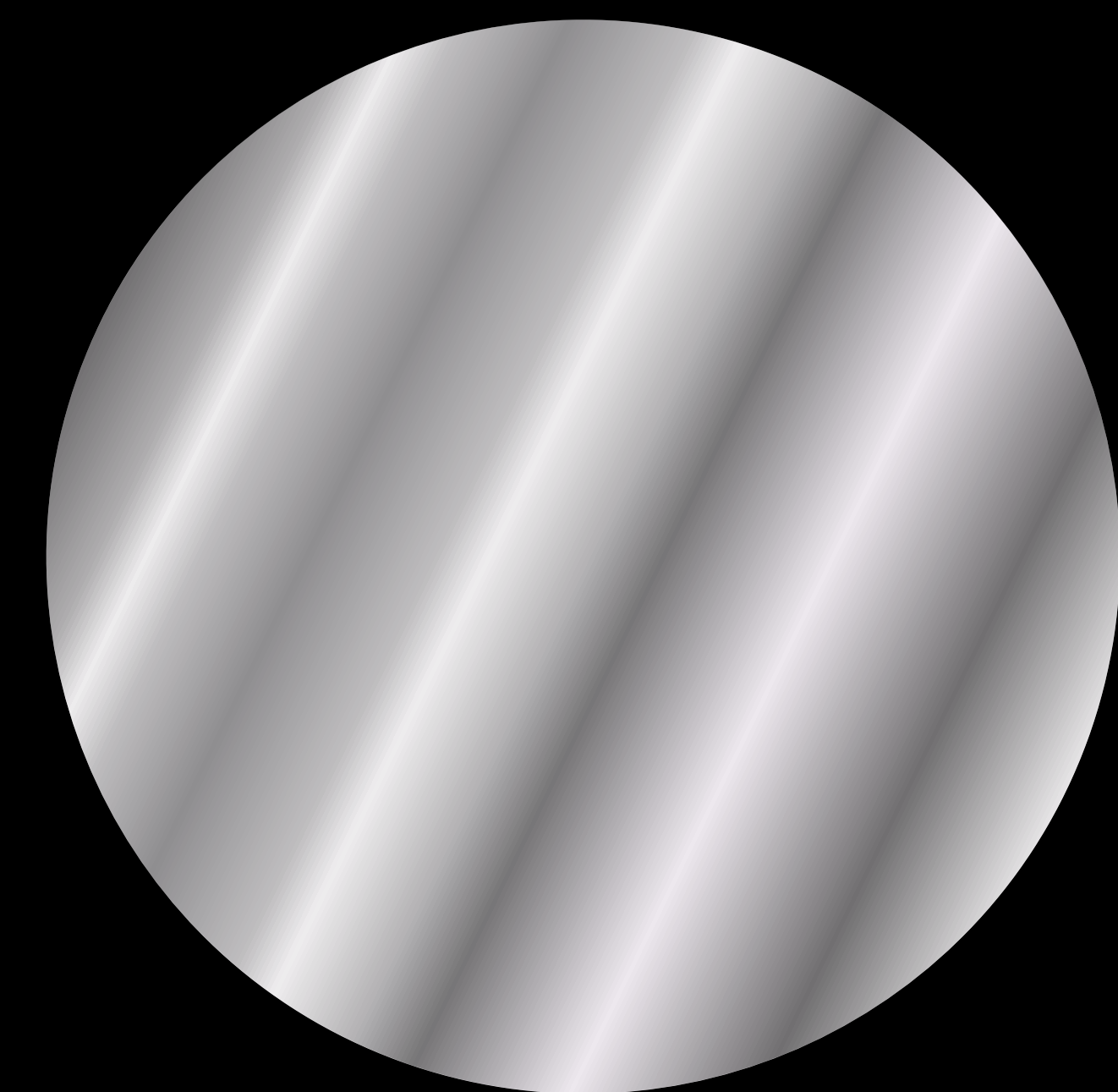
present(taskVC, animated: true, completion: nil)
```

# Contrast Sensitivity Function

Gabor Patch

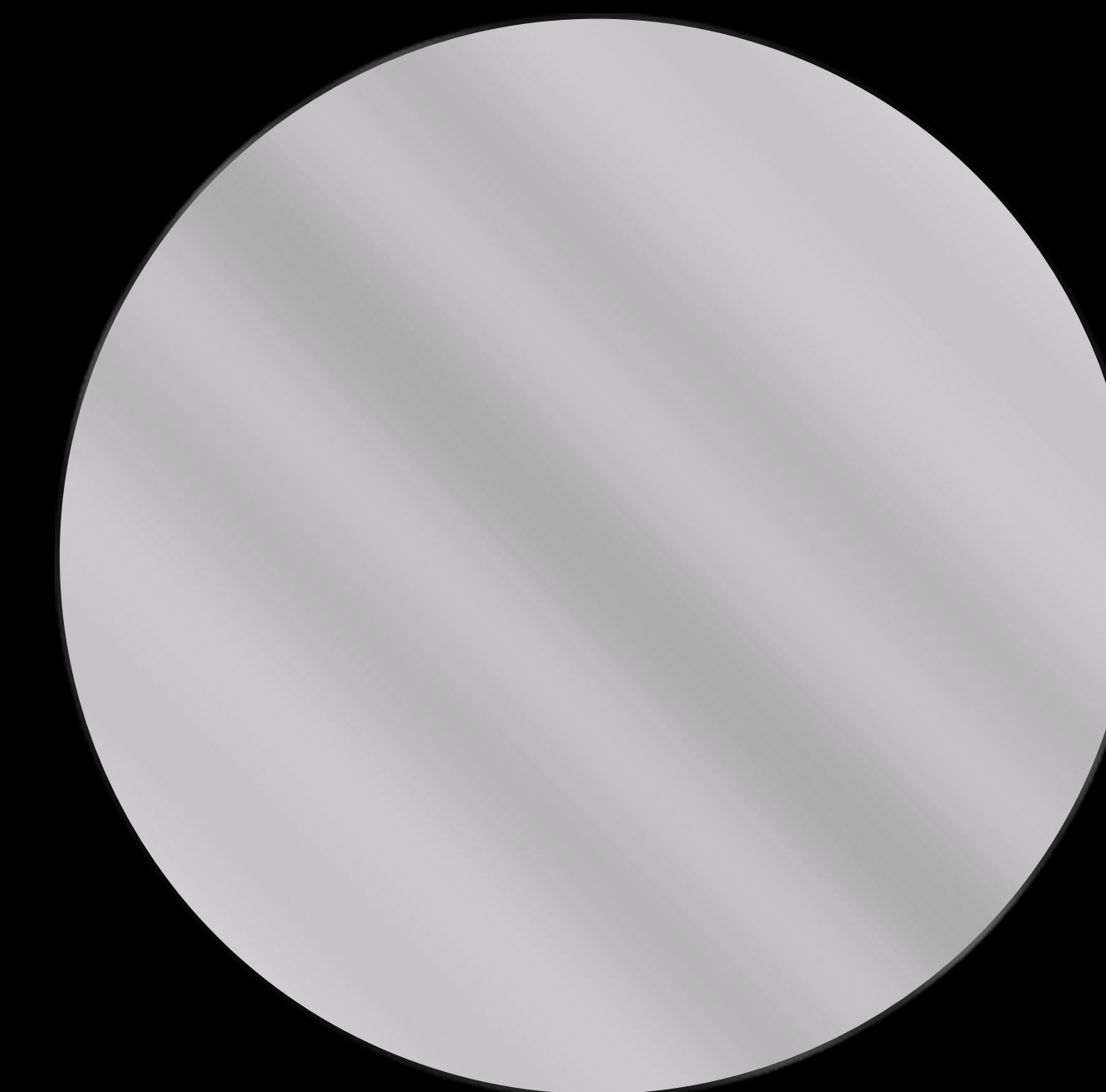
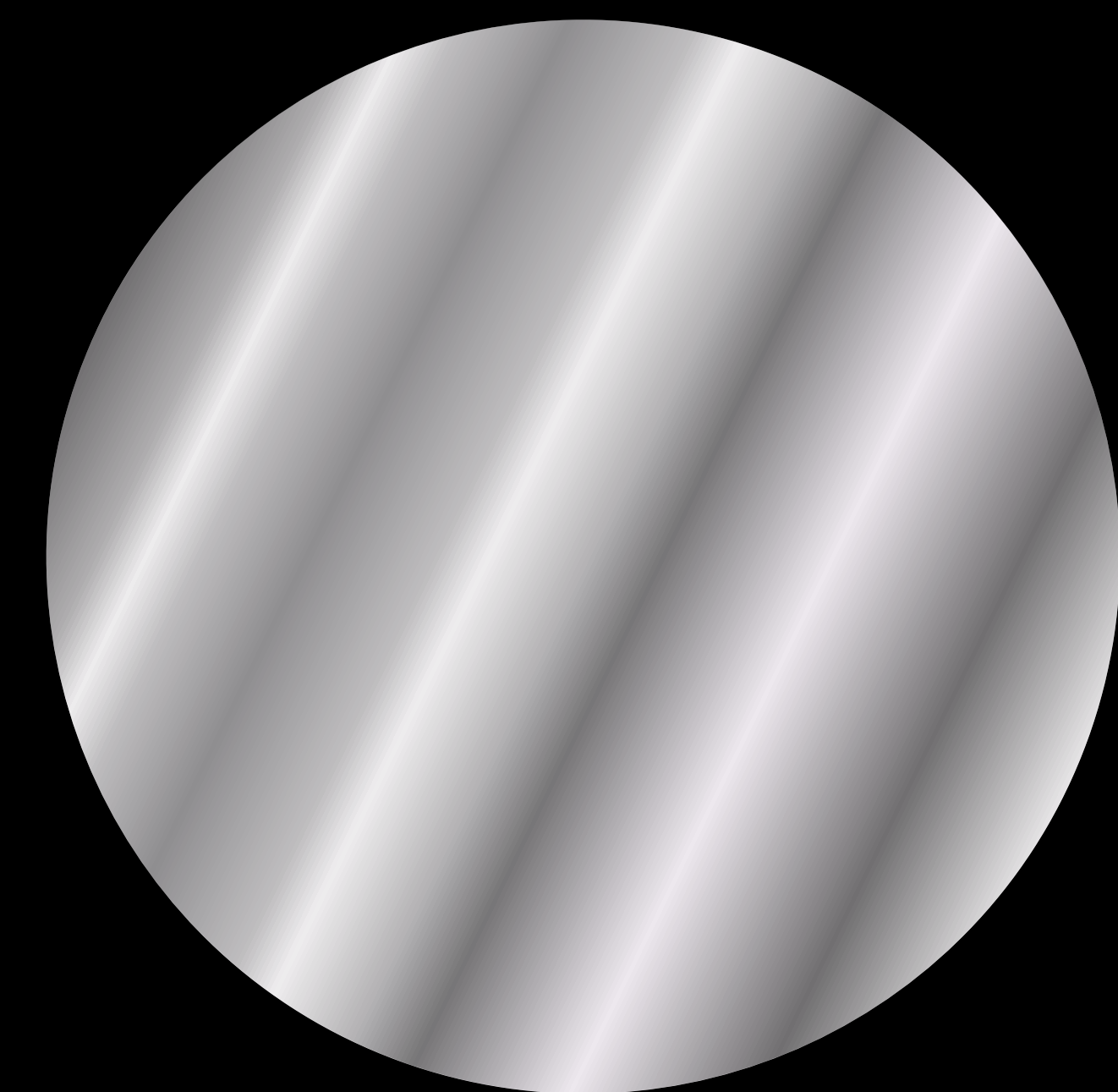
# Contrast Sensitivity Function

Gabor Patch



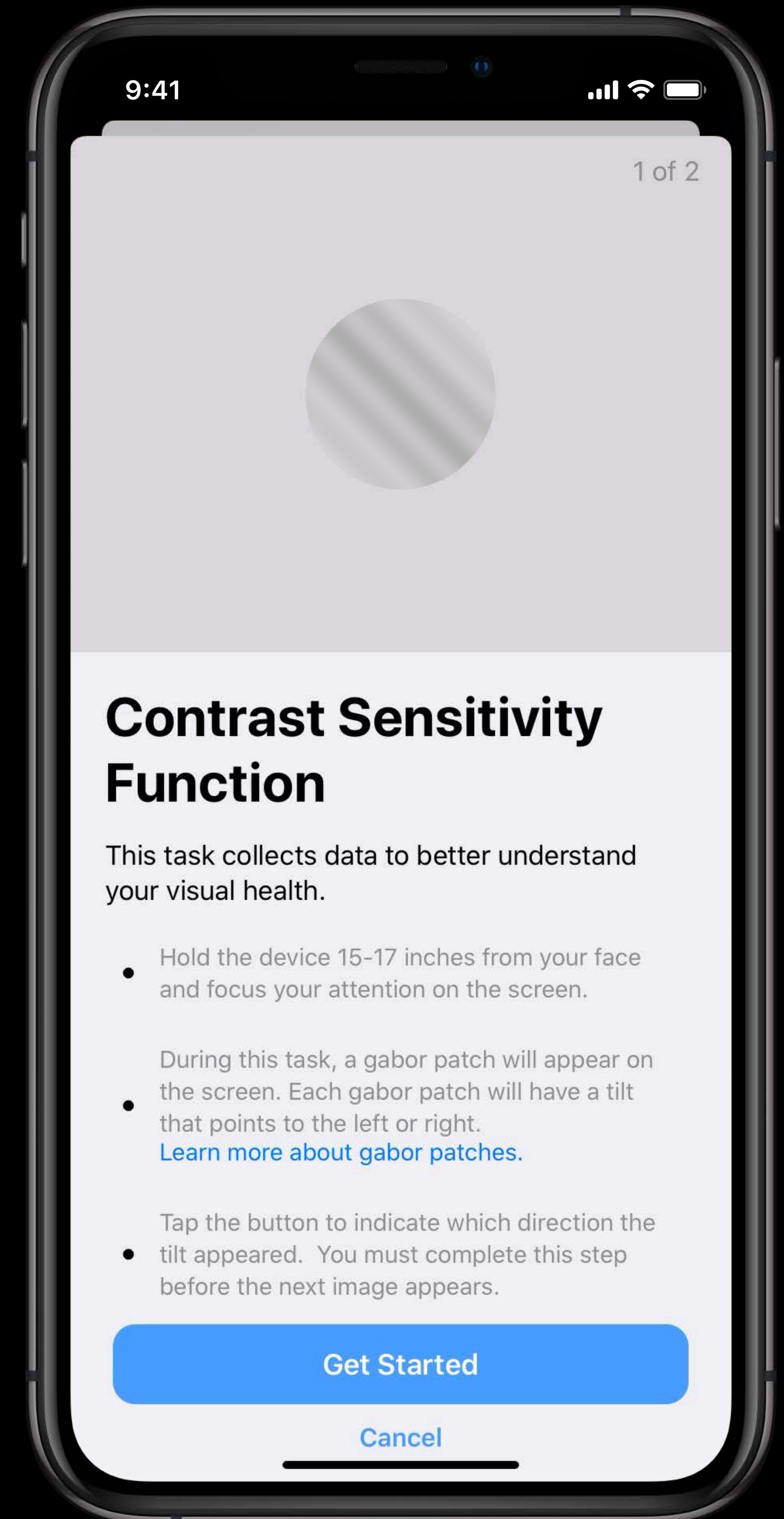
# Contrast Sensitivity Function

Gabor Patch



# Contrast Sensitivity Function

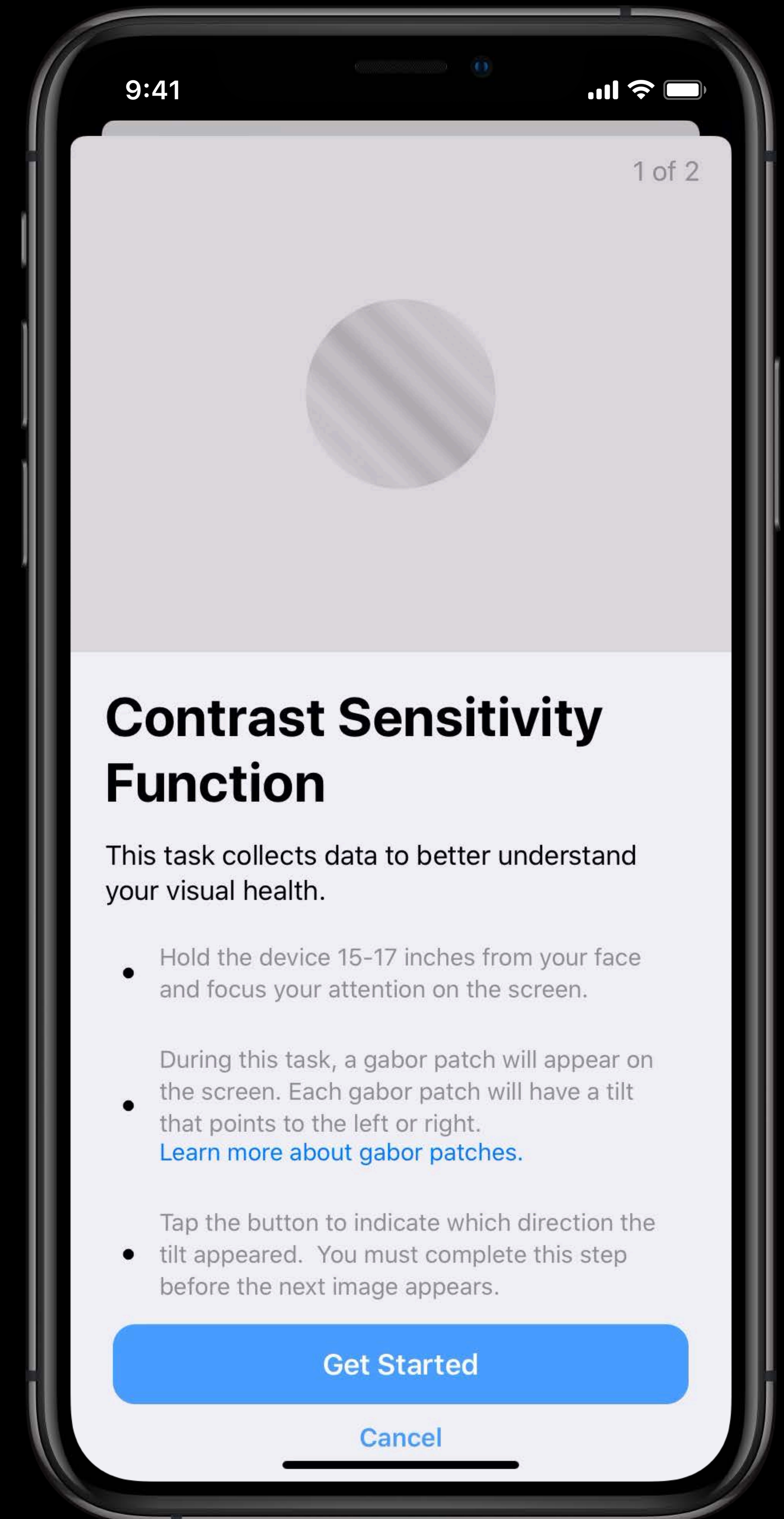
COMING SOON





# Contrast Sensitivity Function

COMING SOON

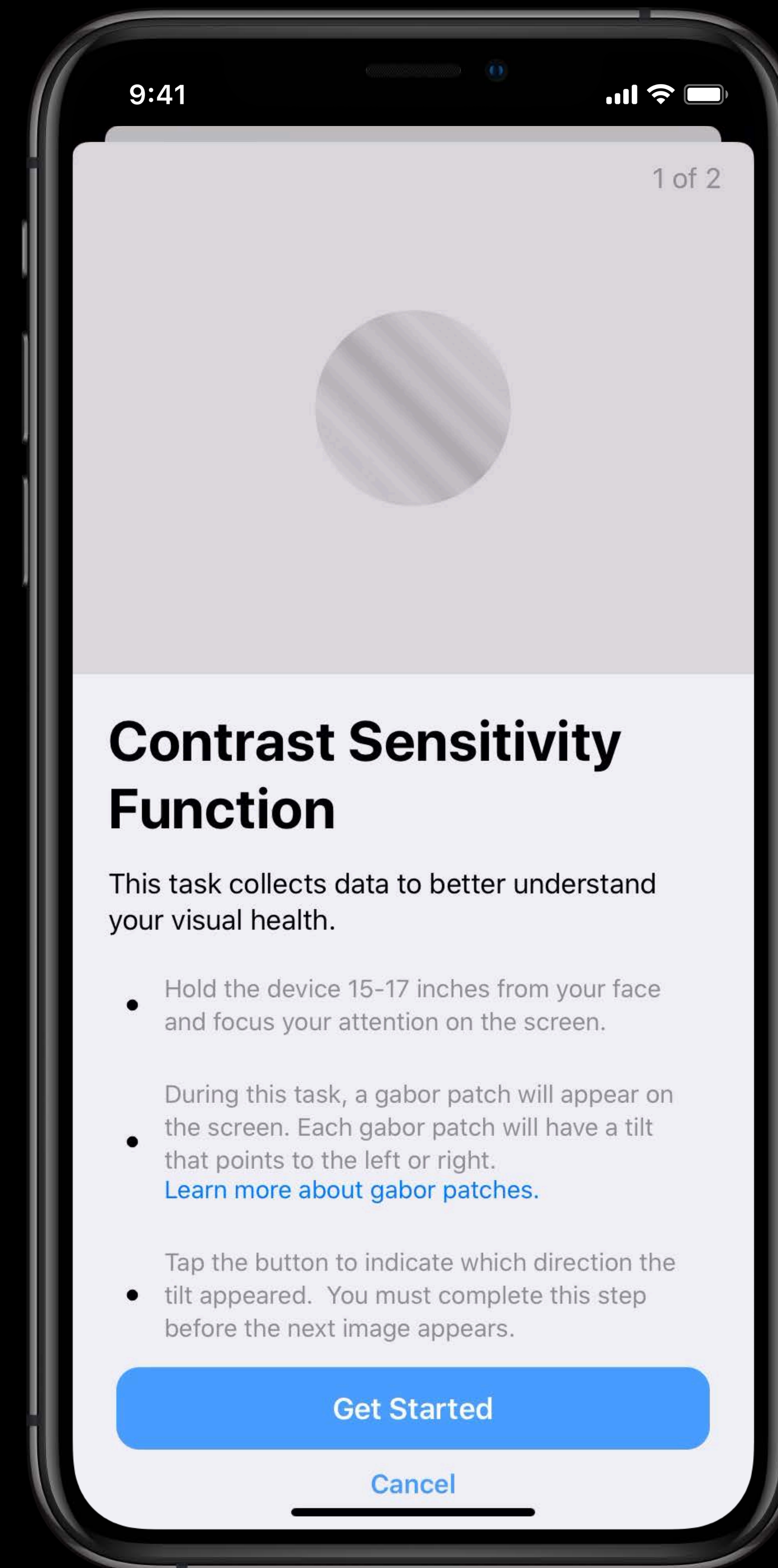


# Contrast Sensitivity Function

COMING SOON

## Gabor Patch Stimulus

- Leverages TrueDepth camera
- Adaptive algorithm varies spatial frequency
- Random orientation and position



# Contrast Sensitivity Function

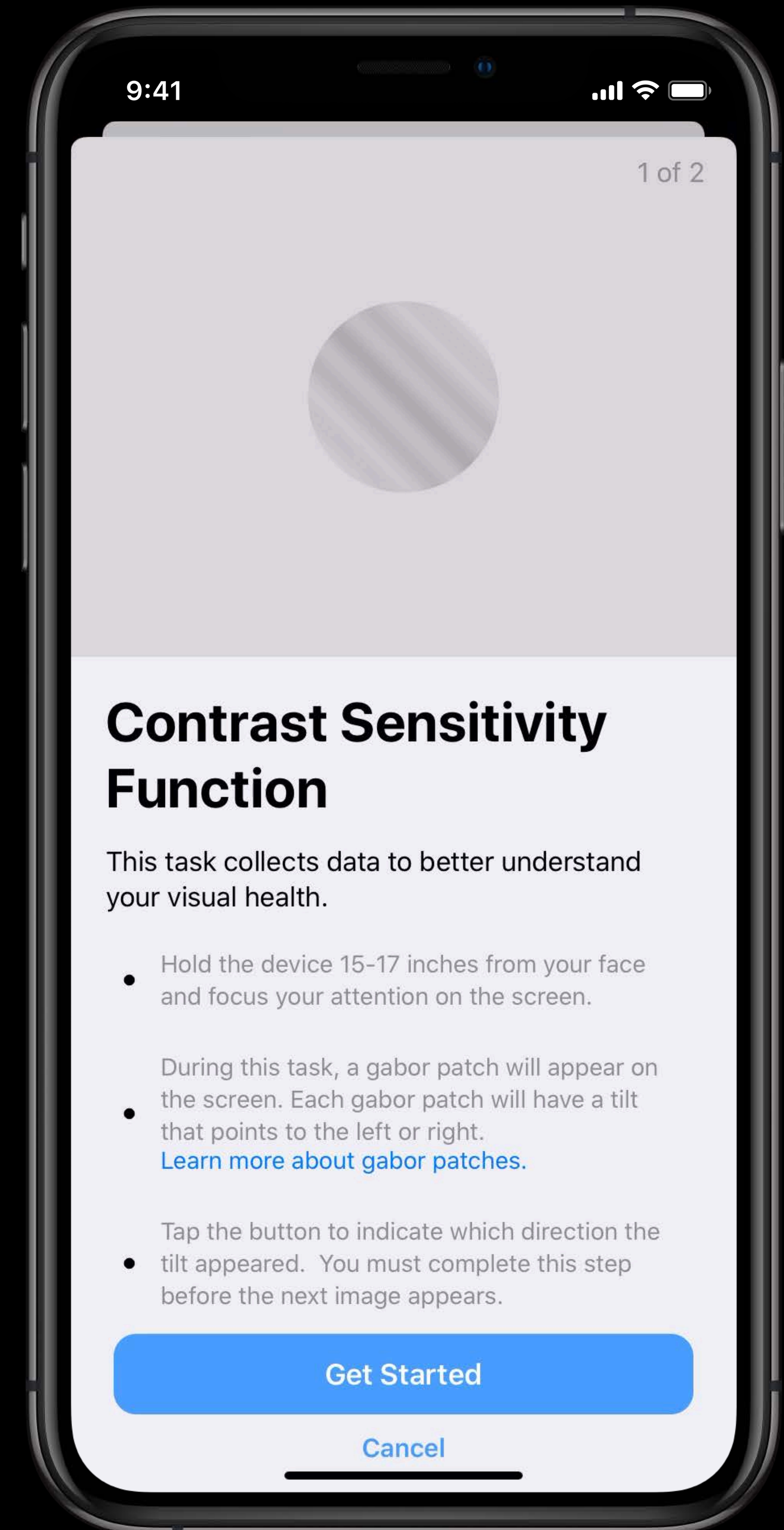
COMING SOON

## Gabor Patch Stimulus

- Leverages TrueDepth camera
- Adaptive algorithm varies spatial frequency
- Random orientation and position

## Result

- Sensitivity vs Spatial Frequency curve



```
import ResearchKit

// create a CSF (Contrast Sensitivity Function) step
let step = ORKCSFStep(identifier: "CSF")
```

```
import ResearchKit

// create a CSF (Contrast Sensitivity Function) step
let step = ORKCSFStep(identifier: "CSF")

// configure min and max viewing distance as determined by the TrueDepth camera
step.minViewingDistance = Measurement(value: 38.0, unit: UnitLength.centimeters)
step.maxViewingDistance = Measurement(value: 42.0, unit: UnitLength.centimeters)
```

```
import ResearchKit

// create a CSF (Contrast Sensitivity Function) step
let step = ORKCSFStep(identifier: "CSF")

// configure min and max viewing distance as determined by the TrueDepth camera
step.minViewingDistance = Measurement(value: 38.0, unit: UnitLength.centimeters)
step.maxViewingDistance = Measurement(value: 42.0, unit: UnitLength.centimeters)

// create an active task by passing in the step
let task = ORKOrderedTask(identifier: "CSFTask", steps: [step])
let taskVC = ORKTaskViewController(task: task, taskRun: UUID())

present(taskVC, animated: true, completion: nil)
```



**Vision**



**Hearing**



**Speech**



Vision



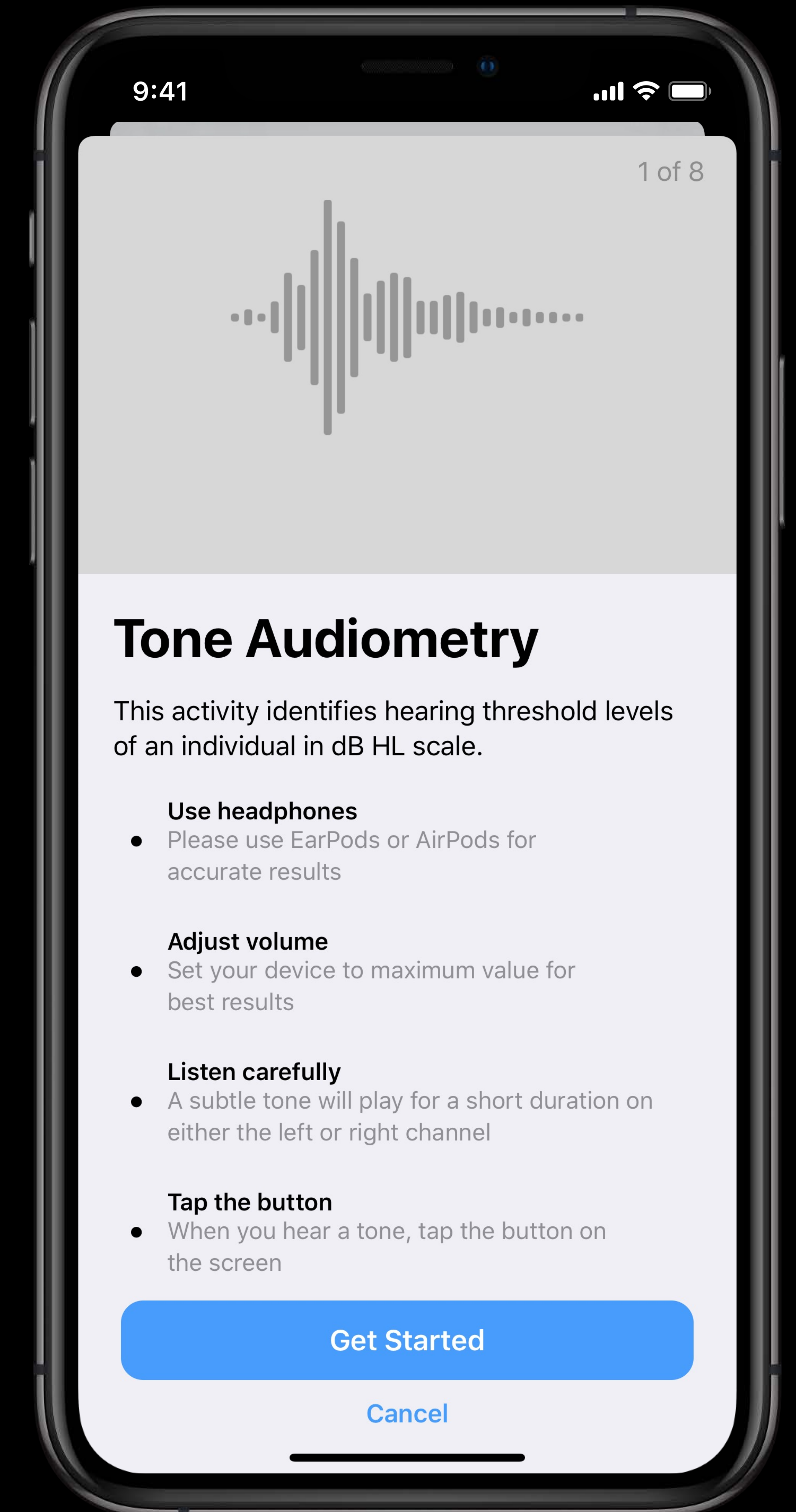
Hearing



Speech



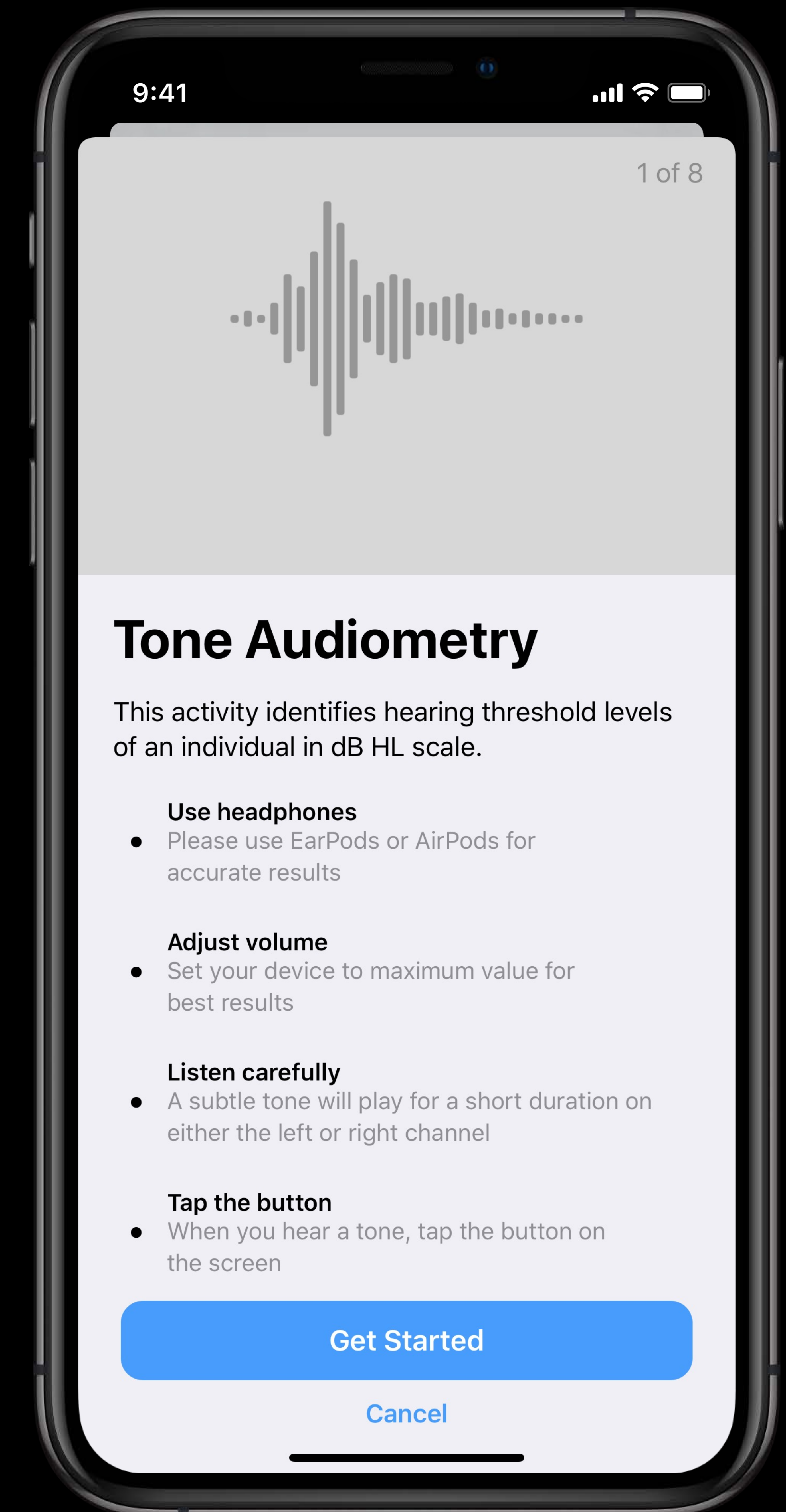
# Hearing Task Updates



# Hearing Task Updates

## Algorithm

- Updates to calibration data
- Adaptive starting level



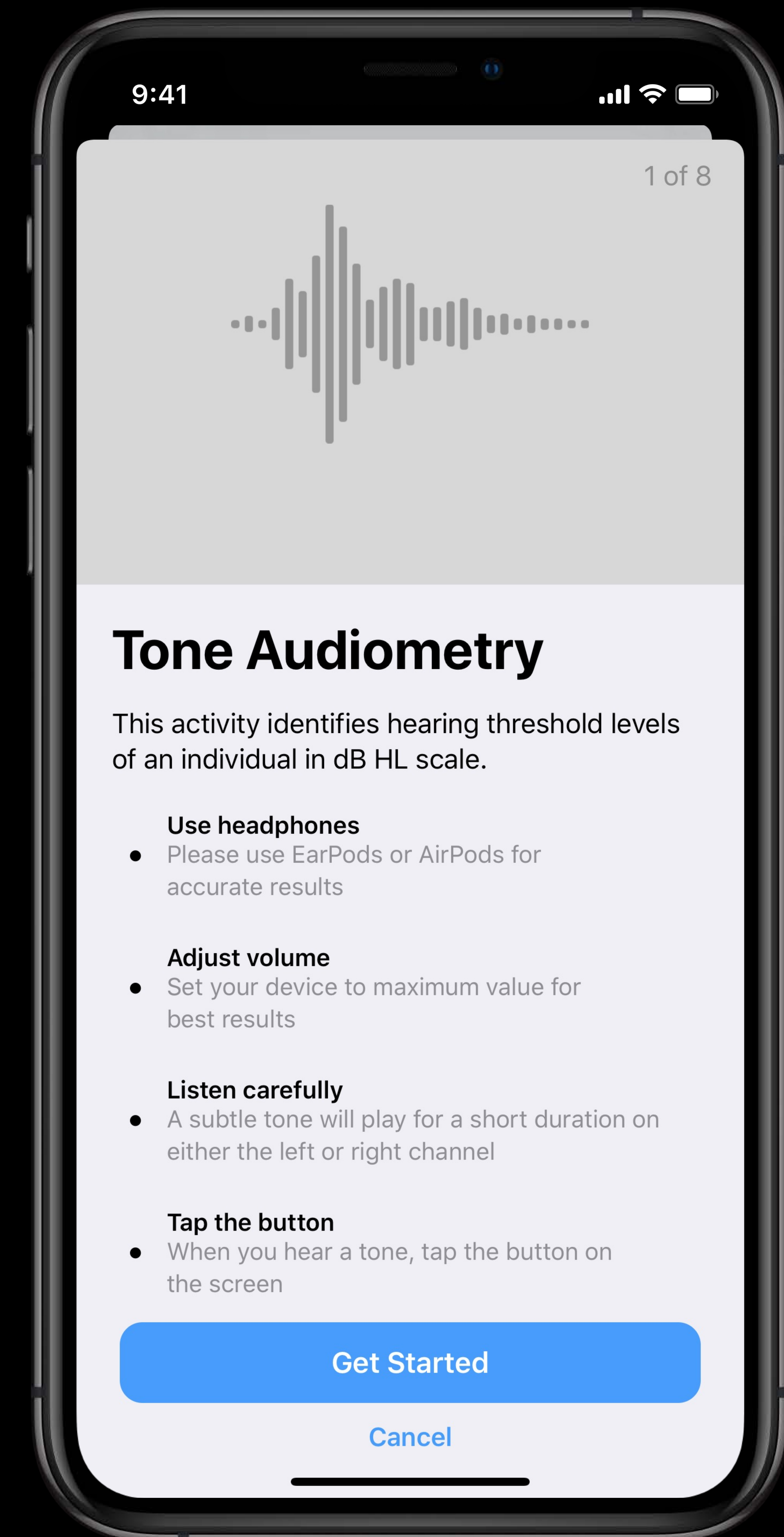
# Hearing Task Updates

## Algorithm

- Updates to calibration data
- Adaptive starting level

## Result

- Write to HealthKit



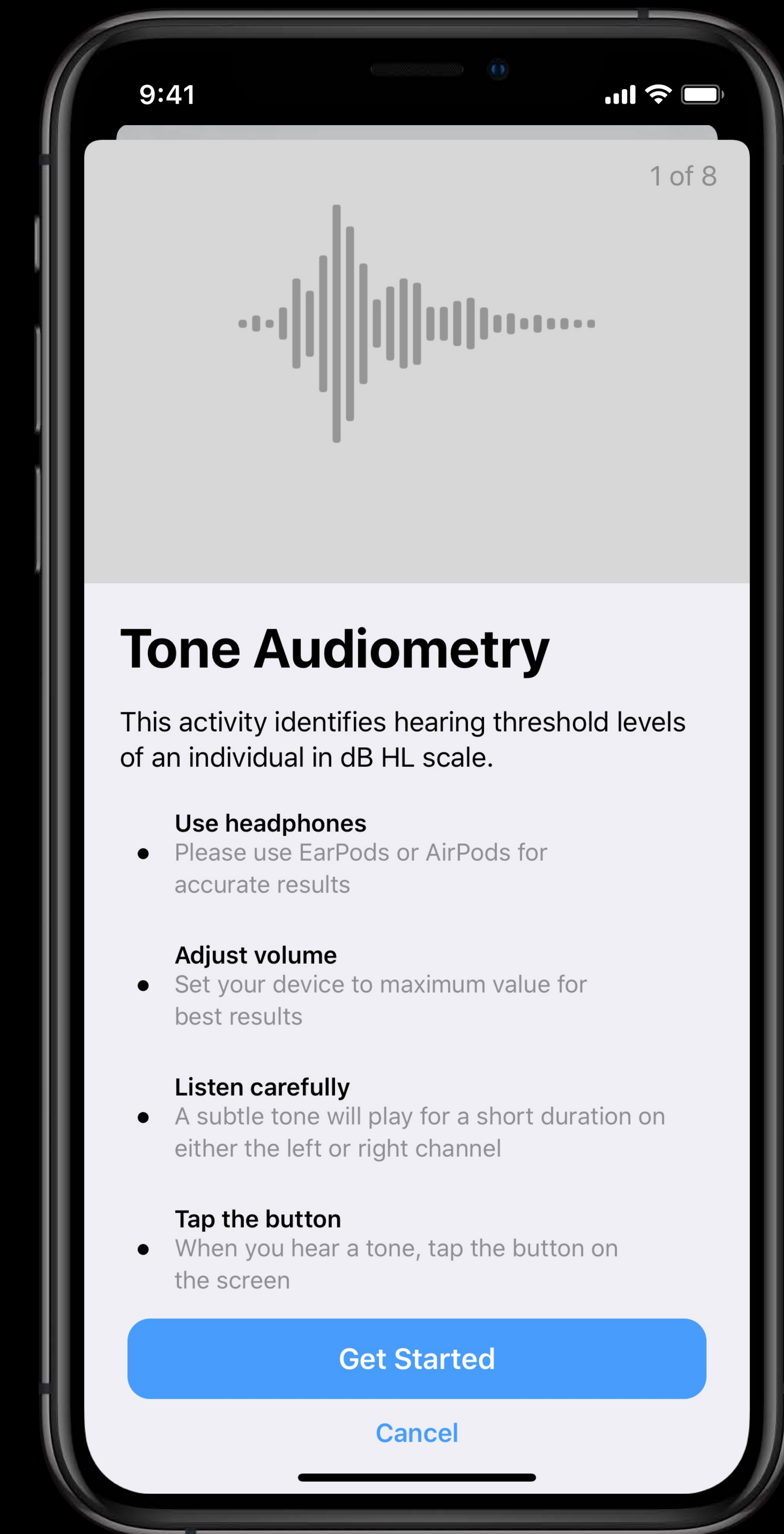
# Hearing Task Updates

## Algorithm

- Updates to calibration data
- Adaptive starting level

## Result

- Write to HealthKit





**Vision**



**Hearing**



**Speech**



Vision



Hearing



Speech

# Speech Task Updates



# Speech Task Updates

## SFTranscription

- Speaking rate
- Average pause duration





# Speech Task Updates

## SFTranscription

- Speaking rate
- Average pause duration

## SFVoiceAnalytics

- Jitter
- Shimmer
- Pitch
- Voicing



# Speech Task Updates

## SFTranscription

- Speaking rate
- Average pause duration

## SFVoiceAnalytics

- Jitter
- Shimmer
- Pitch
- Voicing





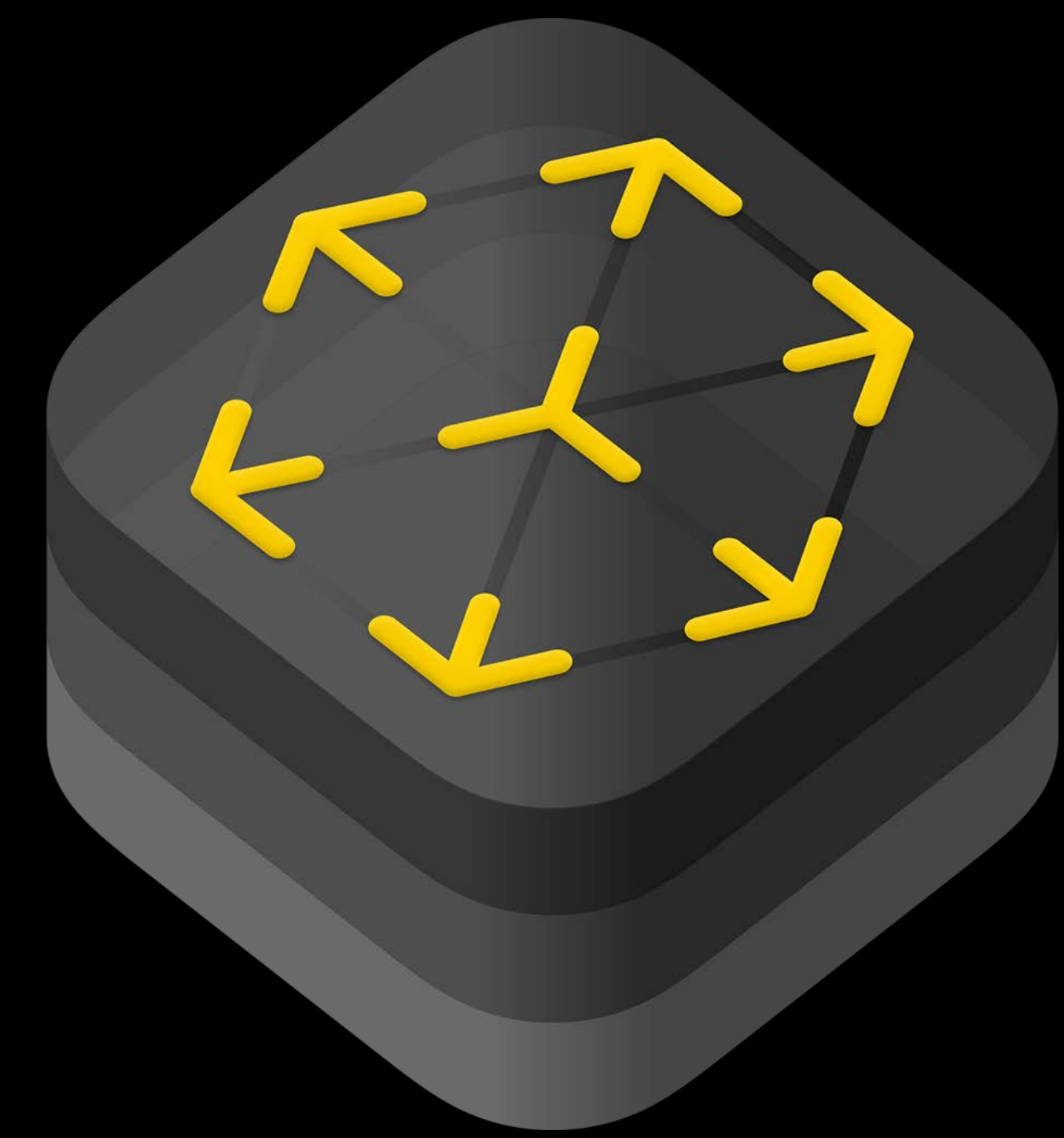
**Vision**



**Hearing**



**Speech**

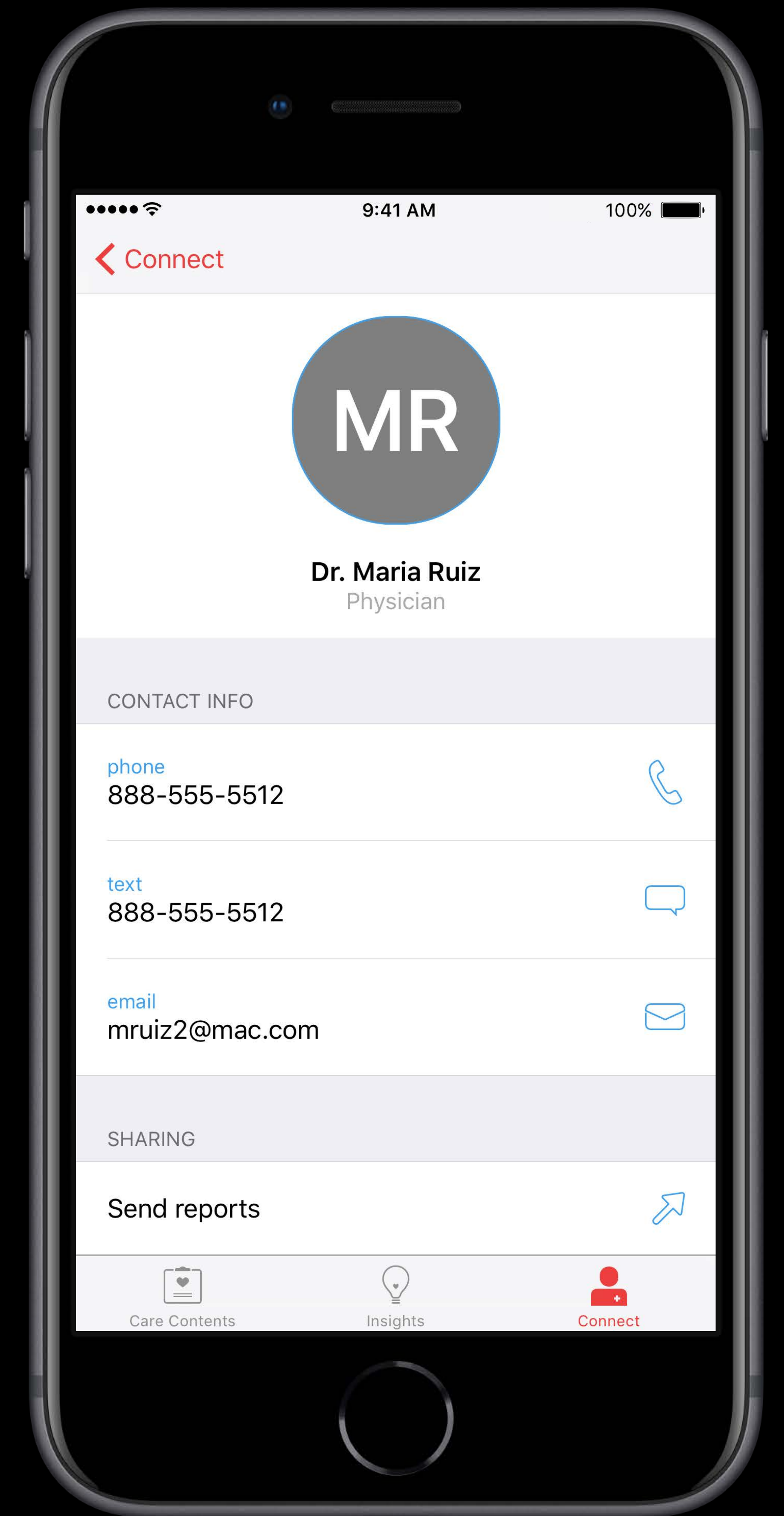
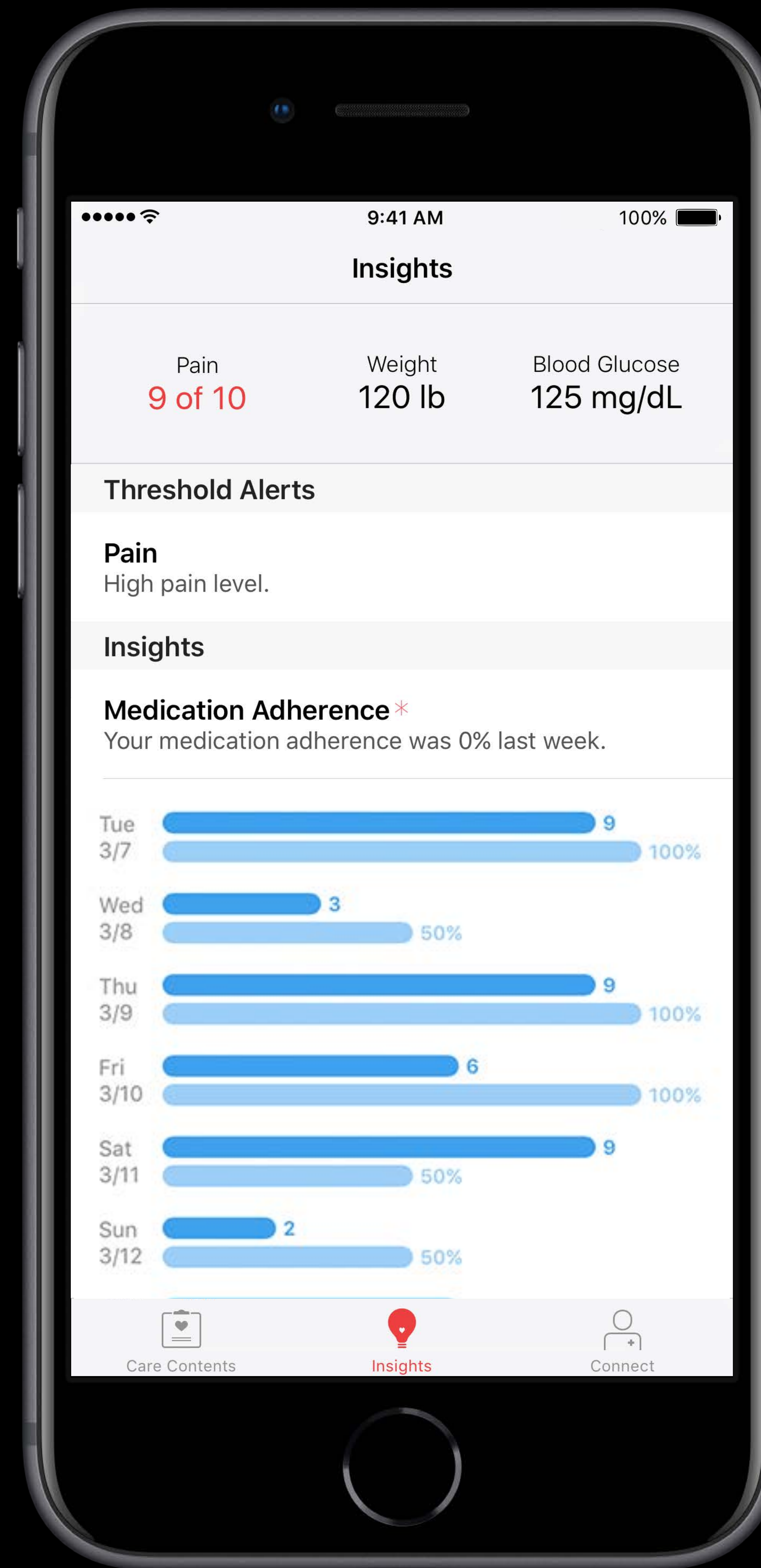
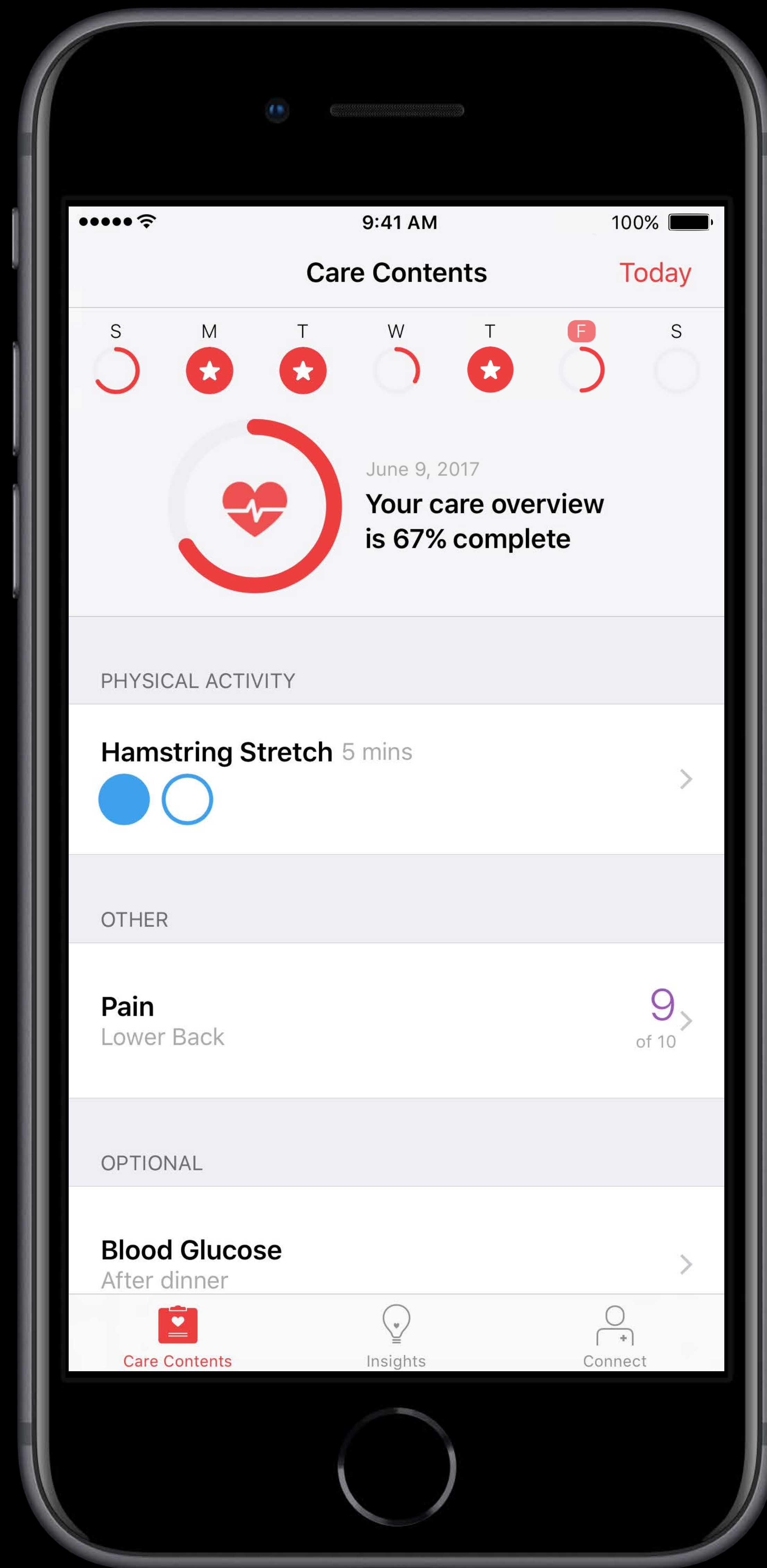






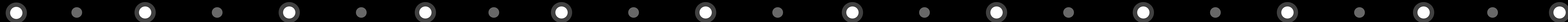
**CareKit**

# JUNE 2016 CareKit





**JUNE**  
**2016**  
CareKit



**2017**  
Bridge API



A horizontal timeline is depicted with a series of dots along the bottom edge. A vertical cyan line intersects this timeline at the 13th dot from the left. The text '2017 UI Updates' is positioned above this vertical line.

**2017**  
UI Updates

2019  
**WWDC**  
TODAY



2019  
**WWDC**  
TODAY

**CareKit 2.0**

9:41

02 03 04 05 06 07 08

Wednesday, Jun 5

### Kegel Exercises

2 more times today

9:00 AM 12:00 PM 3:00 PM 6:00 PM

### Nausea

Anytime today

Press the button anytime you feel nauseous

I'm Feeling Nauseous

11:21 AM Logged

### Take Doxylamine

1 more time today

7:30 AM 2:00 PM

Tasks Charts Care Team

9:41

## Charts

### Nausea vs. Doxylamine Intake

This week

Day	Nausea	Doxylamine
S	4.0	1.0
M	3.0	2.0
T	3.0	2.0
W	1.0	1.0
T	0.0	0.0
F	0.0	0.0
S	0.0	0.0

### Hours of Sleep

Day	Last week	This week
S	6.0	5.5
M	6.0	8.0
T	6.0	8.0
W	6.0	6.0
T	9.0	6.0
F	5.0	6.0
S	6.0	6.0

### Nausea vs. Exercise

This month

0 10 20 30 40 50 60 min

Tasks Charts Care Team

9:41

## Care Team

**Matthew Reiff**  
OBGYN

Dr. Reiff is an OBGYN with 13 years of experience.

Call Message E-mail

**Address**  
396 El Verano Way  
San Francisco CA 94127

**Jane Daniels**  
Family Practice Doctor

Dr. Daniels is a family practice doctor with 8 years of experience.

Call Message E-mail

**Address**  
2598 Reposa Way  
San Francisco CA 94127

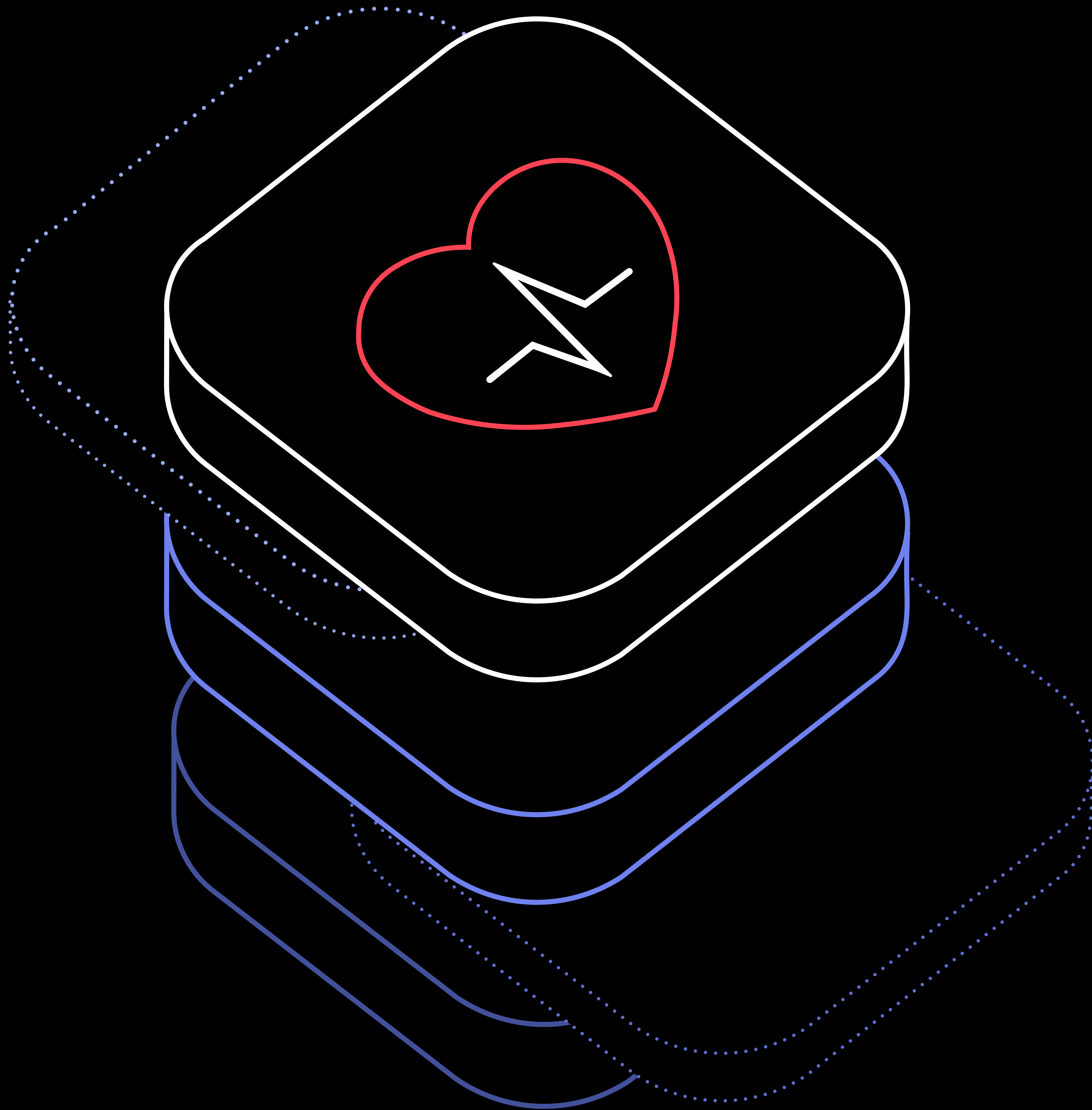
Tasks Charts Care Team

STRING IF ELSE GENERICS INT PROTOCOLS ]  
SET == ENUMERATIONS CODABLE STRING  
{ } COMBINE { } GUARD VAR  
ENCODER TYPEALIAS } FOR STRUCTS } PUBLIC  
[ SET! { PUBLIC } FOR IF SET } FOR  
INT? IF [ == IF SET }! = SET PUBLIC  
FOR STATIC } SET+ SWIFT LET [ SELF  
ENCODE { = PROTOCOLS IF PRIVATE LET {  
VAR } OPTIONALS } IF } SWIFT! DECODE  
GUARD } IF VAR != WHILE VAR PUBLIC OPTIONAL  
SELF ] = SELF CLASS ! = ENUMERATIONS SELF } ENCODE == SET  
DECODE VAR LET COMBINE ENCODERS [ INT  
} PRIVATE = ARRAY CODABLE IF == ] IF  
GENERICS OPTIONALS COMBINE RESULT TYPE }! INIT!  
} PRINT STRING PROTOCOLS SELF VAR



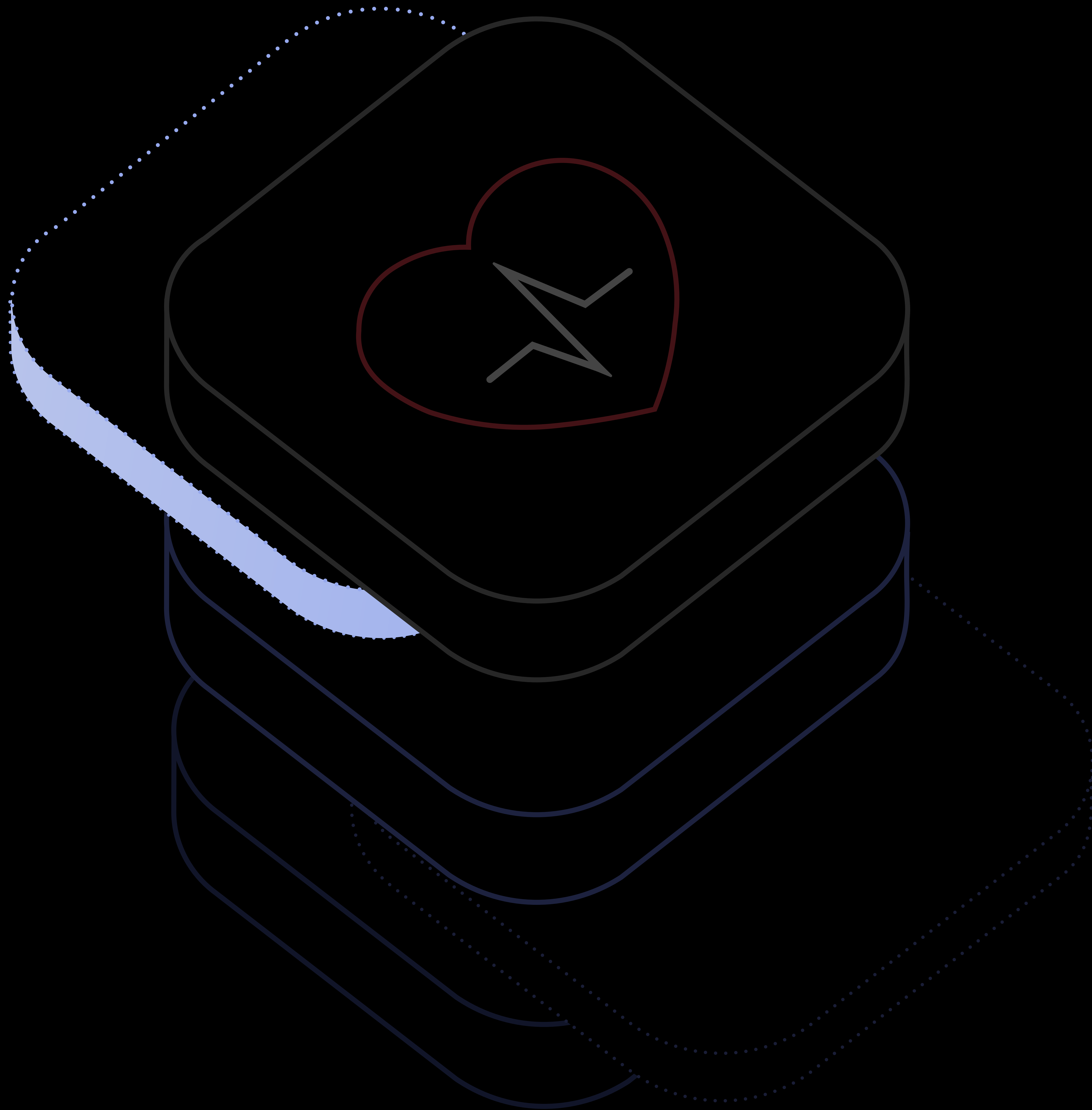


**CareKit UI**  
Naive UI Views



**CareKit Store**  
On-Device Database

**CareKit UI**  
Naive UI Views



**CareKit Store**  
On-Device Database

9:41

02 03 04 05 06 07 08

Wednesday, Jun 5

### Kegel Exercises

2 more times today

9:00 AM 12:00 PM 3:00 PM 6:00 PM

### Nausea

Anytime today

Press the button anytime you feel nauseous

I'm Feeling Nauseous

11:21 AM Logged

### Take Doxylamine

1 more time today

7:30 AM 2:00 PM

Tasks Charts Care Team

9:41

## Charts

### Nausea vs. Doxylamine Intake

This week

Day	Nausea	Doxylamine
S	4.0	1.0
M	3.0	2.0
T	3.0	2.0
W	1.0	1.0
T	0.0	0.0
F	0.0	0.0
S	0.0	0.0

### Hours of Sleep

Day	Last week	This week
S	6.0	5.0
M	6.0	8.0
T	6.0	8.0
W	6.0	6.0
T	7.0	6.0
F	5.0	6.0
S	6.0	6.0

### Nausea vs. Exercise

This month

0 10 20 30 40 50 60 min

Tasks Charts Care Team

9:41

## Care Team

**Matthew Reiff**  
OBGYN

Dr. Reiff is an OBGYN with 13 years of experience.

Call Message E-mail

**Address**  
396 El Verano Way  
San Francisco CA 94127

**Jane Daniels**  
Family Practice Doctor

Dr. Daniels is a family practice doctor with 8 years of experience.

Call Message E-mail

**Address**  
2598 Reposa Way  
San Francisco CA 94127

Tasks Charts Care Team



**Tasks**



**Charts**



**Contacts**



**Tasks**

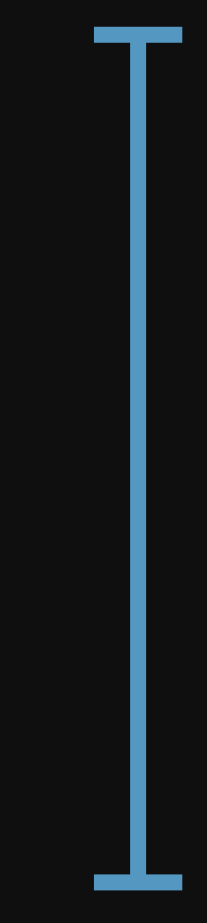
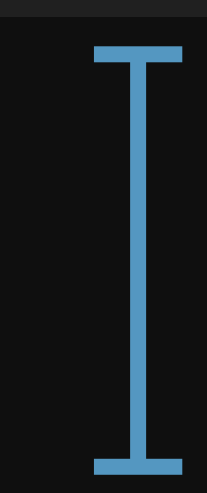
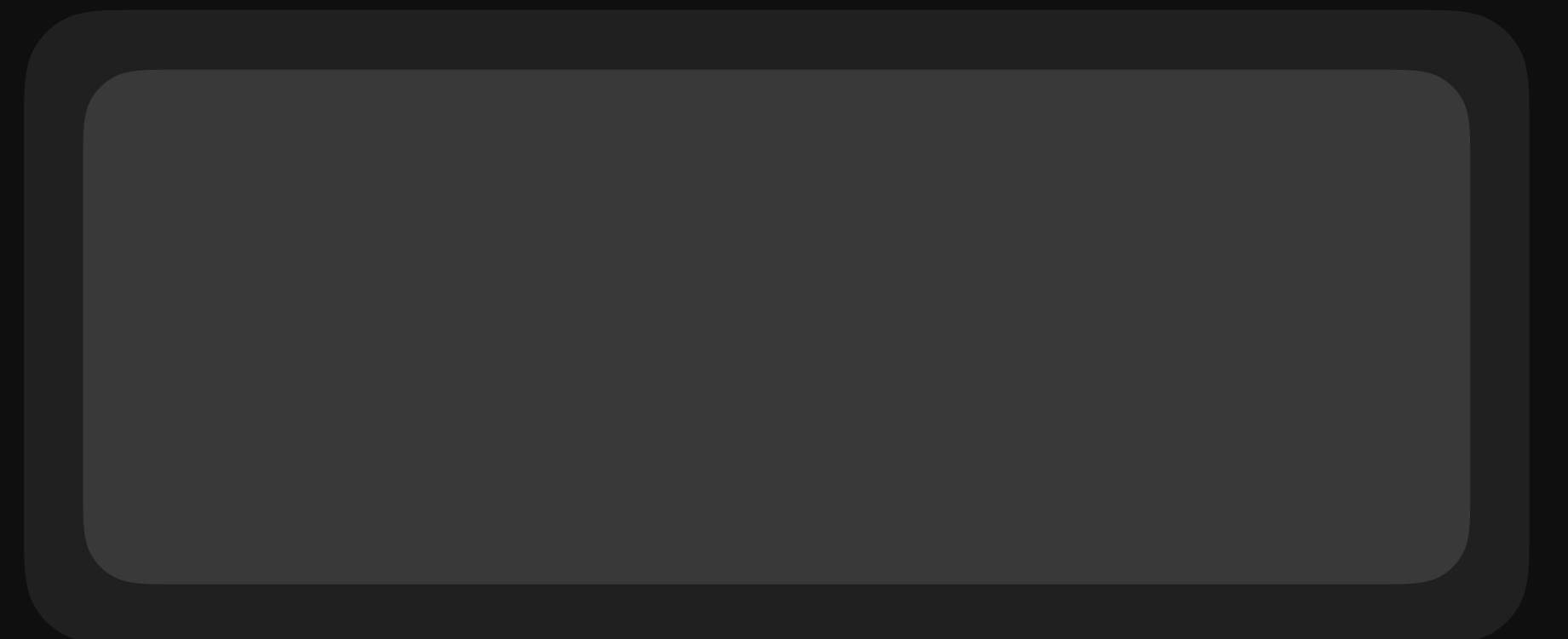


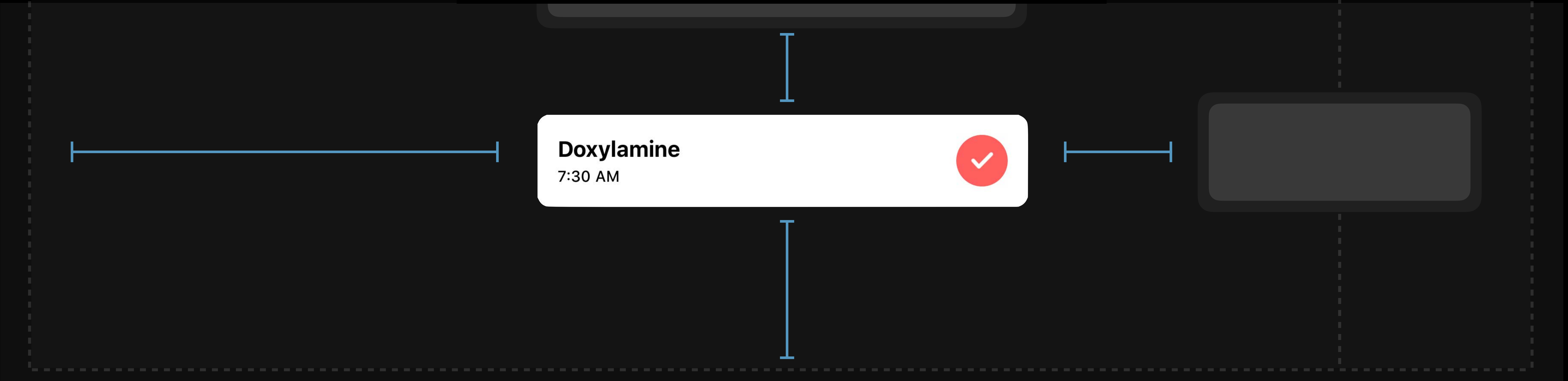
**Charts**



**Contacts**

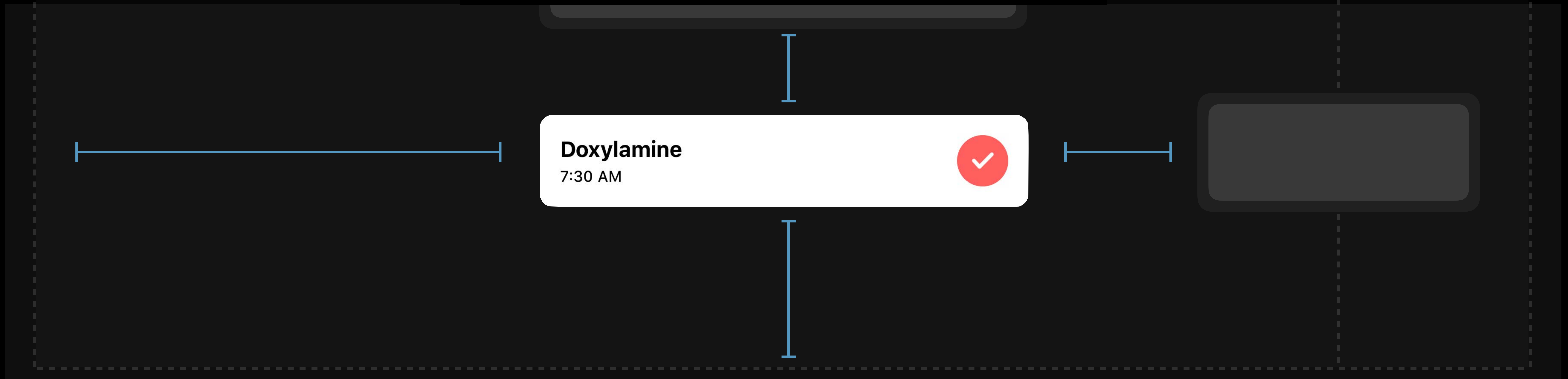
**Doxylamine**  
7:30 AM





```
import CareKitUI
```

```
let taskView = OCKSimpleTaskView()
```



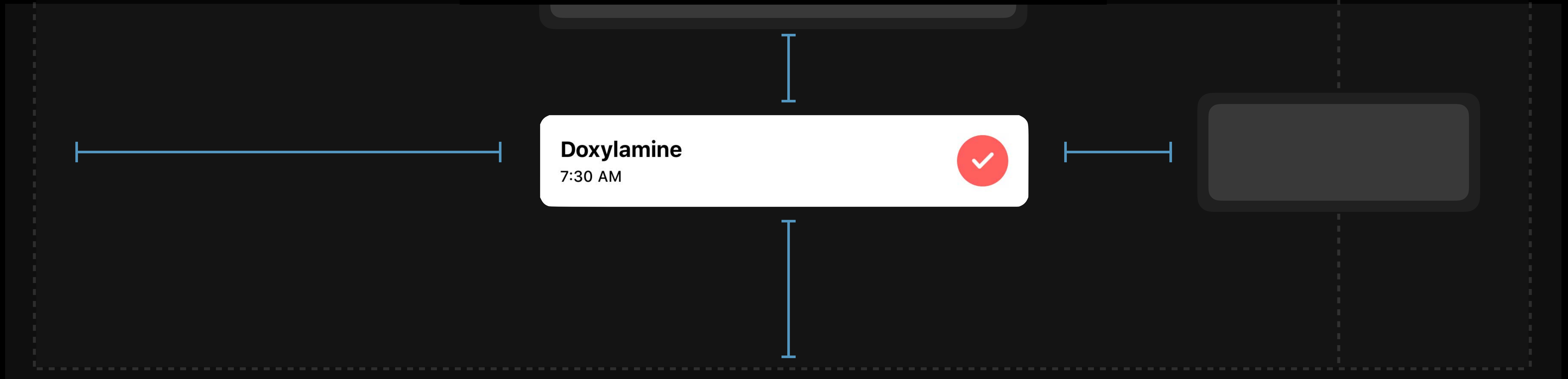
```
import CareKitUI
```

```
let taskView = OCKSimpleTaskView()
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "7:30 AM"
```



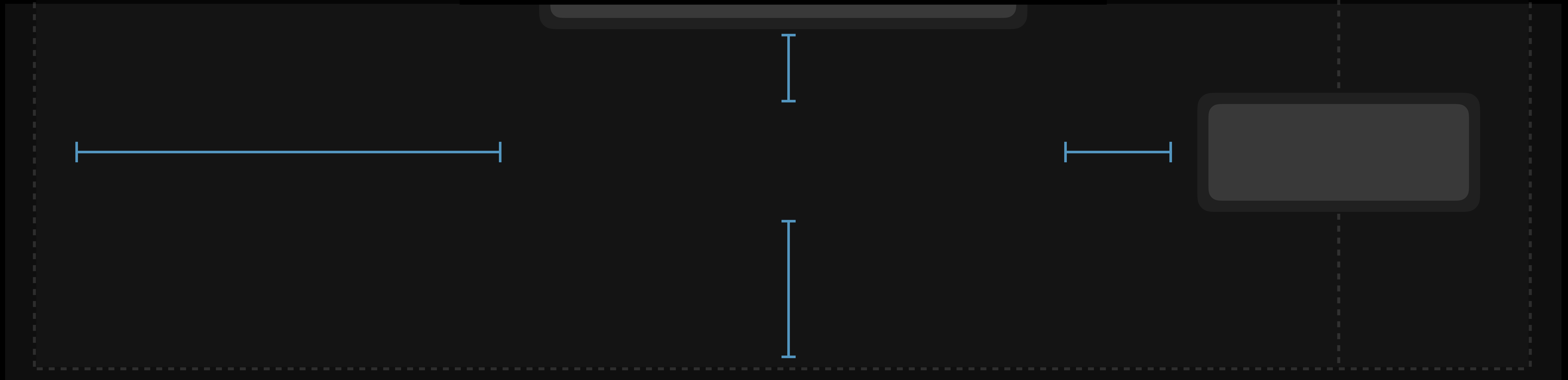


```
import CareKitUI
```

```
let taskView = OCKSimpleTaskView()
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "7:30 AM"
```

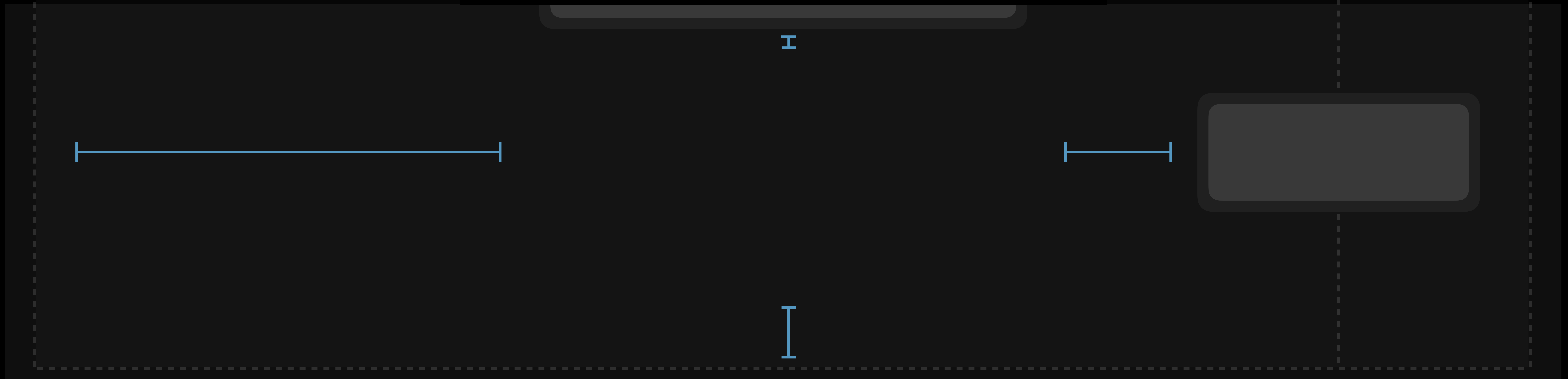


```
import CareKitUI
```

```
let taskView =
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "7:30 AM"
```

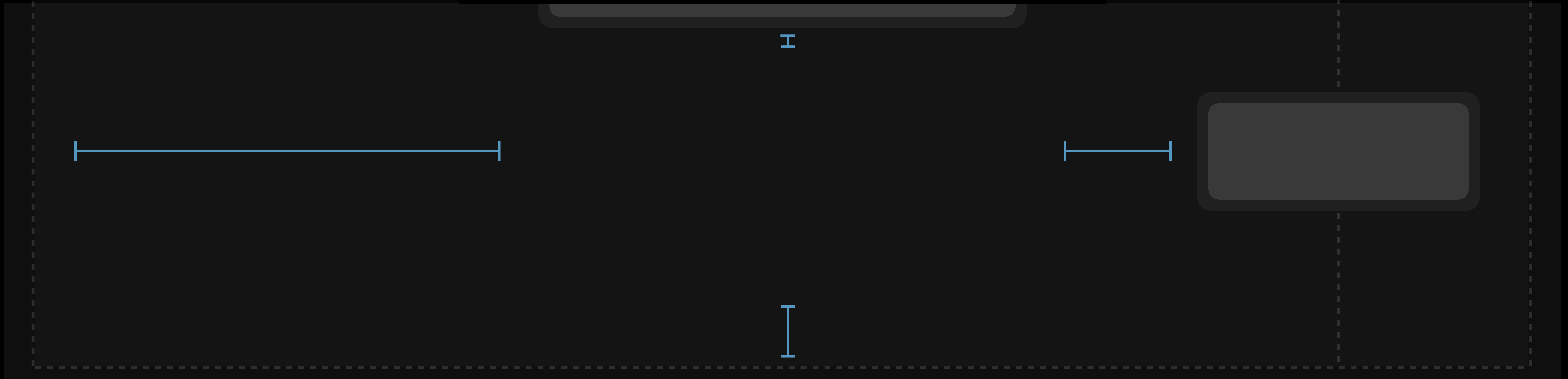


```
import CareKitUI
```

```
let taskView =
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "7:30 AM"
```

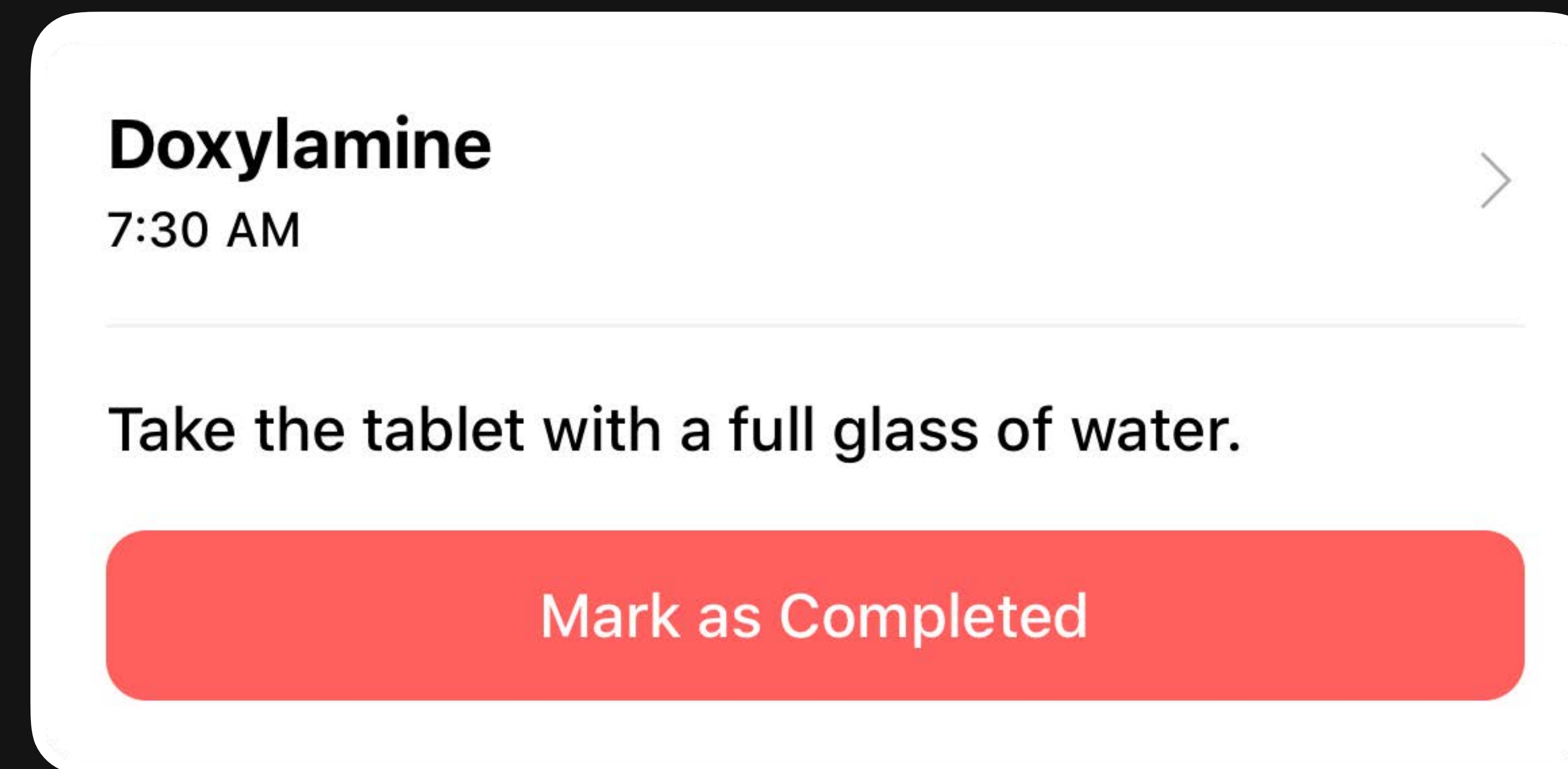


```
import CareKitUI
```

```
let taskView = OCKInstructionsTaskView()
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "7:30 AM"
```

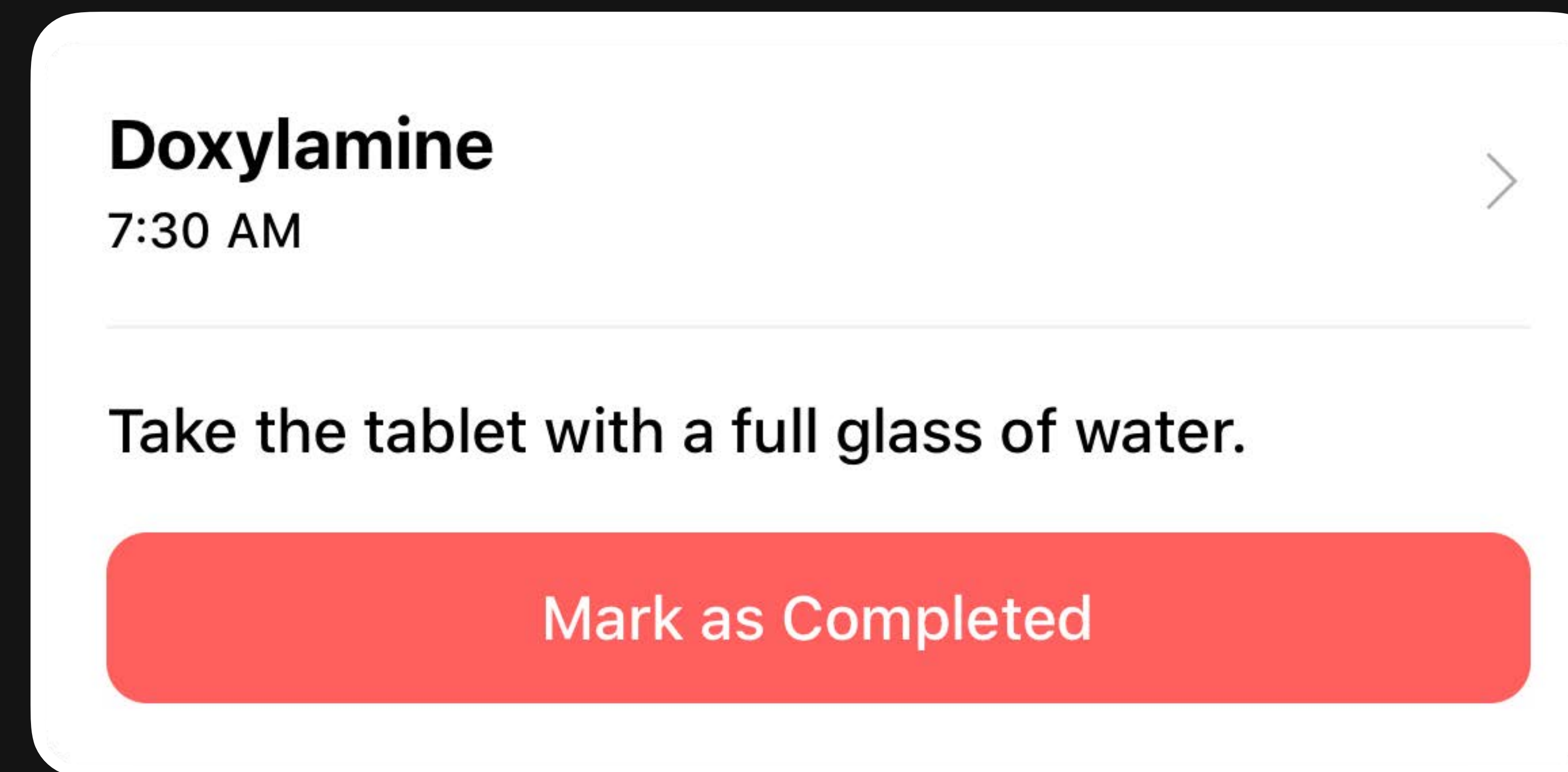


```
import CareKitUI
```

```
let taskView = OCKInstructionsTaskView()
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "7:30 AM"
```



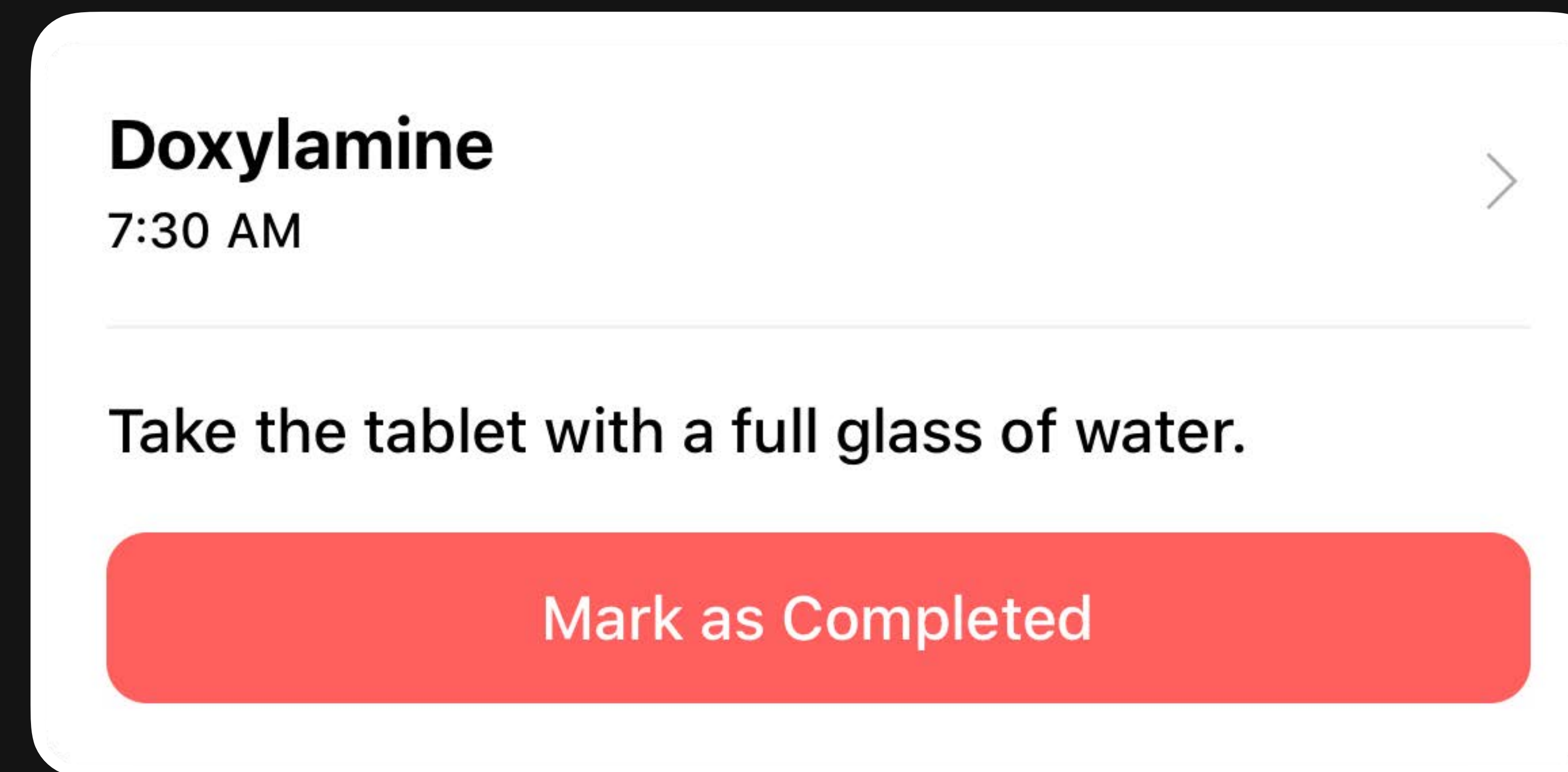
```
import CareKitUI
```

```
let taskView = OCKInstructionsTaskView()
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "7:30 AM"
```

```
taskView.instructionsLabel.text = "Take the tablet with a full glass of water."
```



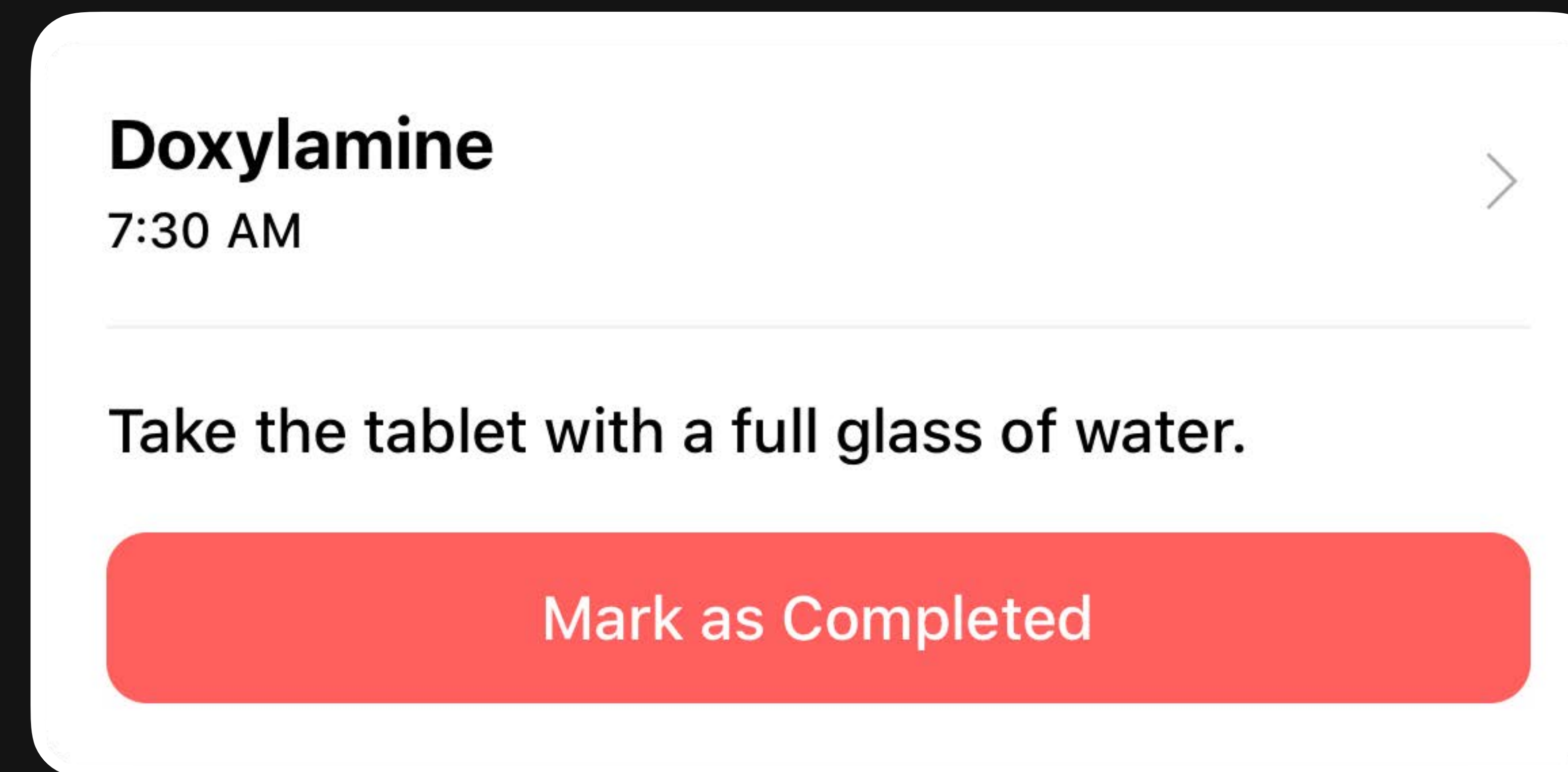
```
import CareKitUI
```

```
let taskView = OCKInstructionsTaskView()
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "7:30 AM"
```

```
taskView.instructionsLabel.text = "Take the tablet with a full glass of water."
```



```
import CareKitUI
```

```
let taskView =
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "7:30 AM"
```

```
taskView.instructionsLabel.text = "Take the tablet with a full glass of water."
```





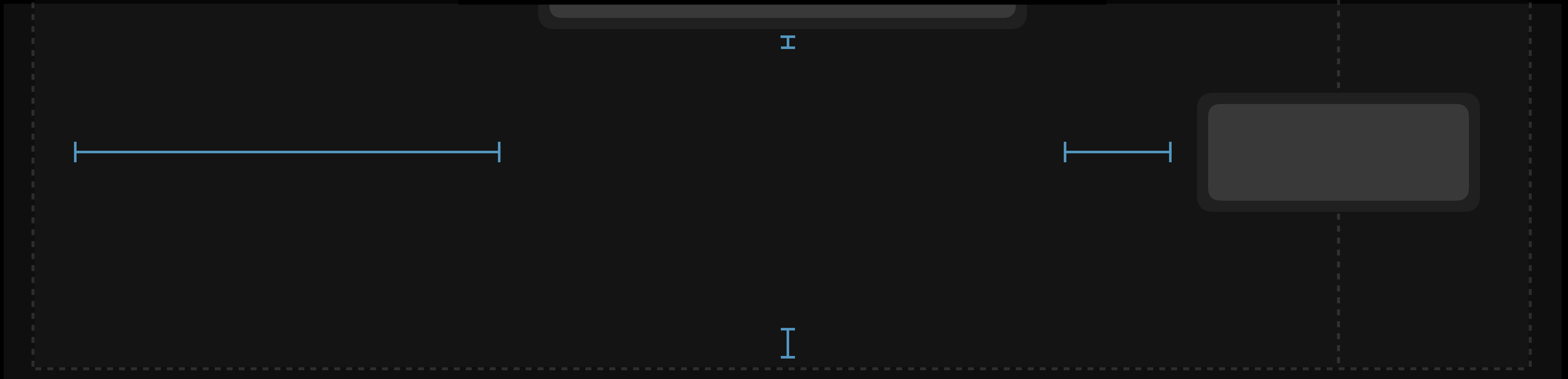
```
import CareKitUI
```

```
let taskView =
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "1 event remaining today"
```

```
taskView.instructionsLabel.text = "Take the tablet with a full glass of water."
```



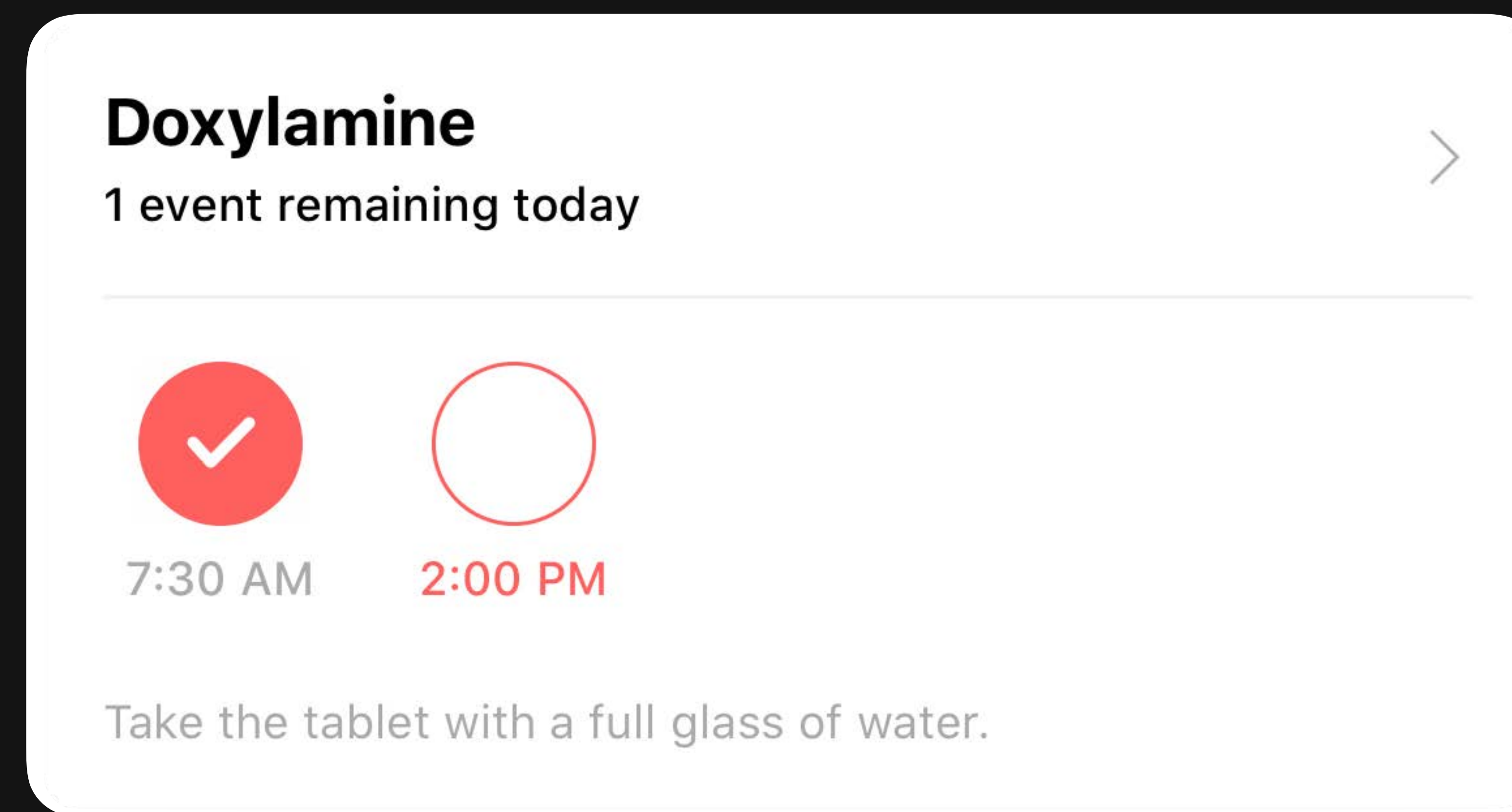
```
import CareKitUI
```

```
let taskView = OCKGridTaskView()
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "1 event remaining today"
```

```
taskView.instructionsLabel.text = "Take the tablet with a full glass of water."
```



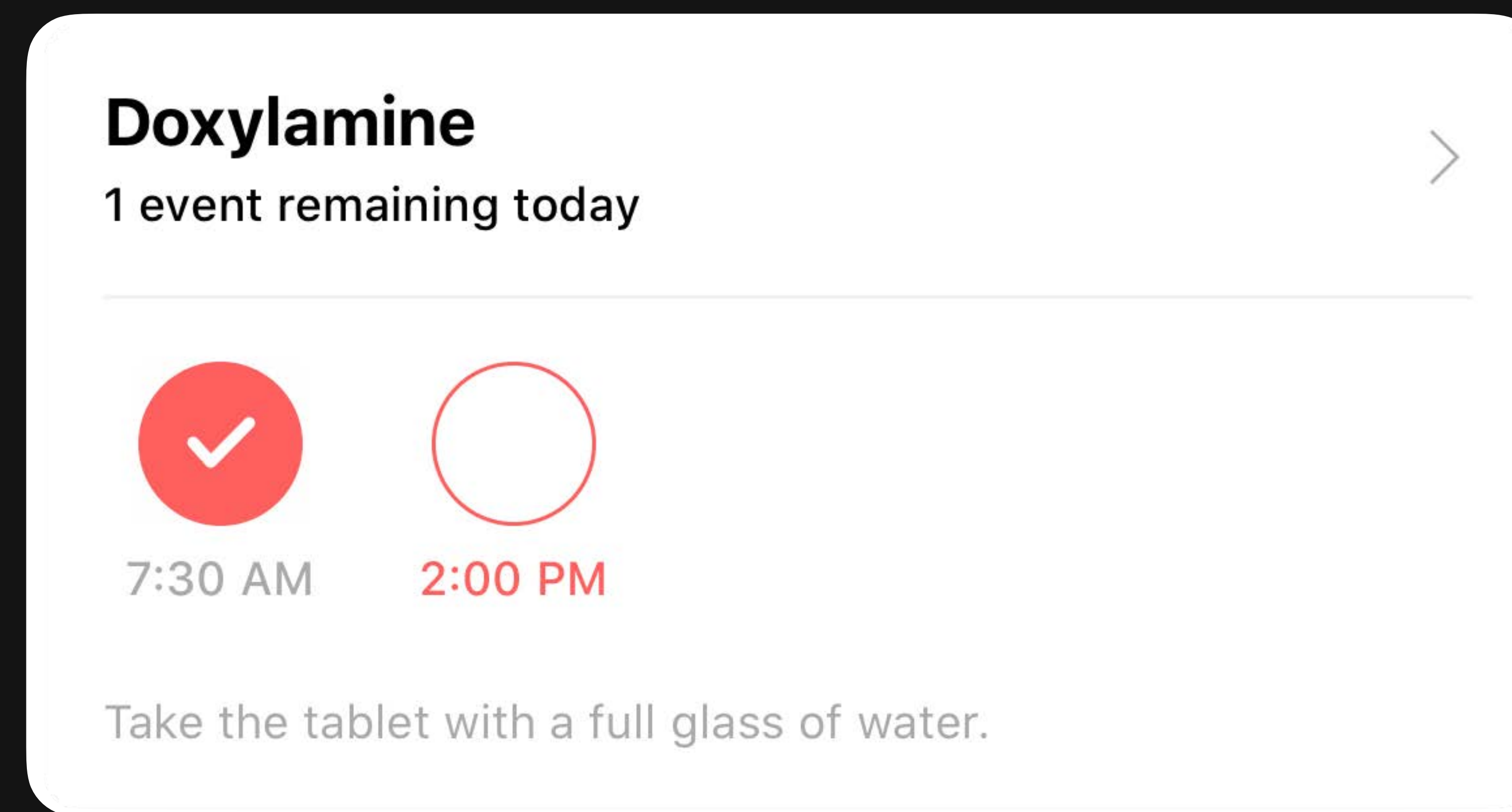
```
import CareKitUI
```

```
let taskView = OCKGridTaskView()
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "1 event remaining today"
```

```
taskView.instructionsLabel.text = "Take the tablet with a full glass of water."
```



```
import CareKitUI
```

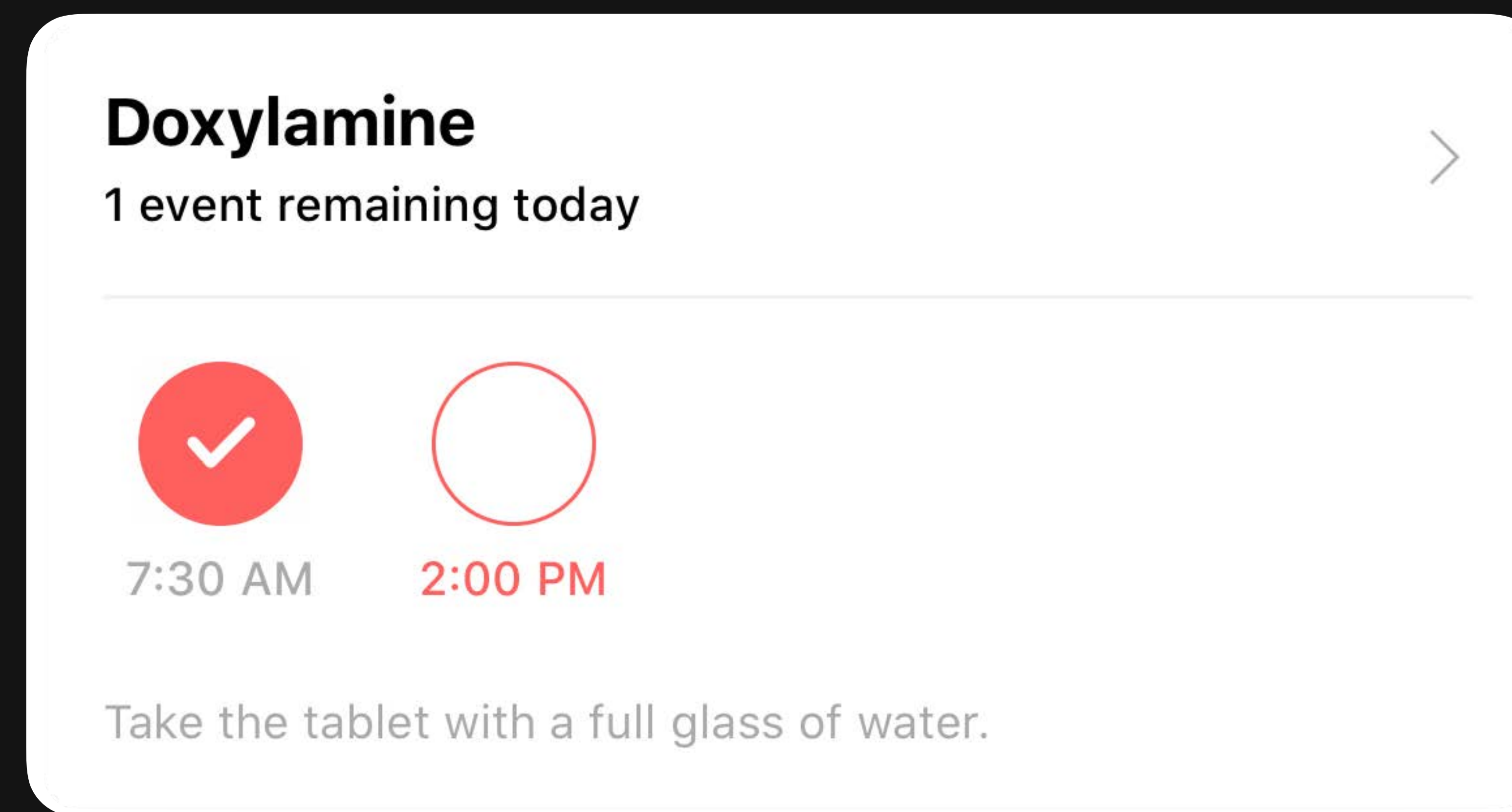
```
let taskView = OCKGridTaskView()
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "1 event remaining today"
```

```
taskView.instructionsLabel.text = "Take the tablet with a full glass of water."
```

```
taskView.collectionView.dataSource = self
```



```
import CareKitUI
```

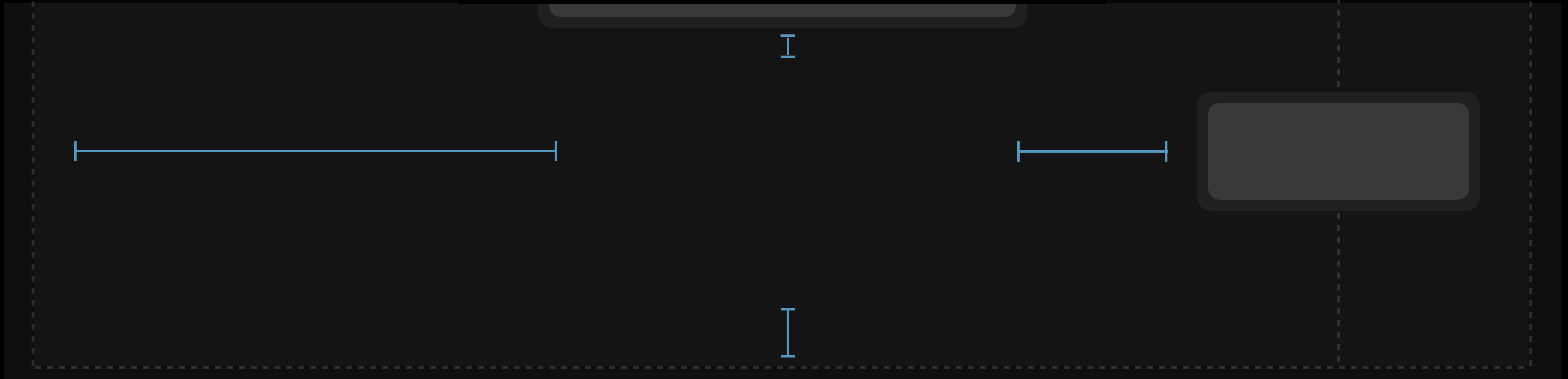
```
let taskView =
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "1 event remaining today"
```

```
taskView.instructionsLabel.text = "Take the tablet with a full glass of water."
```

```
taskView.collectionView.dataSource = self
```



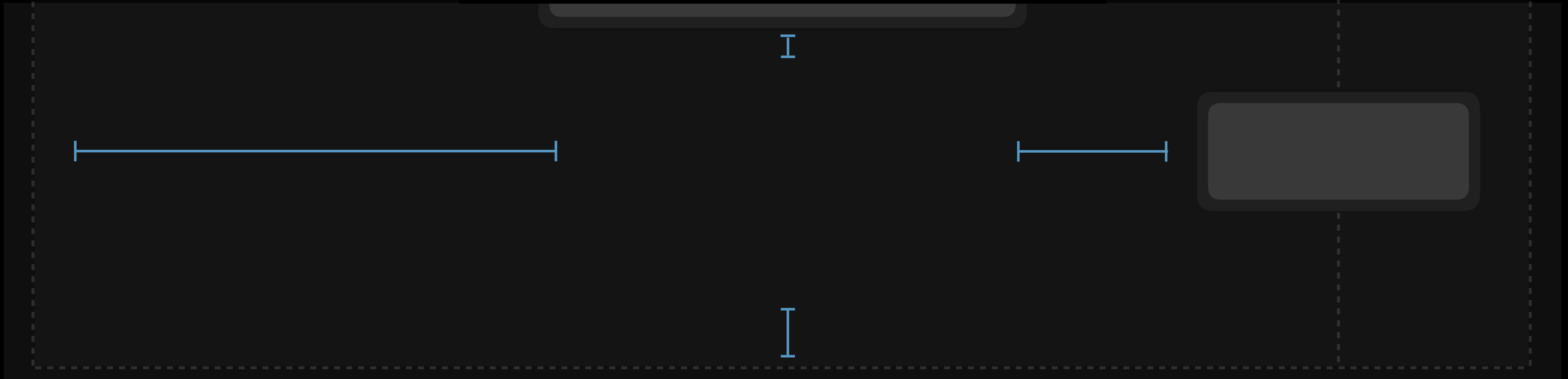
```
import CareKitUI
```

```
let taskView =
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "1 event remaining today"
```

```
taskView.instructionsLabel.text = "Take the tablet with a full glass of water."
```



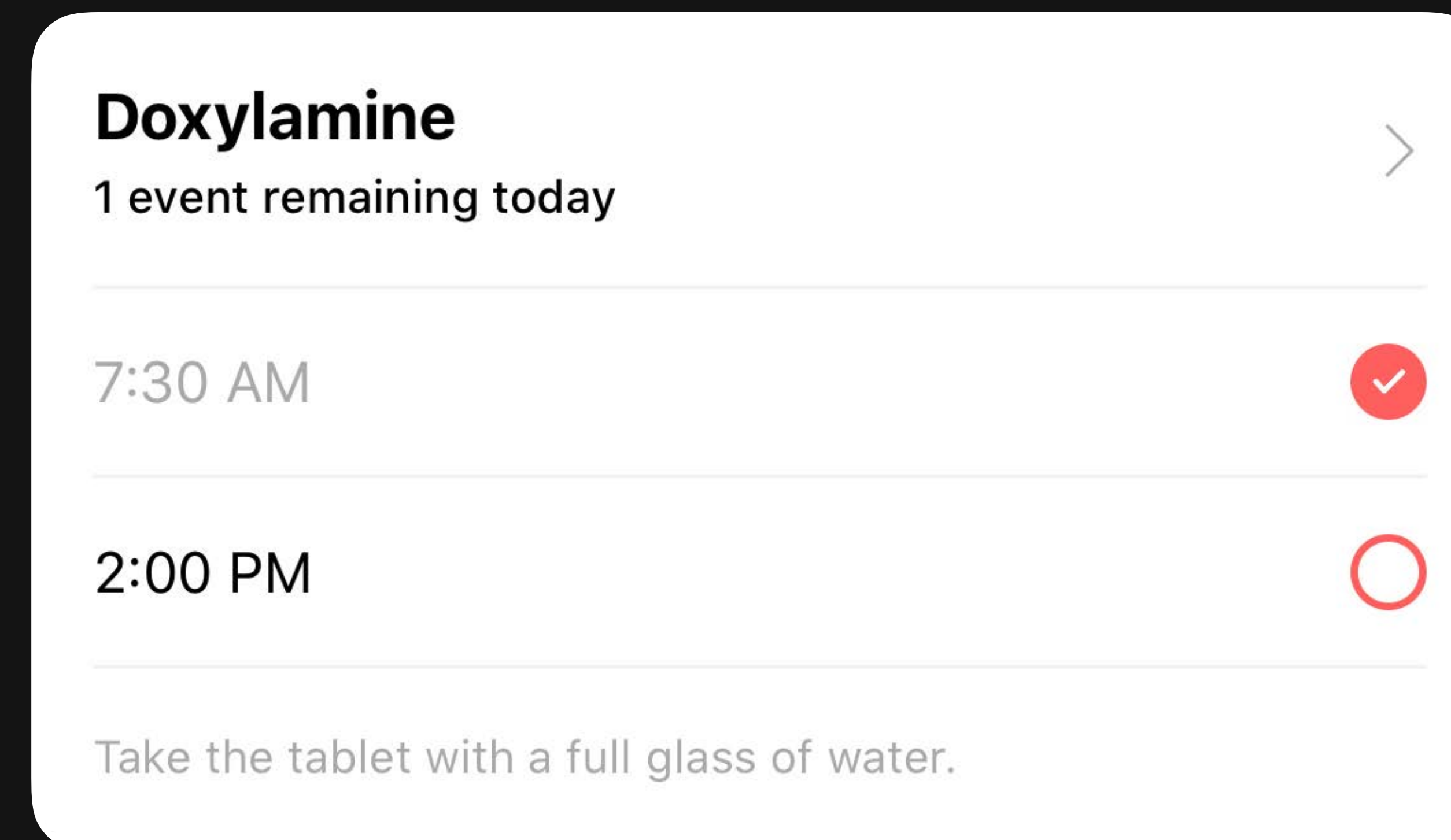
```
import CareKitUI
```

```
let taskView = OCKChecklistTaskView()
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "1 event remaining today"
```

```
taskView.instructionsLabel.text = "Take the tablet with a full glass of water."
```



```
import CareKitUI
```

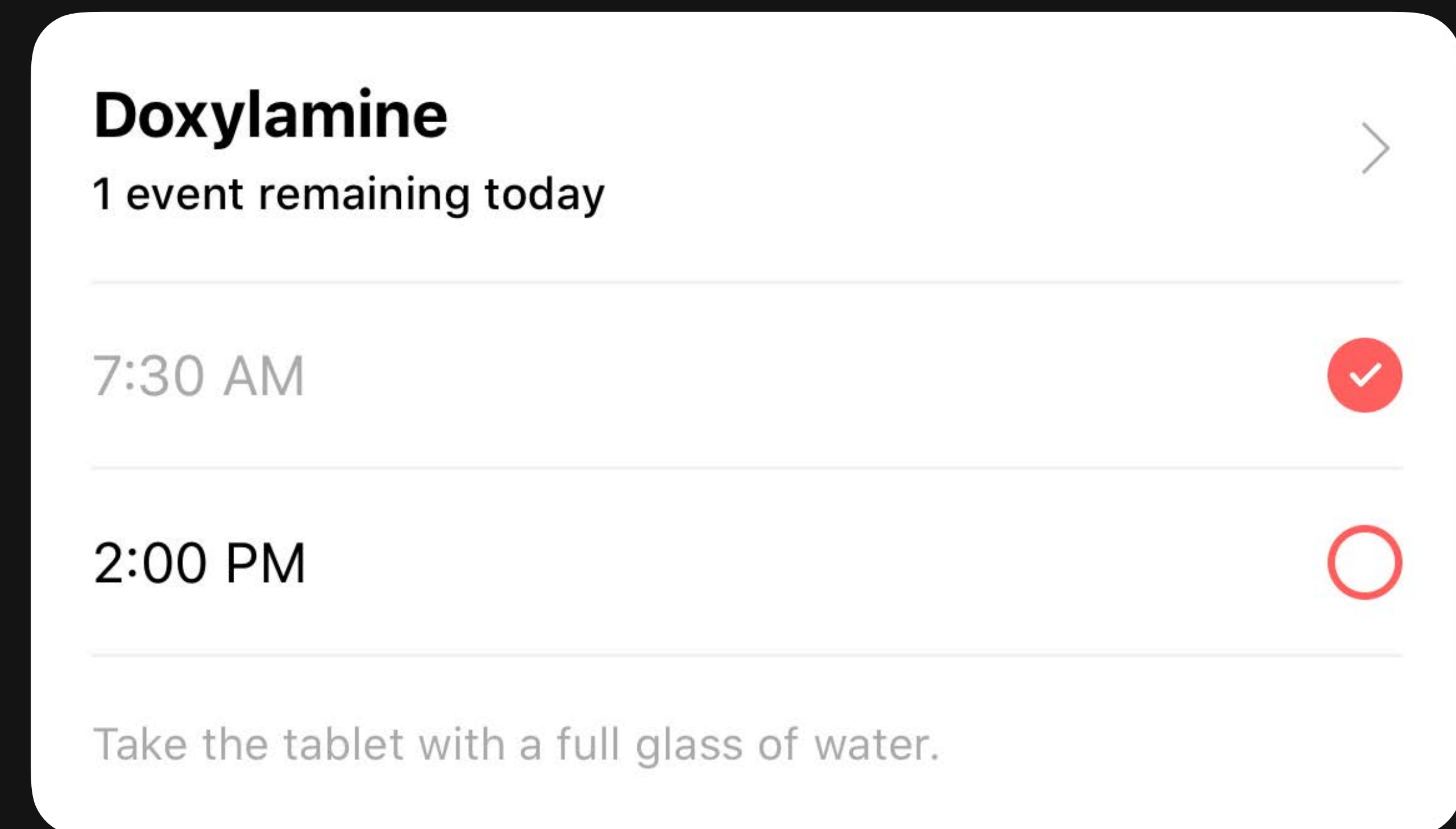
```
let taskView = OCKChecklistTaskView()
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "1 event remaining today"
```

```
taskView.instructionsLabel.text = "Take the tablet with a full glass of water."
```





```
import CareKitUI
```

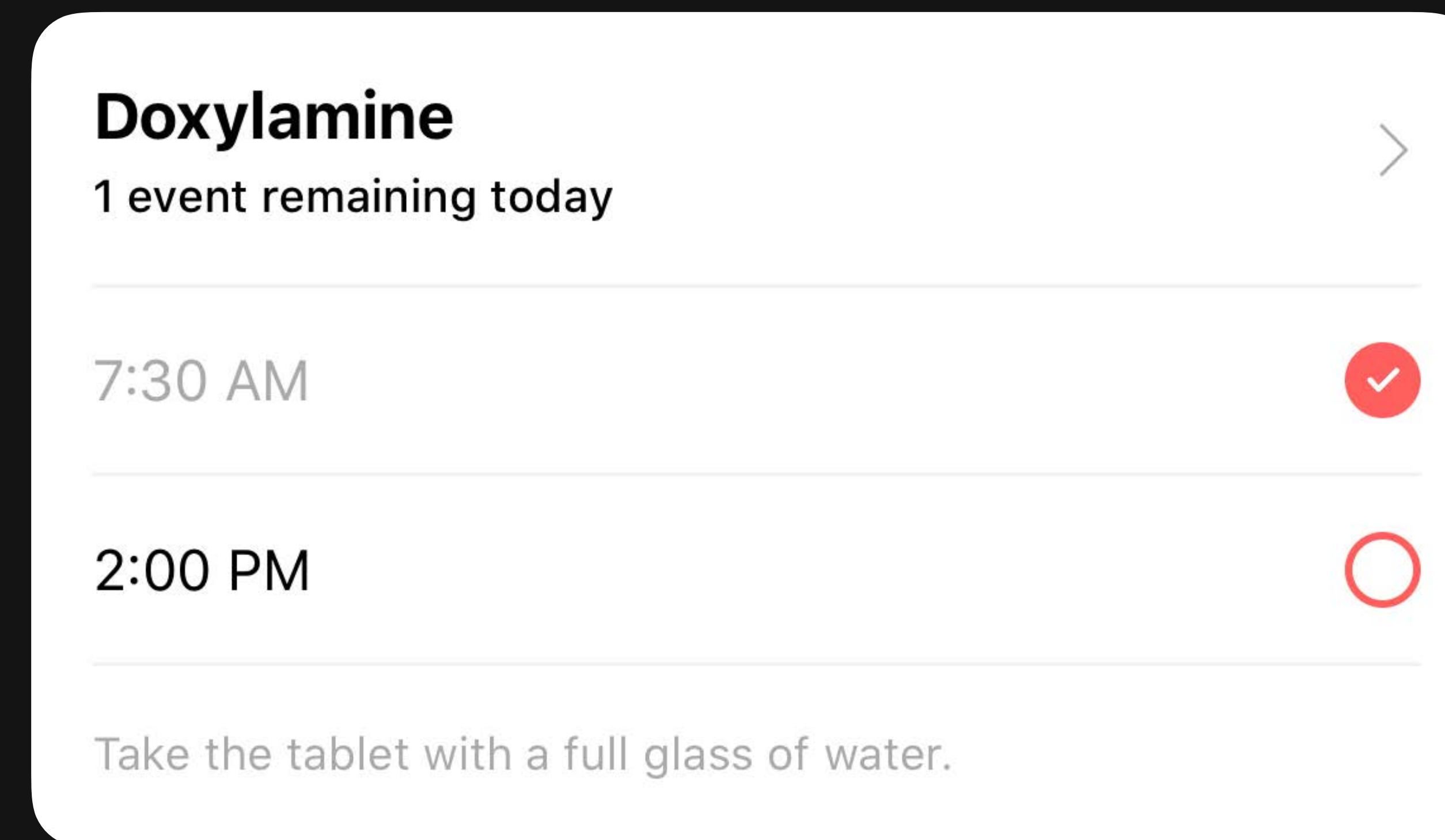
```
let taskView = OCKChecklistTaskView()
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "1 event remaining today"
```

```
taskView.instructionsLabel.text = "Take the tablet with a full glass of water."
```

```
taskView.appendItem(withTitle: "2:00 PM")
```



```
import CareKitUI
```

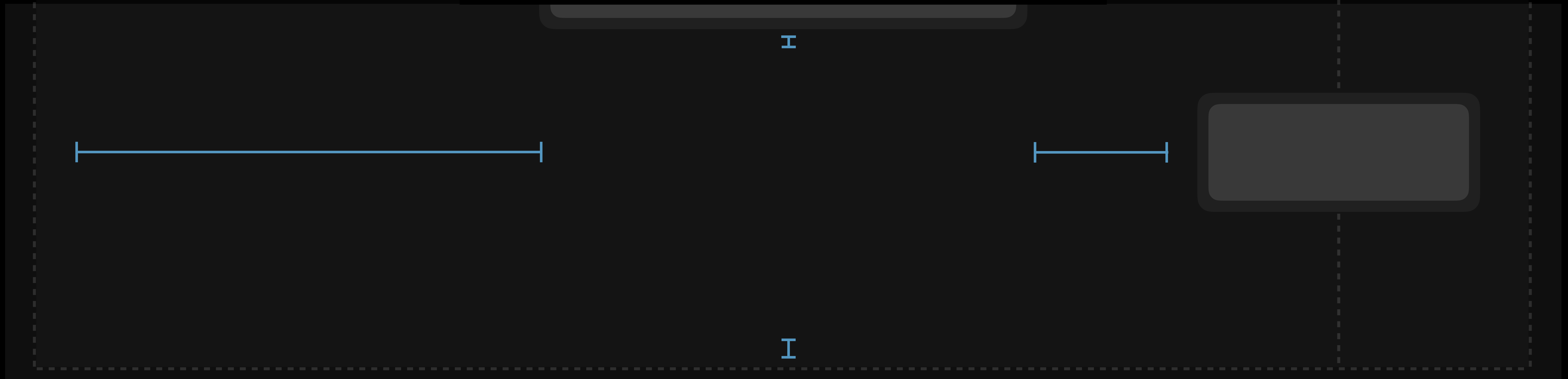
```
let taskView =
```

```
taskView.headerView.titleLabel.text = "Doxylamine"
```

```
taskView.headerView.detailLabel.text = "1 event remaining today"
```

```
taskView.instructionsLabel.text = "Take the tablet with a full glass of water."
```

```
taskView.appendItem(withTitle: "2:00 PM")
```



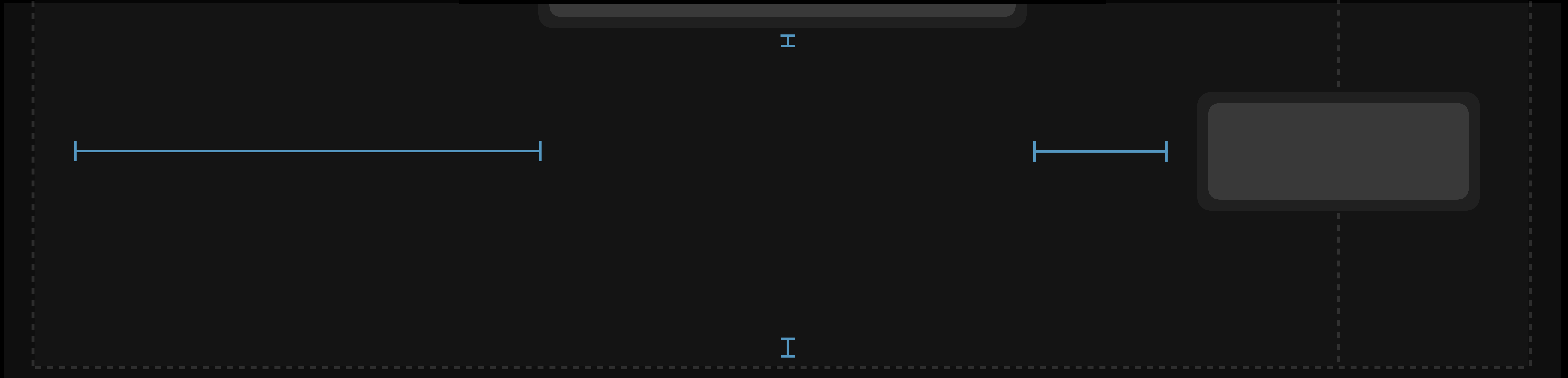
```
import CareKitUI
```

```
let taskView =
```

```
taskView.headerView.titleLabel.text = "Track your Nausea"
```

```
taskView.headerView.detailLabel.text = "Anytime today"
```

```
taskView.instructionsLabel.text = "Tap the button below anytime you experience nausea."
```



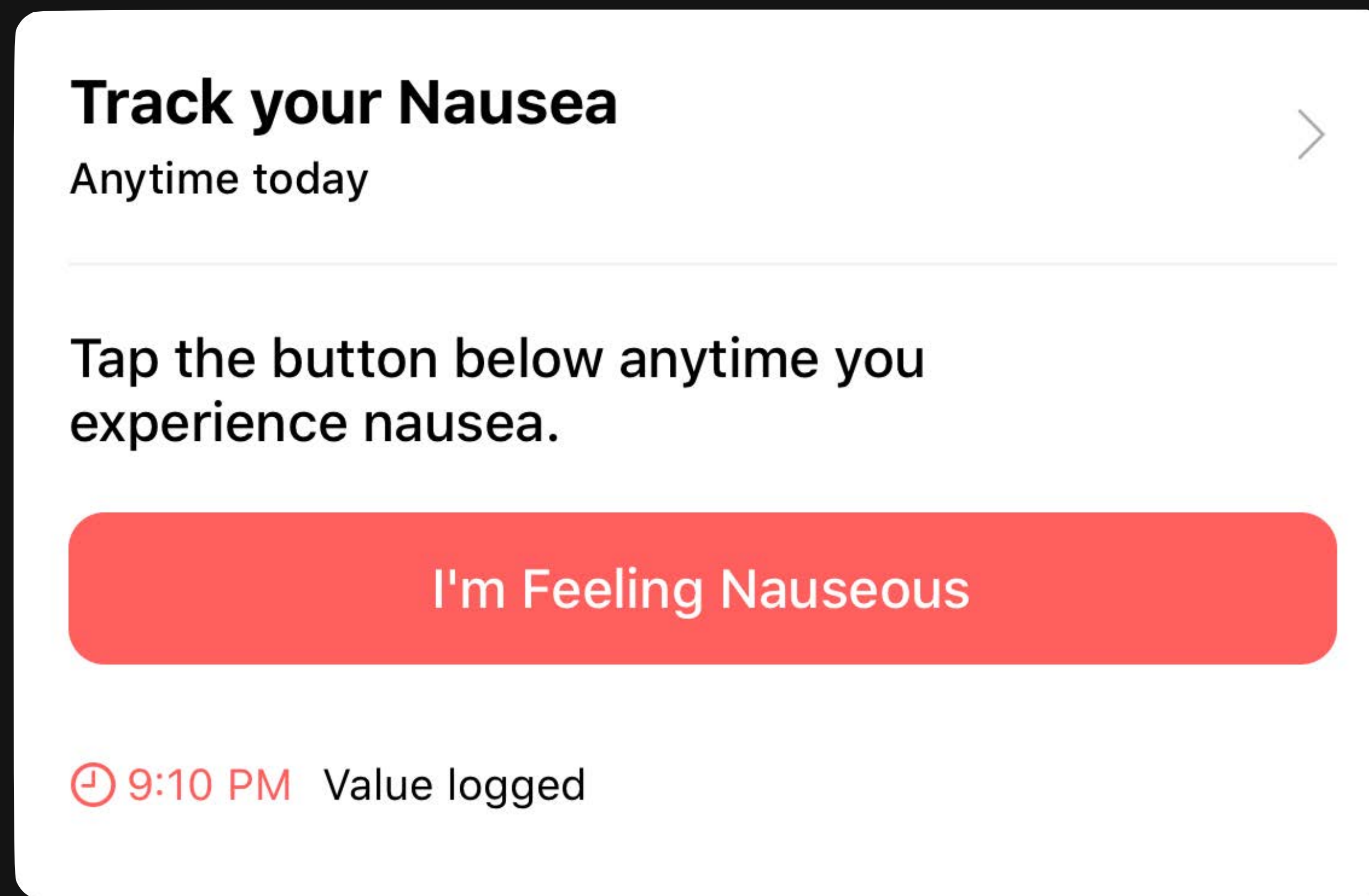
```
import CareKitUI
```

```
let taskView = OCKSimpleLogTaskView()
```

```
taskView.headerView.titleLabel.text = "Track your Nausea"
```

```
taskView.headerView.detailLabel.text = "Anytime today"
```

```
taskView.instructionsLabel.text = "Tap the button below anytime you experience nausea."
```



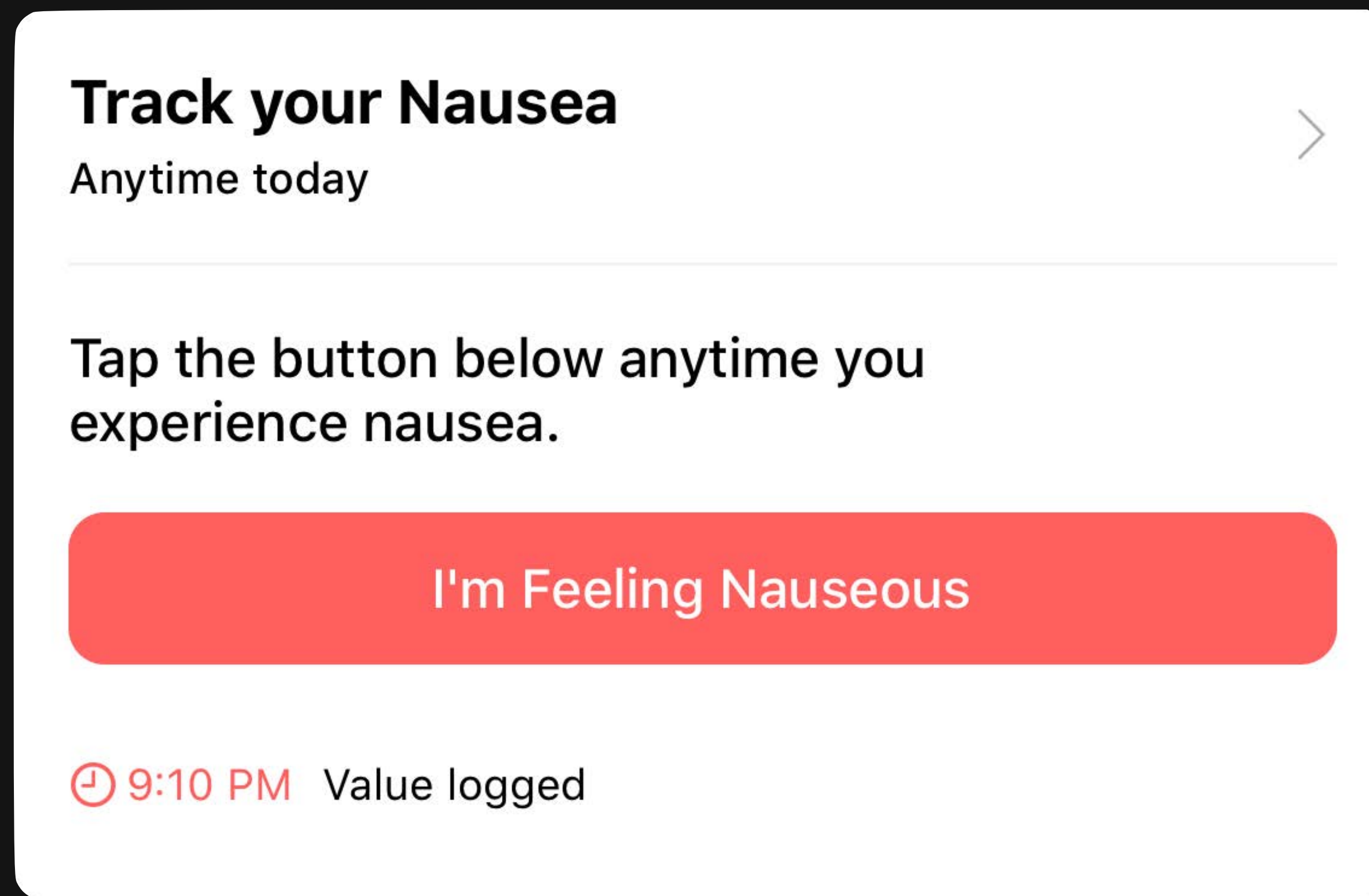
```
import CareKitUI
```

```
let taskView = OCKSimpleLogTaskView()
```

```
taskView.headerView.titleLabel.text = "Track your Nausea"
```

```
taskView.headerView.detailLabel.text = "Anytime today"
```

```
taskView.instructionsLabel.text = "Tap the button below anytime you experience nausea."
```



```
import CareKitUI
```

```
let taskView = OCKSimpleLogTaskView()
```

```
taskView.headerView.titleLabel.text = "Track your Nausea"
```

```
taskView.headerView.detailLabel.text = "Anytime today"
```

```
taskView.instructionsLabel.text = "Tap the button below anytime you experience nausea."
```

```
taskView.appendItem(withTitle: "9:10 PM", detail: "Value logged")
```



**Tasks**



**Charts**



**Contacts**



Tasks

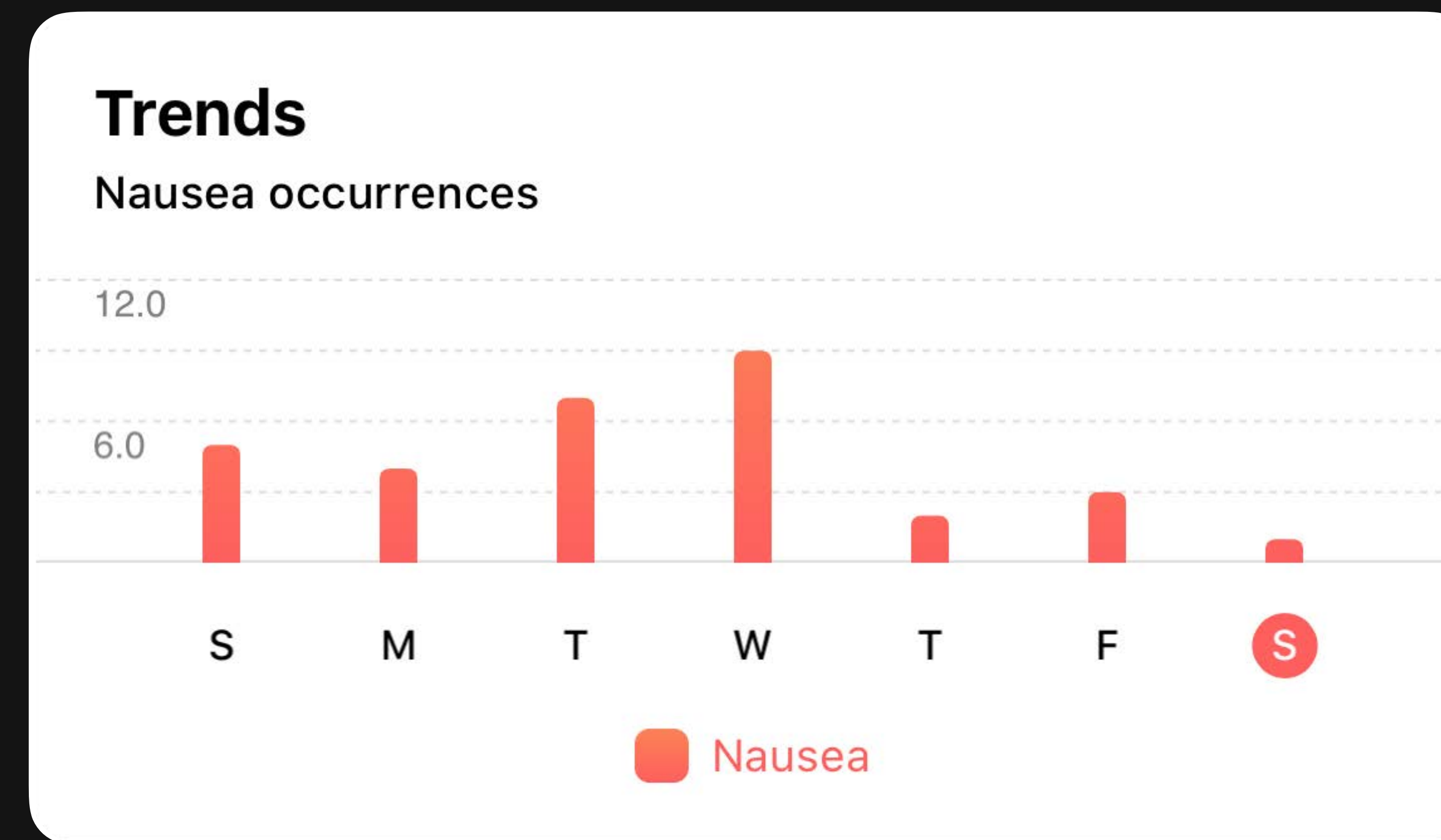


Charts



Contacts





```
import CareKitUI
```

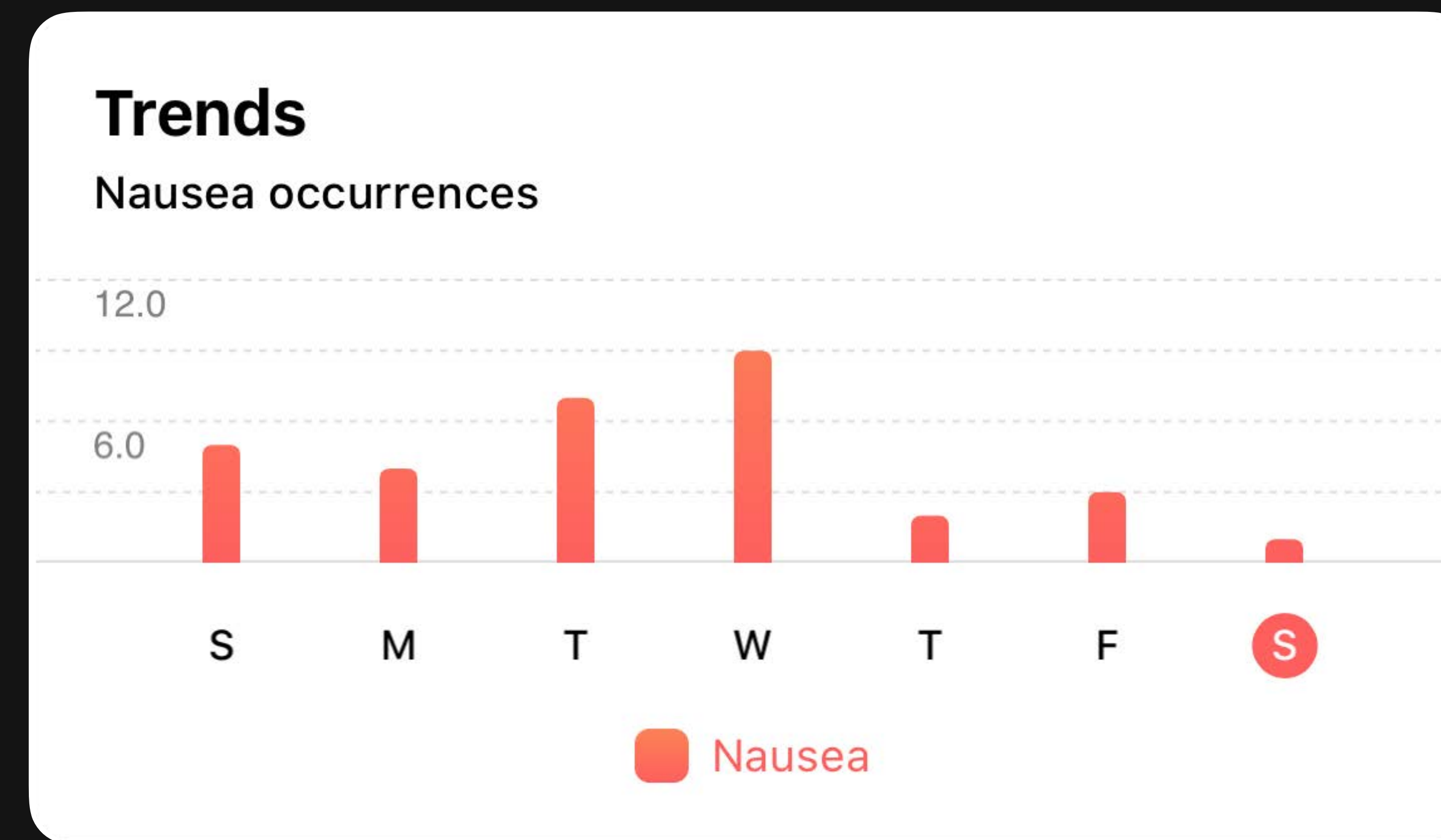
```
let chartView = OCKCartesianChartView(type:.bar)
```

```
chartView.headerView.titleLabel.text = "Trends"
```

```
chartView.headerView.detailLabel.text = "Nausea occurrences"
```

```
chartView.horizontalAxisMarkers = ["S", "M", "T", "W", "T", "F", "S"]
```

```
chartView.dataSeries = [OCKDataSeries(values: [5, 4, 7, 9, 2, 3, 1], title: "Nausea")]
```



```
import CareKitUI
```

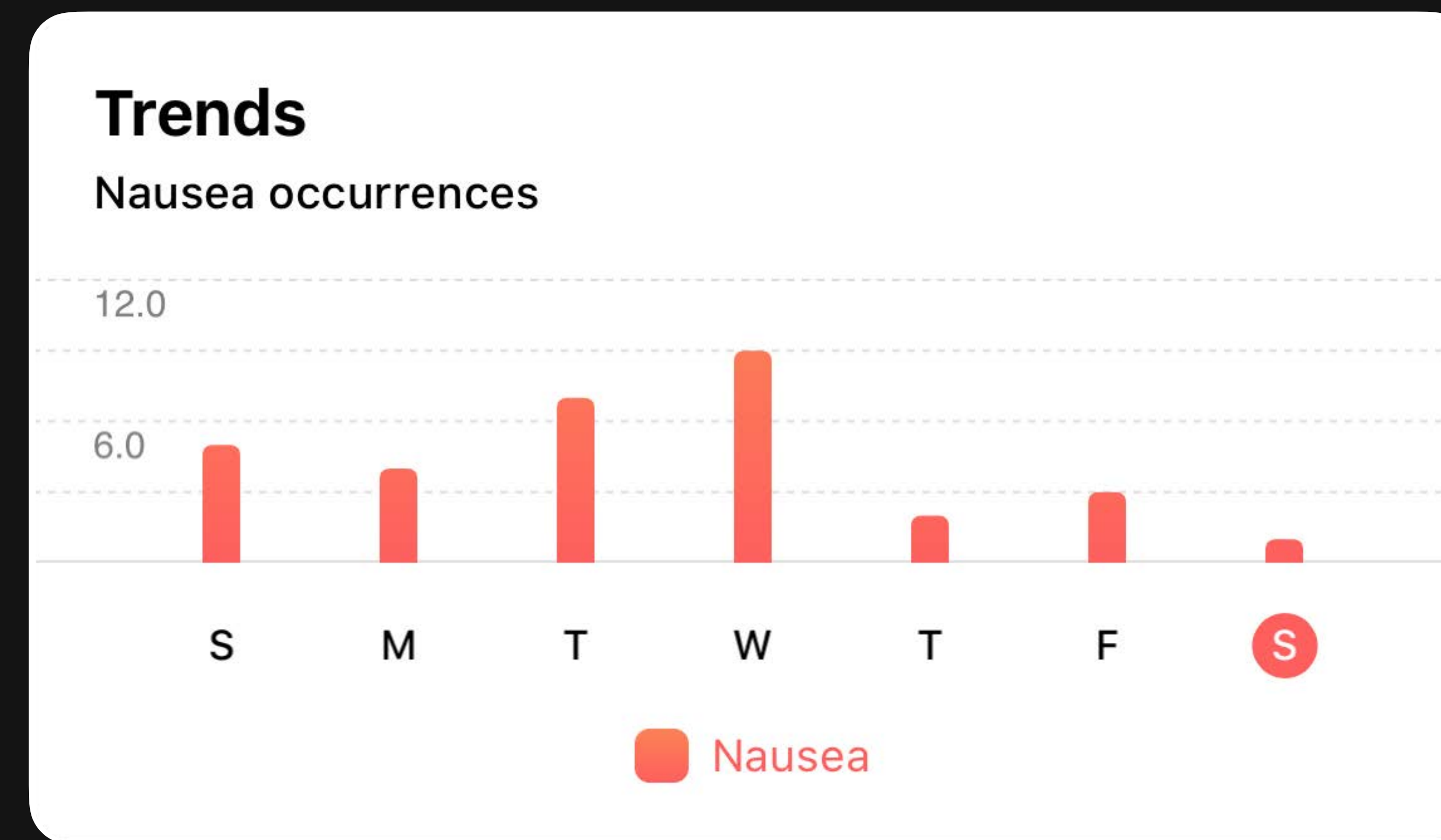
```
let chartView = OCKCartesianChartView(type:.bar)
```

```
chartView.headerView.titleLabel.text = "Trends"
```

```
chartView.headerView.detailLabel.text = "Nausea occurrences"
```

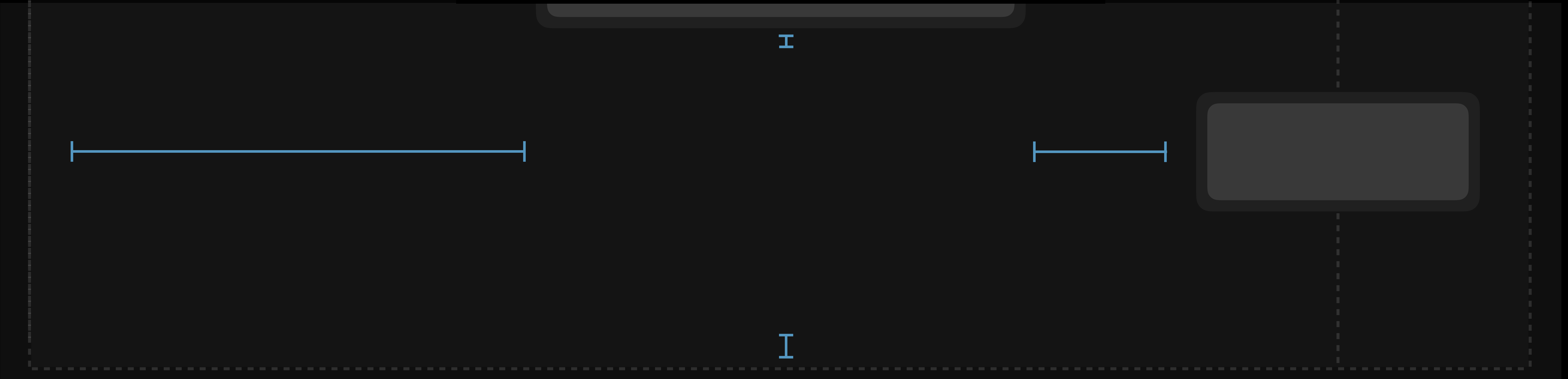
```
chartView.horizontalAxisMarkers = ["S", "M", "T", "W", "T", "F", "S"]
```

```
chartView.dataSeries = [OCKDataSeries(values: [5, 4, 7, 9, 2, 3, 1], title: "Nausea")]
```



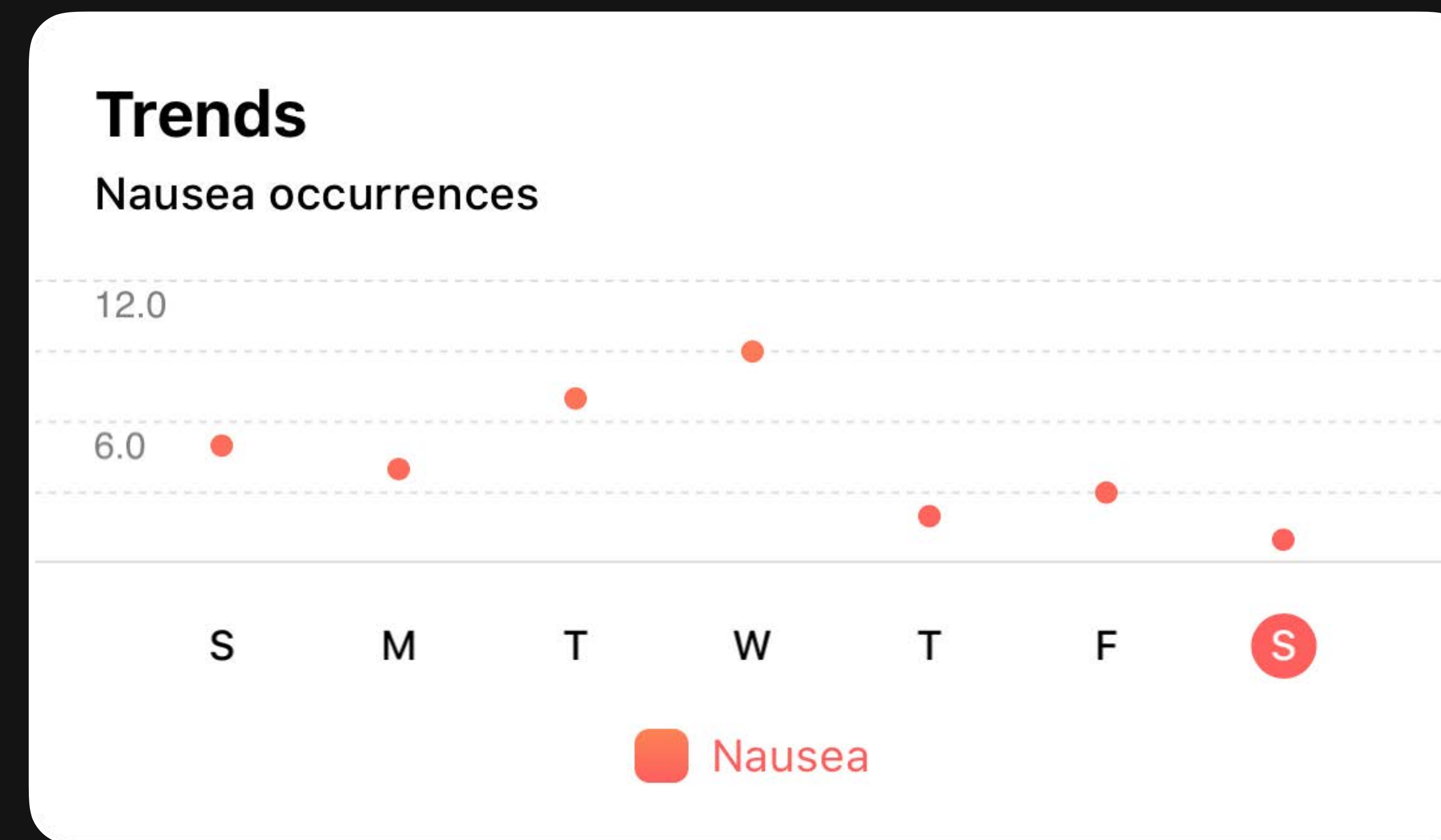
```
import CareKitUI
```

```
let chartView = OCKCartesianChartView(type:  
chartView.headerView.titleLabel.text = "Trends"  
chartView.headerView.detailLabel.text = "Nausea occurrences"  
chartView.horizontalAxisMarkers = ["S", "M", "T", "W", "T", "F", "S"]  
chartView.dataSeries = [OCKDataSeries(values: [5, 4, 7, 9, 2, 3, 1], title: "Nausea")]
```



```
import CareKitUI
```

```
let chartView = OCKCartesianChartView(type:  
chartView.headerView.titleLabel.text = "Trends"  
chartView.headerView.detailLabel.text = "Nausea occurrences"  
chartView.horizontalAxisMarkers = ["S", "M", "T", "W", "T", "F", "S"]  
chartView.dataSeries = [OCKDataSeries(values: [5, 4, 7, 9, 2, 3, 1], title: "Nausea")]
```



```
import CareKitUI
```

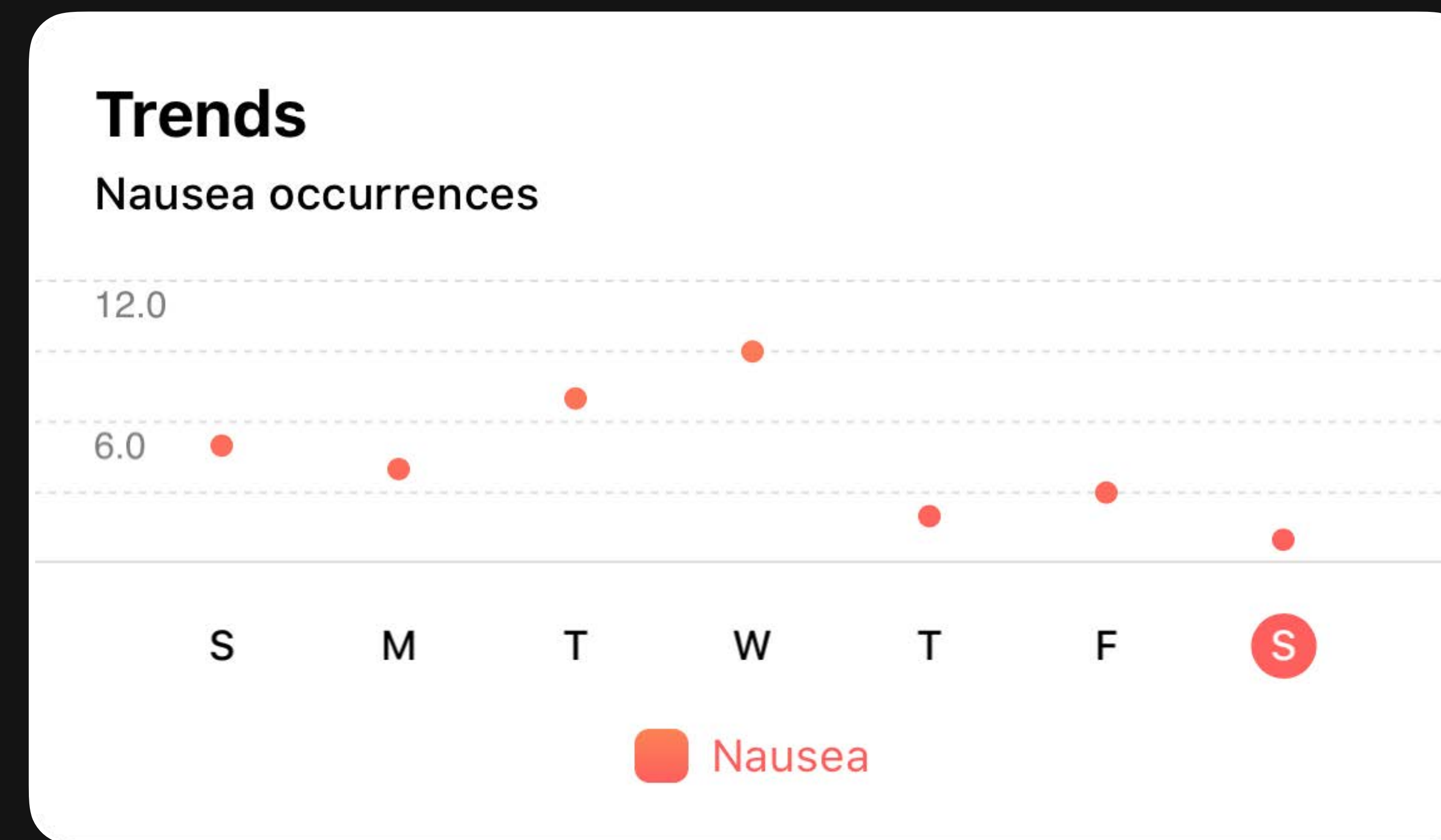
```
let chartView = OCKCartesianChartView(type:.scatter)
```

```
chartView.headerView.titleLabel.text = "Trends"
```

```
chartView.headerView.detailLabel.text = "Nausea occurrences"
```

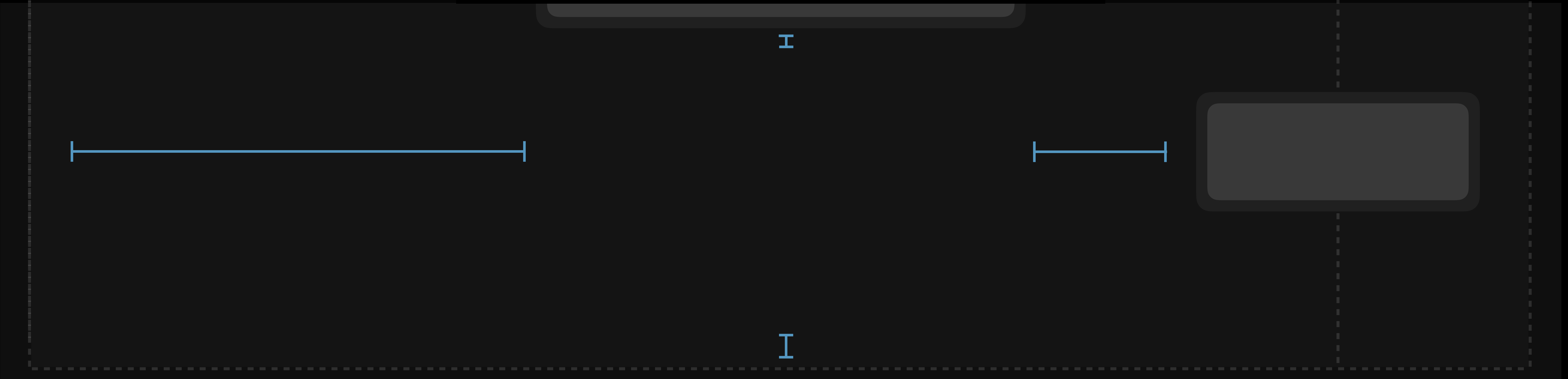
```
chartView.horizontalAxisMarkers = ["S", "M", "T", "W", "T", "F", "S"]
```

```
chartView.dataSeries = [OCKDataSeries(values: [5, 4, 7, 9, 2, 3, 1], title: "Nausea")]
```



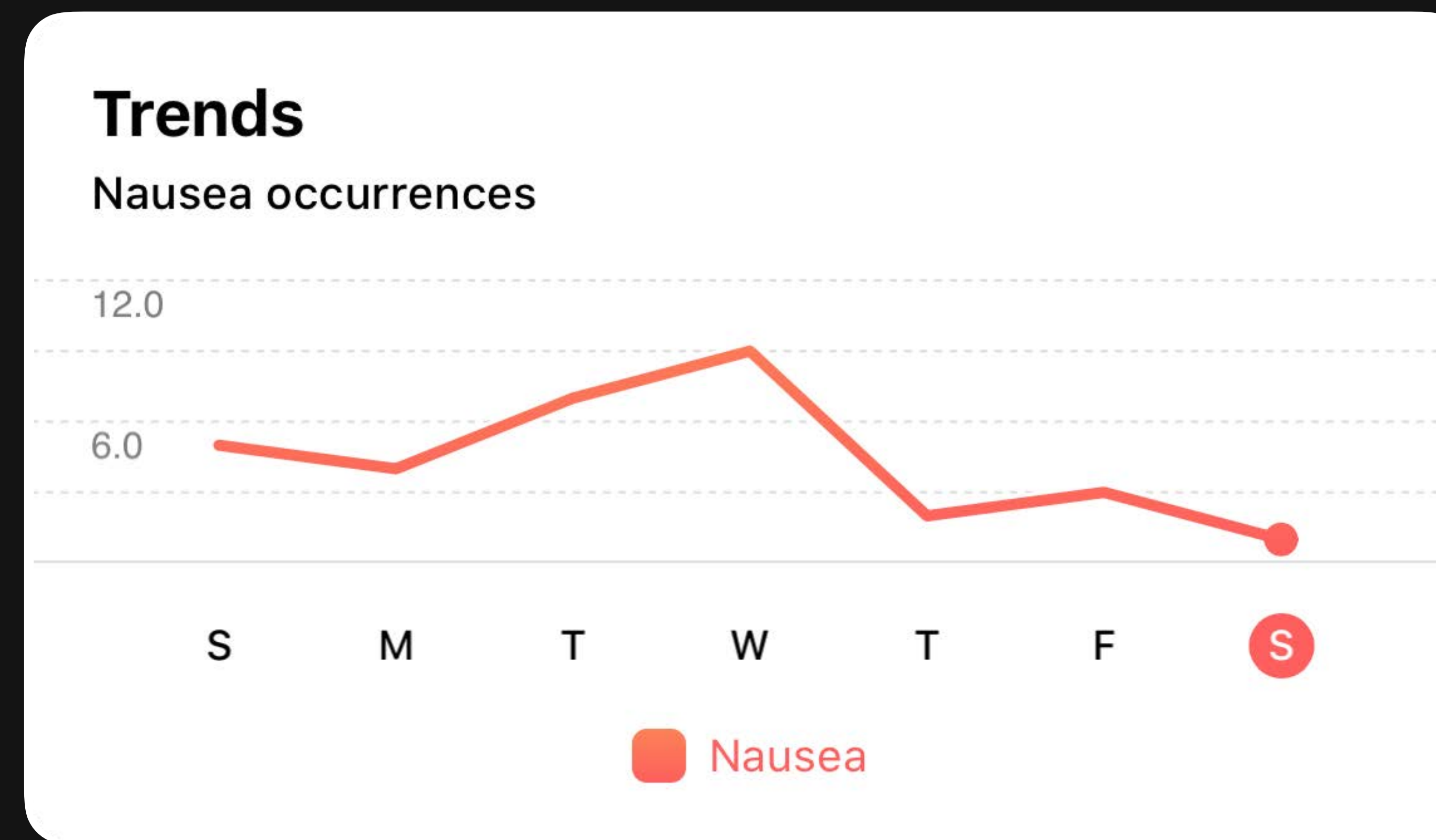
```
import CareKitUI
```

```
let chartView = OCKCartesianChartView(type:  
chartView.headerView.titleLabel.text = "Trends"  
chartView.headerView.detailLabel.text = "Nausea occurrences"  
chartView.horizontalAxisMarkers = ["S", "M", "T", "W", "T", "F", "S"]  
chartView.dataSeries = [OCKDataSeries(values: [5, 4, 7, 9, 2, 3, 1], title: "Nausea")]
```



```
import CareKitUI
```

```
let chartView = OCKCartesianChartView(type:  
chartView.headerView.titleLabel.text = "Trends"  
chartView.headerView.detailLabel.text = "Nausea occurrences"  
chartView.horizontalAxisMarkers = ["S", "M", "T", "W", "T", "F", "S"]  
chartView.dataSeries = [OCKDataSeries(values: [5, 4, 7, 9, 2, 3, 1], title: "Nausea")]
```



```
import CareKitUI
```

```
let chartView = OCKCartesianChartView(type:.line)
```

```
chartView.headerView.titleLabel.text = "Trends"
```

```
chartView.headerView.detailLabel.text = "Nausea occurrences"
```

```
chartView.horizontalAxisMarkers = ["S", "M", "T", "W", "T", "F", "S"]
```

```
chartView.dataSeries = [OCKDataSeries(values: [5, 4, 7, 9, 2, 3, 1], title: "Nausea")]
```





Tasks



Charts



Contacts



**Tasks**



**Charts**



**Contacts**



```
import CareKitUI
```

```
let contactView = OCKContactCardView()
```

```
contactView.headerView.titleLabel.text = "Matthew Reiff"
```

```
contactView.headerView.detailLabel.text = "Family Practice"
```

```
contactView.headerView.iconImageView.image = UIImage(named: "matthew")
```

```
contactView.instructionsLabel.text = "Dr. Reiff is an OBGYN with 13 years of experience."
```

```
contactView.callButton.setTitle("Call", for: .normal)
```



**Tasks**

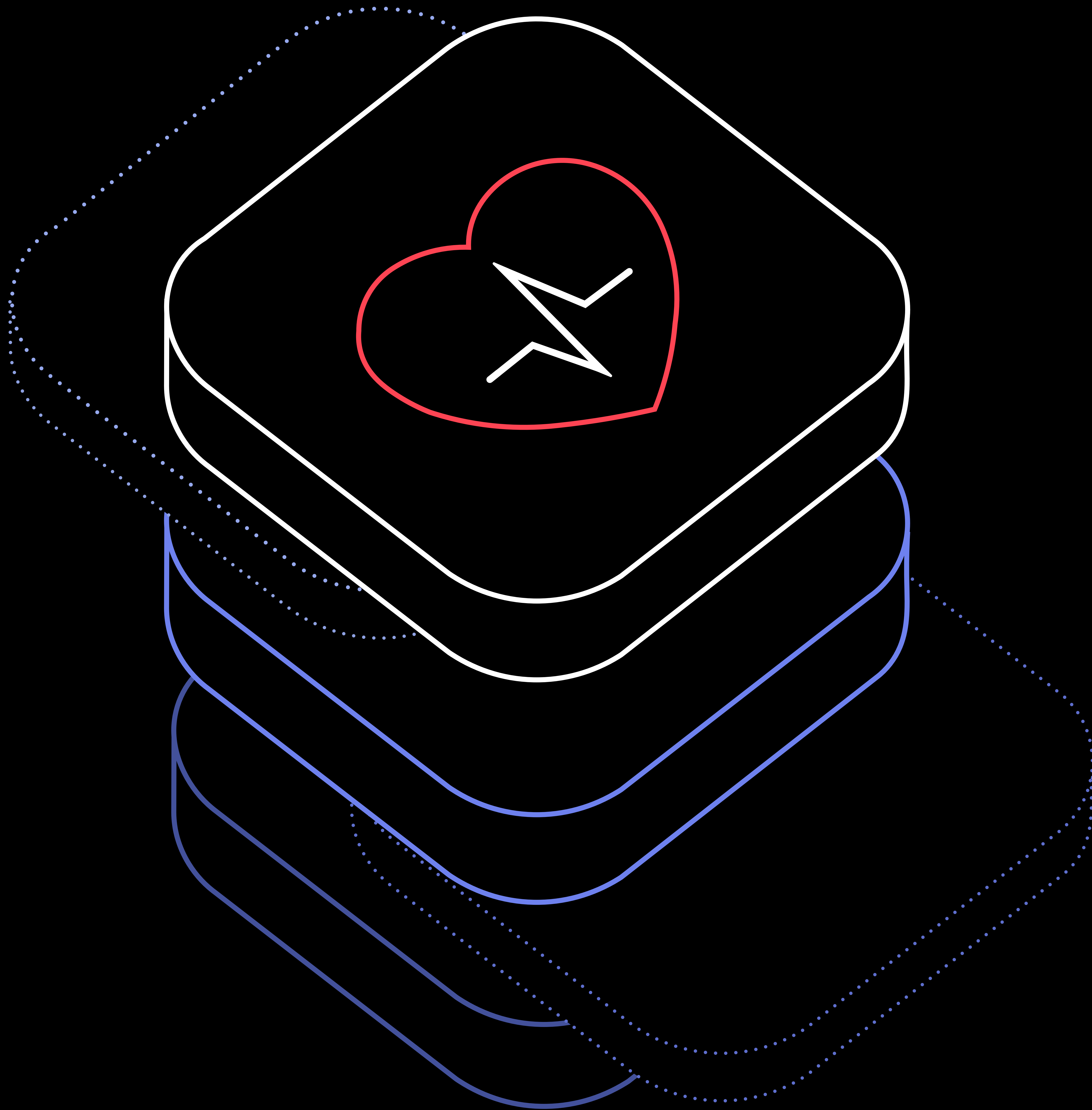


**Charts**



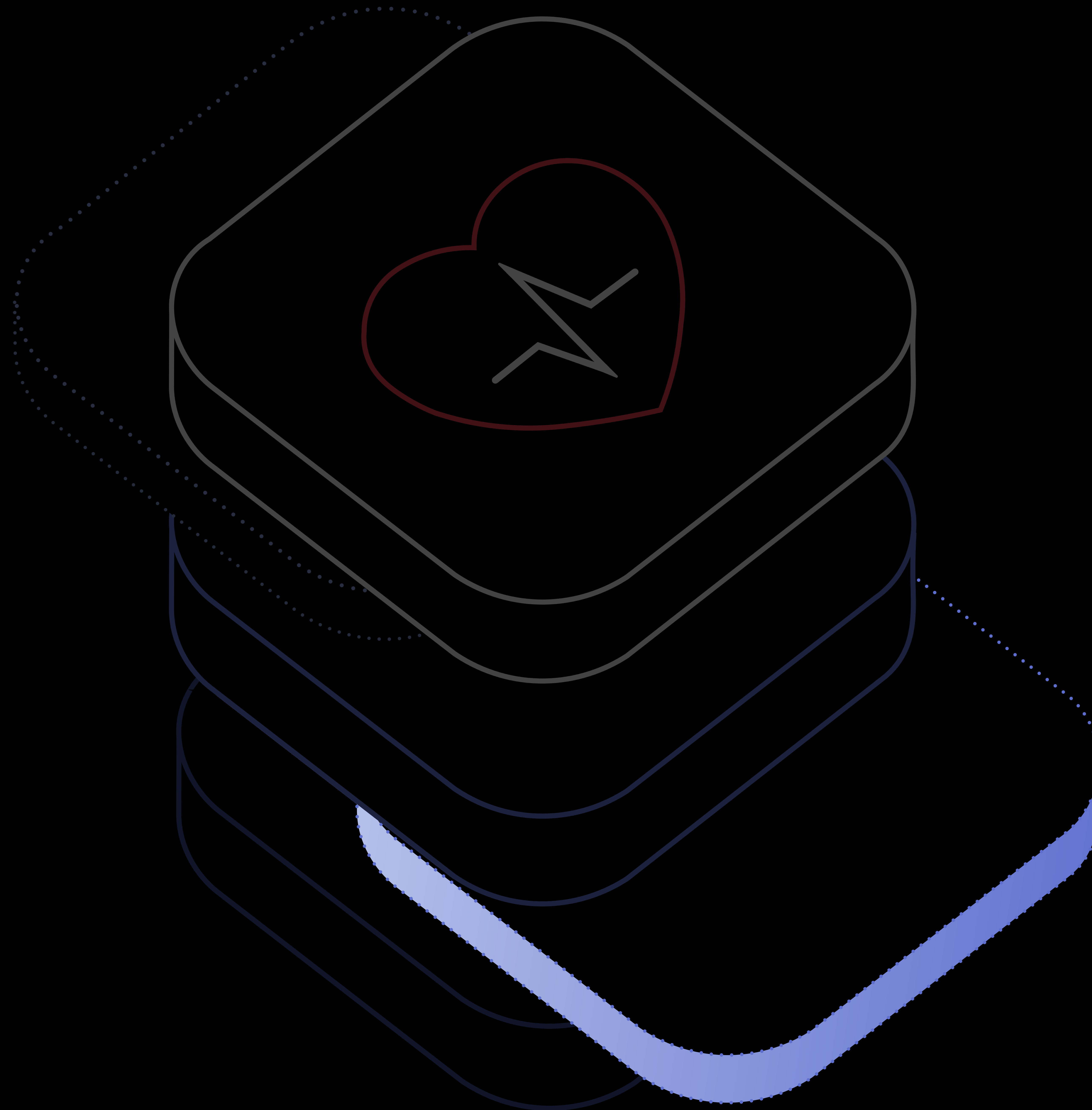
**Contacts**

**CareKit UI**  
Naive UI Views

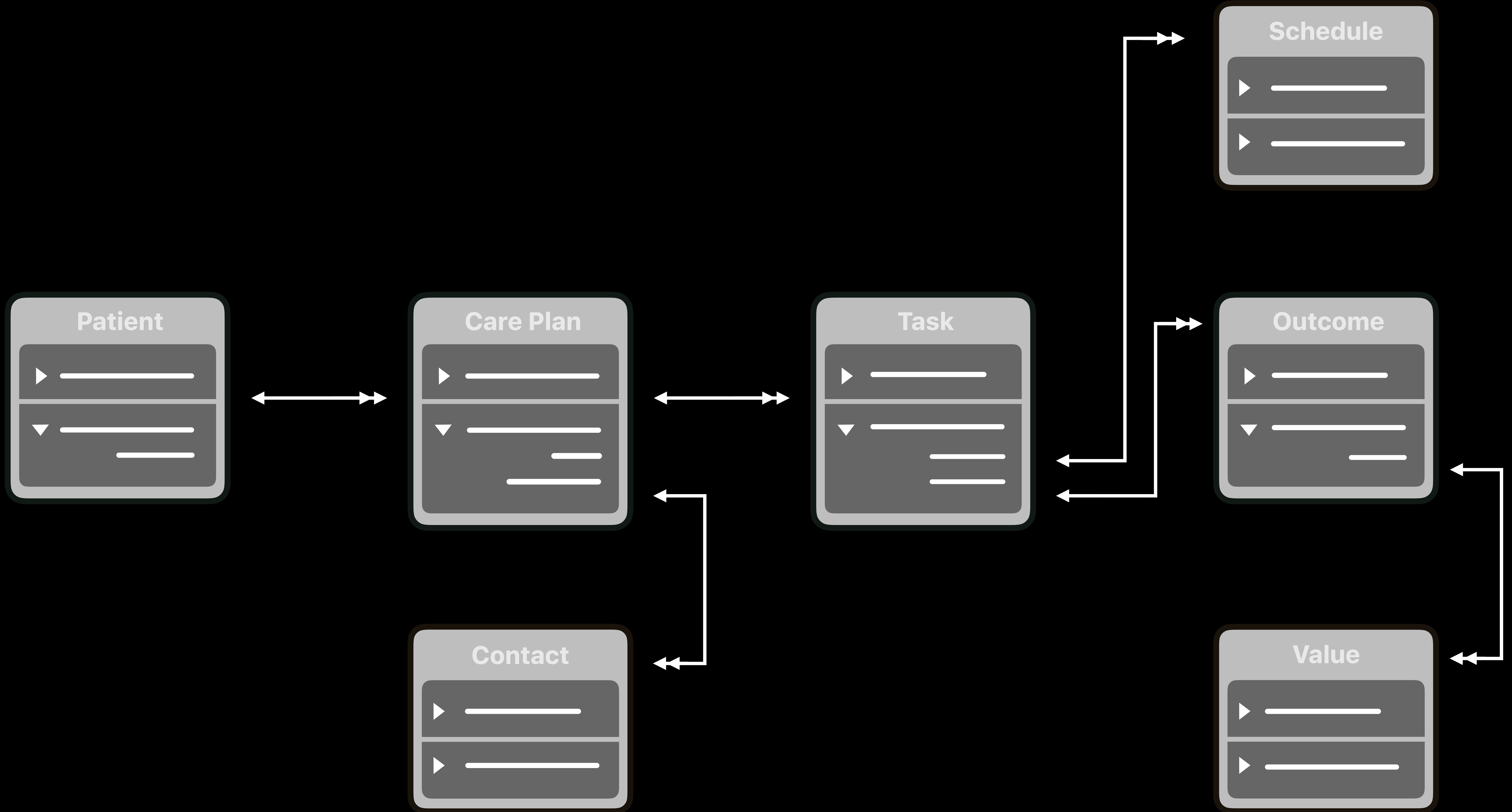


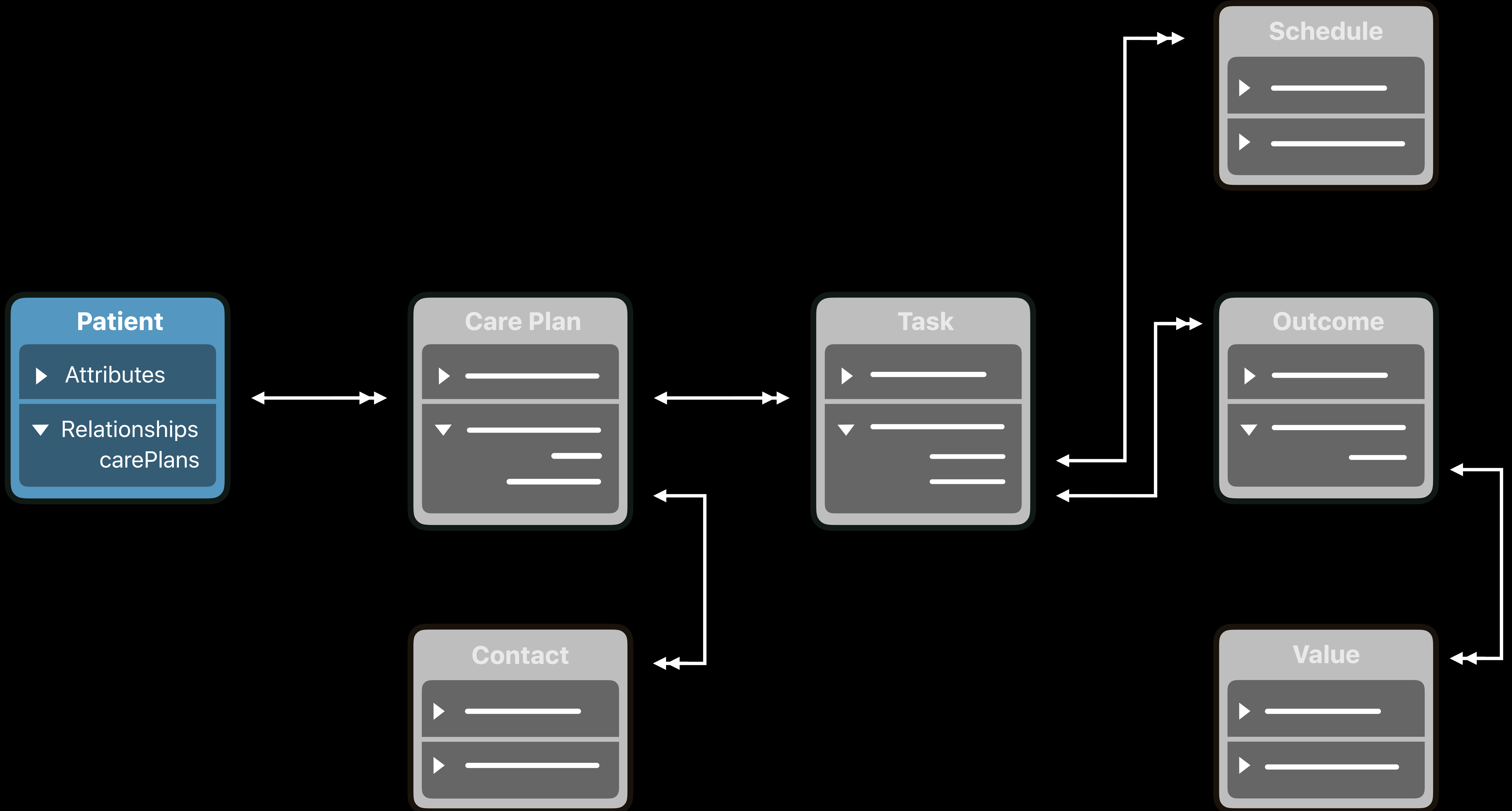
**CareKit Store**  
On-Device Database

**CareKit UI**  
Naive UI Views



**CareKit Store**  
On-Device Database







```
import CareKitStore
```

```
// create an instance of the CareKitStore with a unique identifier
```

```
let store = OCKStore(identifier: "store")
```

```
import CareKitStore

// create an instance of the CareKitStore with a unique identifier
let store = OCKStore(identifier: "store")

// create an instance of the Patient entity
let patient = OCKPatient(identifier: "patient", givenName: "Jane", familyName: "Appleseed")
```

```
import CareKitStore

// create an instance of the CareKitStore with a unique identifier
let store = OCKStore(identifier: "store")

// create an instance of the Patient entity
let patient = OCKPatient(identifier: "patient", givenName: "Jane", familyName: "Appleseed")

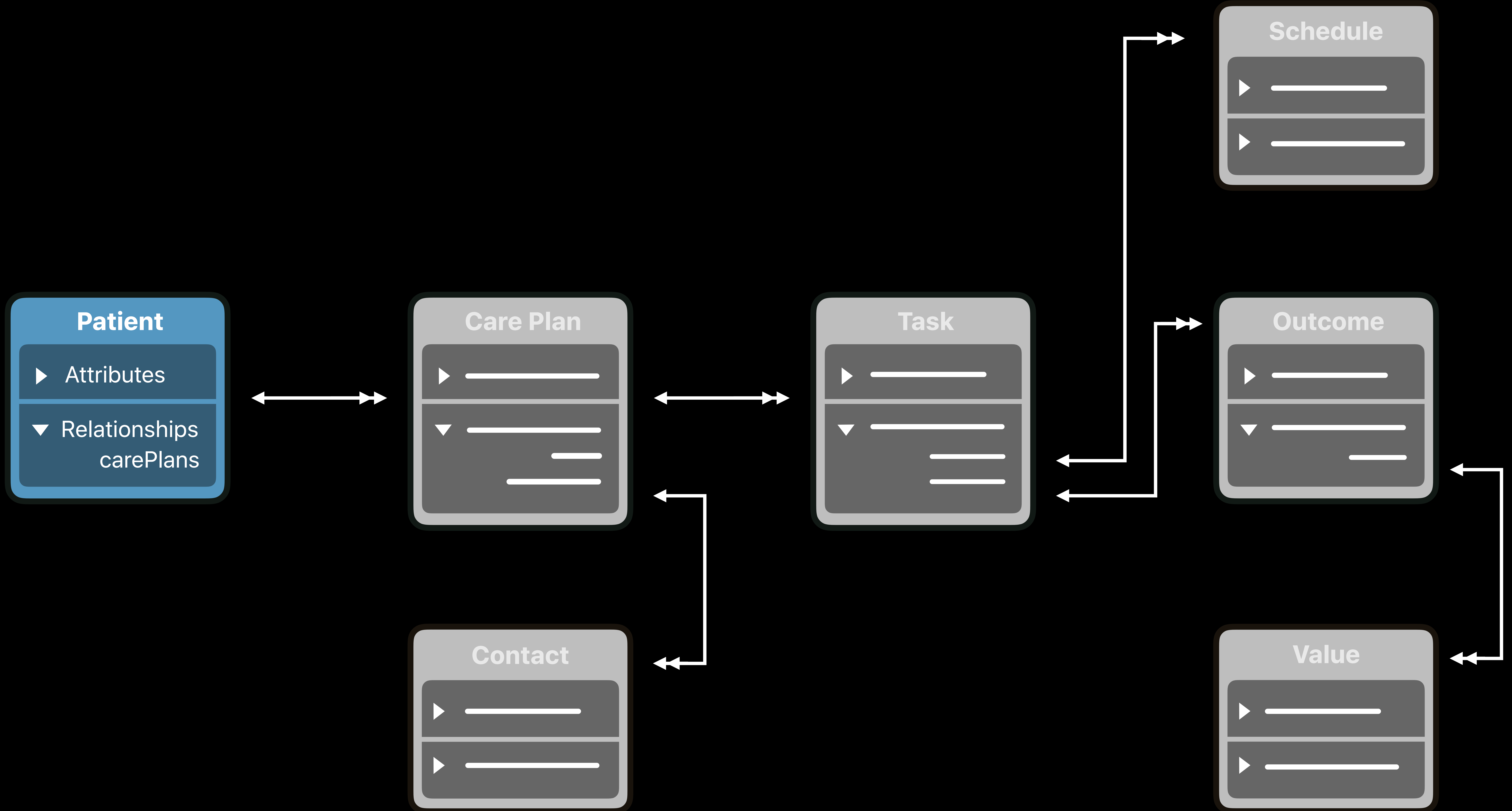
// add the newly created Patient entity to the store asynchronously
store.addPatient(patient) { result in
    switch result {
        case .success(let patient):
            print("ingested patient with id - \(patient.localDatabaseID)")
        case .failure(let error):
            print("ingestion failed with reason - \(error.localizedDescription)")
    }
}
```

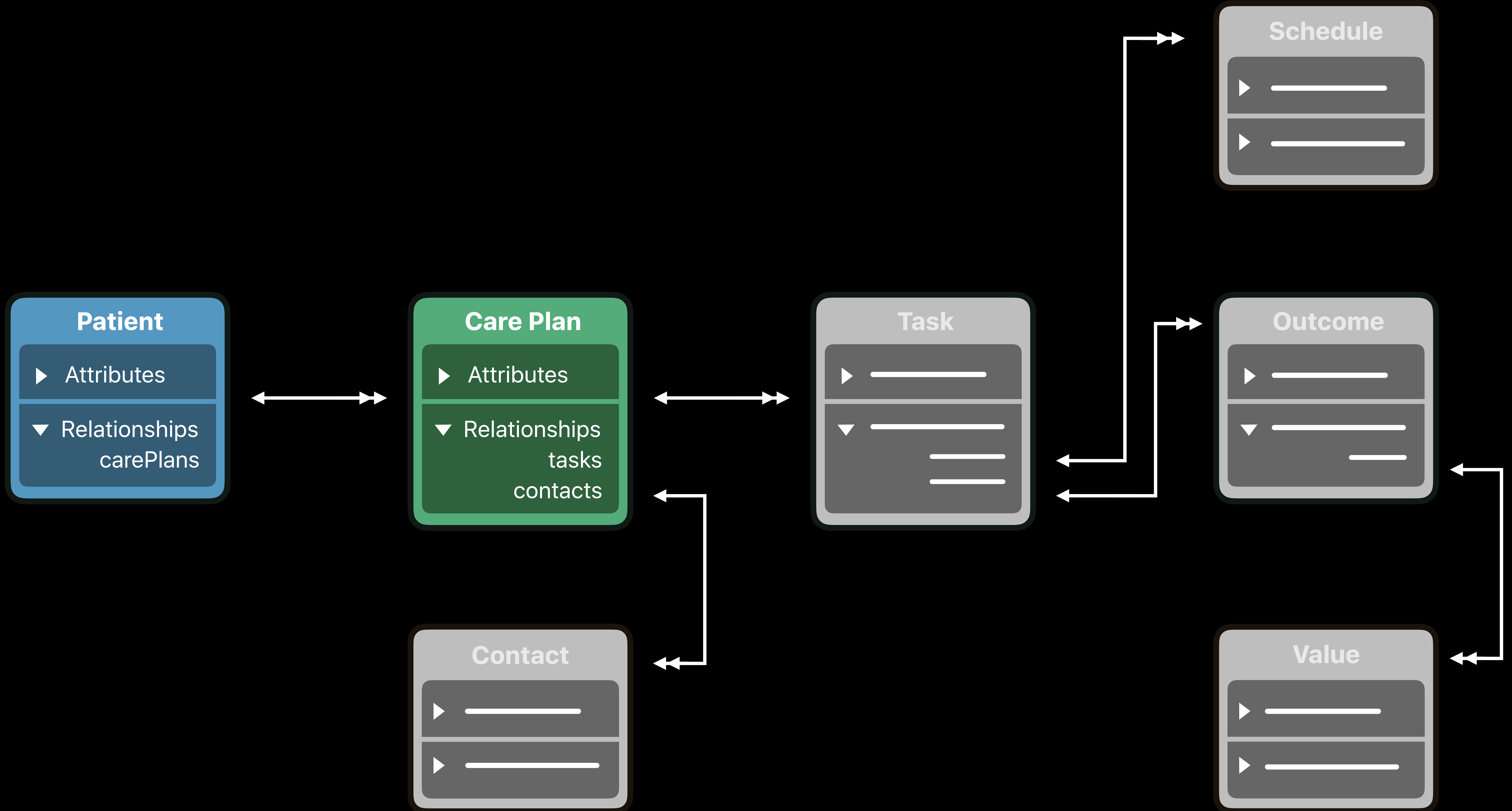
```
import CareKitStore

// create an instance of the CareKitStore with a unique identifier
let store = OCKStore(identifier: "store")

// create an instance of the Patient entity
let patient = OCKPatient(identifier: "patient", givenName: "Jane", familyName: "Appleseed")

// add the newly created Patient entity to the store asynchronously
store.addPatient(patient) { result in
    switch result {
    case .success(let patient):
        print("ingested patient with id - \(patient.localDatabaseID)")
    case .failure(let error):
        print("ingestion failed with reason - \(error.localizedDescription)")
    }
}
```





```
import CareKitStore

// create an instance of the CareKitStore with a unique identifier
let store = OCKStore(identifier: "store")
```

```
import CareKitStore

// create an instance of the CareKitStore with a unique identifier
let store = OCKStore(identifier: "store")

// query patient with identifier asynchronously from the CareKitStore
store.fetchPatient(withIdentifier: "patient") { result in
    switch result {
        case .success(let patient):
            // create a new CarePlan that is associated with the patient
            let carePlan = OCKCarePlan(identifier: "carePlan",
                                       title: "Healthy Pregnancy",
                                       patientID: patient.localDatabaseID)

            // add CarePlan to the CareKitStore
            store.addCarePlan(carePlan)
        case .failure(let error):
            print("ingestion failed with reason - \(error.localizedDescription)")
    }
}
```

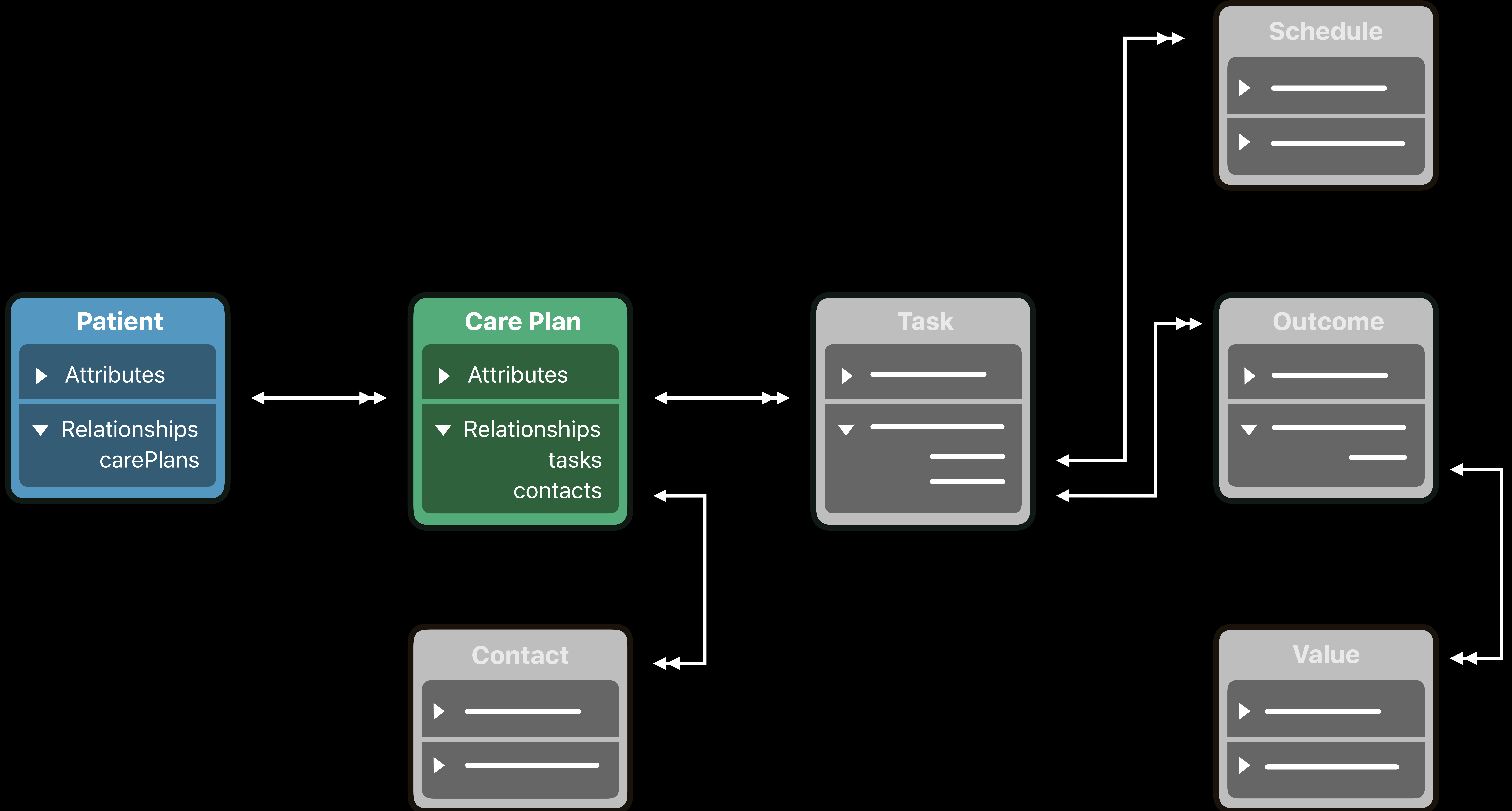


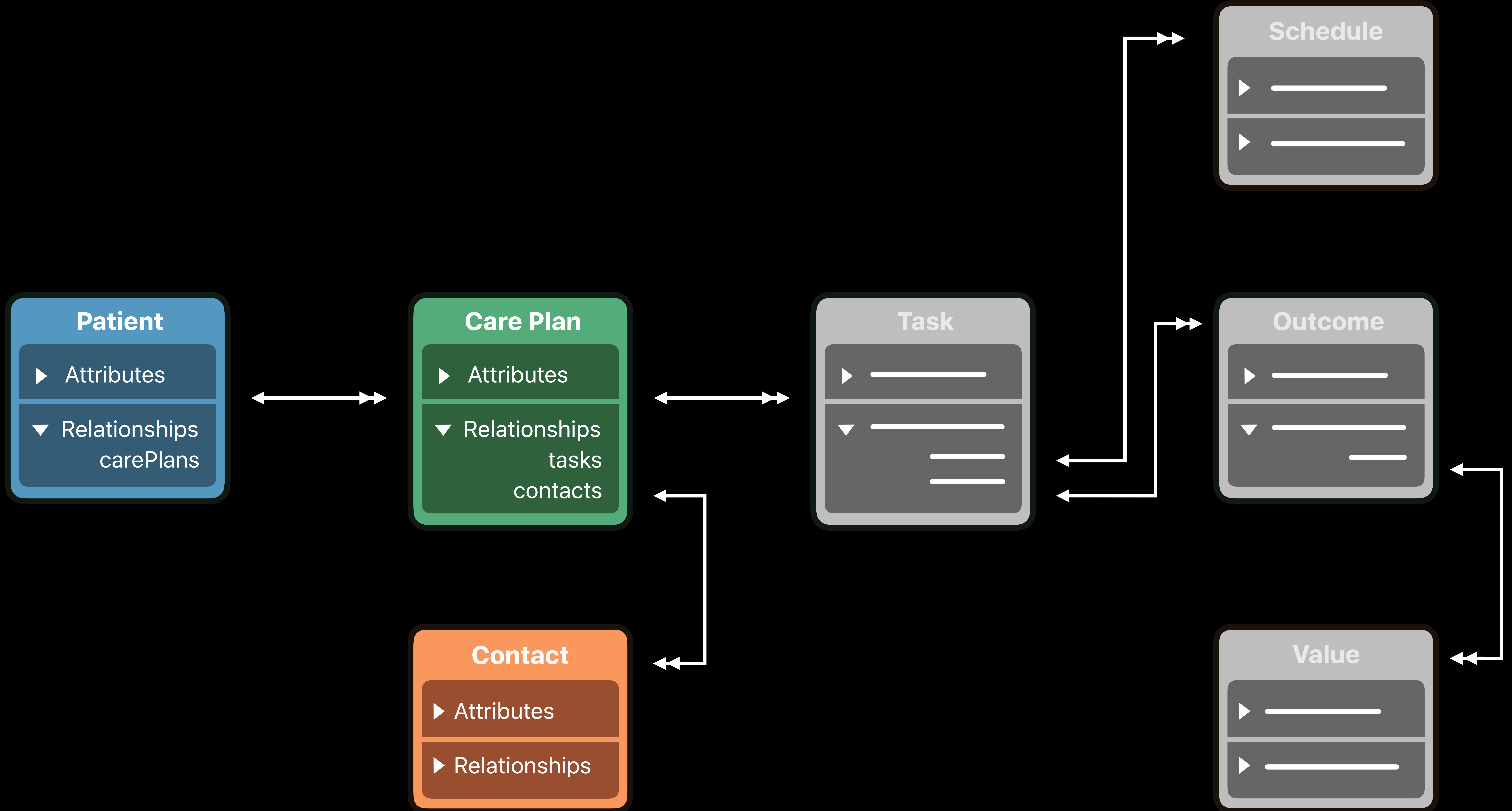
```
import CareKitStore

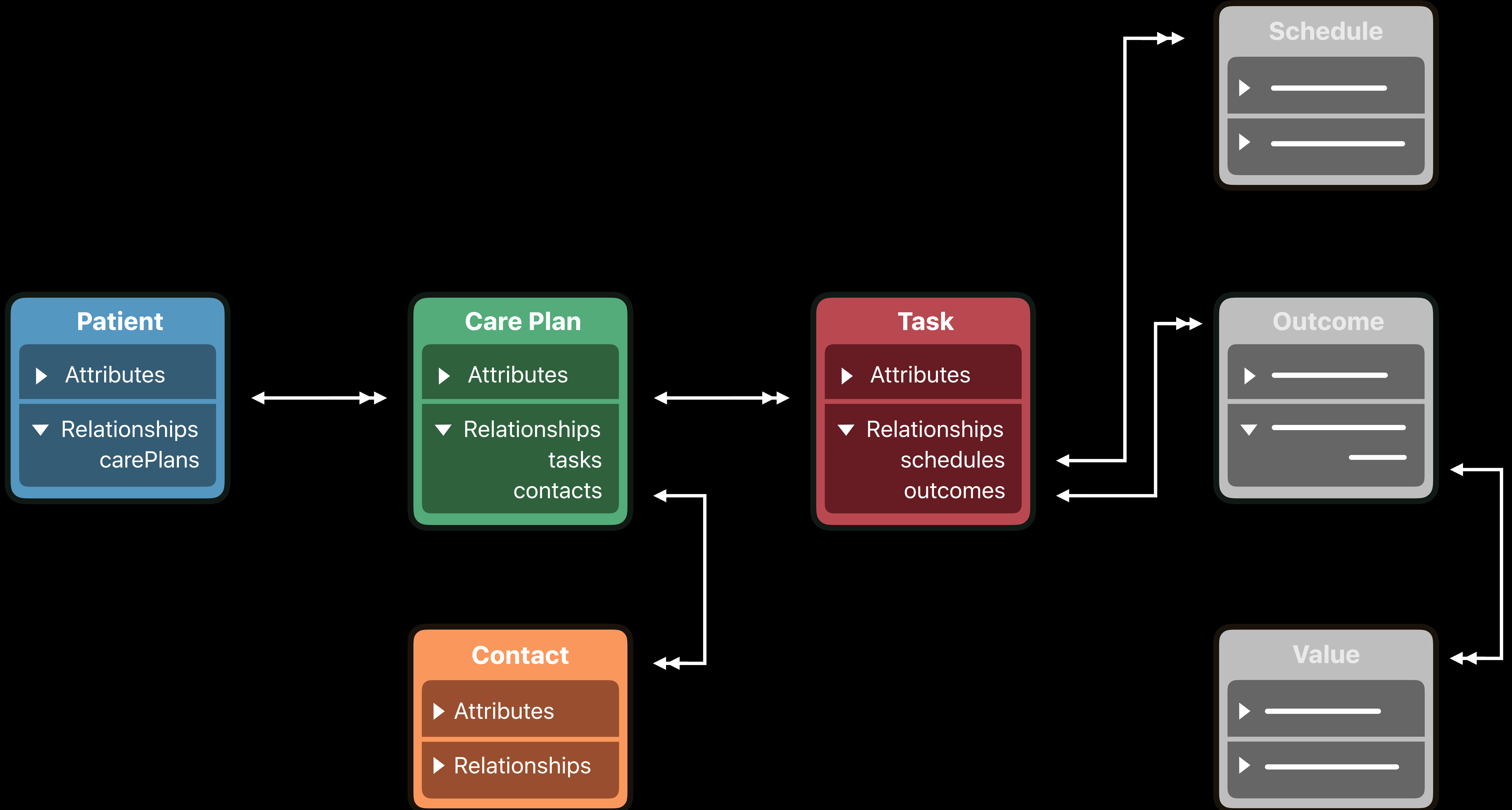
// create an instance of the CareKitStore with a unique identifier
let store = OCKStore(identifier: "store")

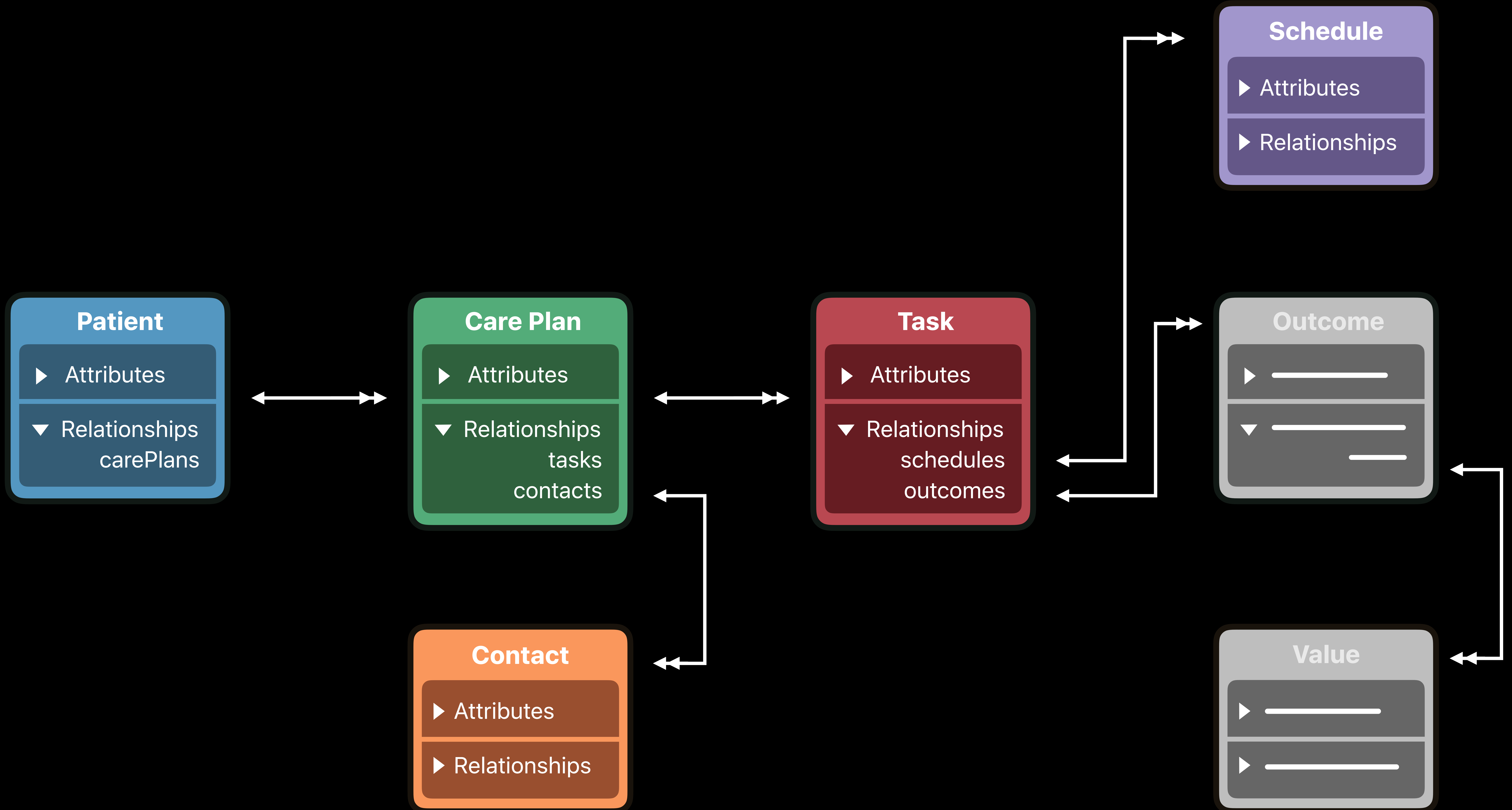
// query patient with identifier asynchronously from the CareKitStore
store.fetchPatient(withIdentifier: "patient") { result in
    switch result {
    case .success(let patient):
        // create a new CarePlan that is associated with the patient
        let carePlan = OCKCarePlan(identifier: "carePlan",
                                   title: "Healthy Pregnancy",
                                   patientID: patient.localDatabaseID)

        // add CarePlan to the CareKitStore
        store.addCarePlan(carePlan)
    case .failure(let error):
        print("ingestion failed with reason - \(error.localizedDescription)")
    }
}
```









```
import CareKitStore
```

```
let store = OCKStore(identifier: "store")
```

```
import CareKitStore

let store = OCKStore(identifier: "store")

// schedule a medication to be taken everyday at 7am
let breakfastTime = DateComponents(year: 2019, month: 6, day: 5, hour: 7, minute: 0)
let breakfastDose = OCKSchedule.dailyAtTime(start: breakfastTime)
```

```
import CareKitStore

let store = OCKStore(identifier: "store")

// schedule a medication to be taken everyday at 7am
let breakfastTime = DateComponents(year: 2019, month: 6, day: 5, hour: 7, minute: 0)
let breakfastDose = OCKSchedule.dailyAtTime(start: breakfastTime)

// schedule a medication to be taken every other day at 12pm
let lunchTime = DateComponents(year: 2019, month: 6, day: 5, hour: 12, minute: 0)
let lunchDose = OCKScheduleElement(start: lunchTime, interval: DateComponents(day: 2))
```



```
import CareKitStore

let store = OCKStore(identifier: "store")

// schedule a medication to be taken everyday at 7am
let breakfastTime = DateComponents(year: 2019, month: 6, day: 5, hour: 7, minute: 0)
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let lunchTime = DateComponents(year: 2019, month: 6, day: 5, hour: 12, minute: 0)
let lunchDose = OCKScheduleElement(start: lunchTime, interval: DateComponents(day: 2))

// compose these schedules together
let schedule = OCKSchedule(composing: [breakfastDose, lunchDose])
```

```
import CareKitStore

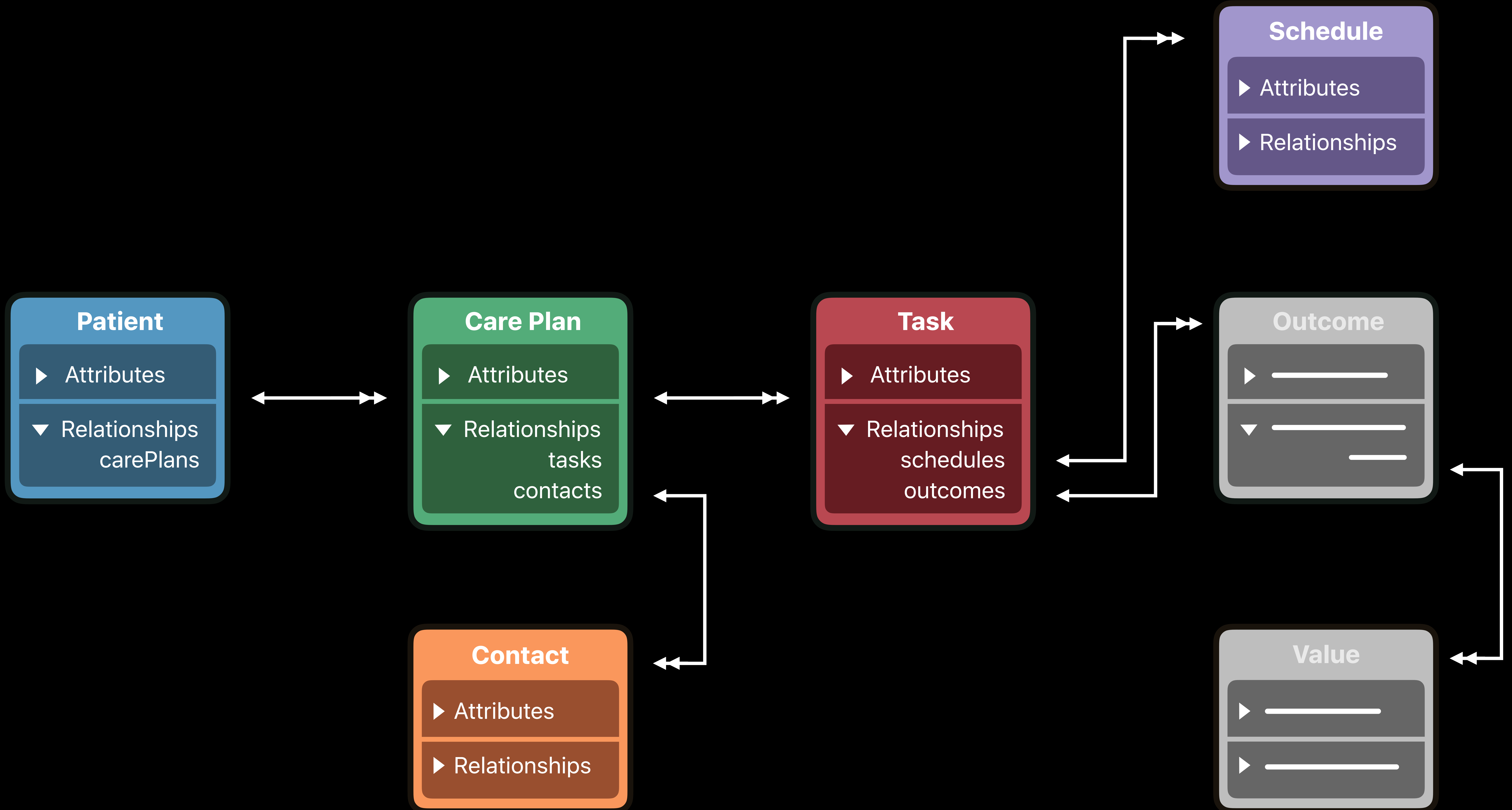
let store = OCKStore(identifier: "store")

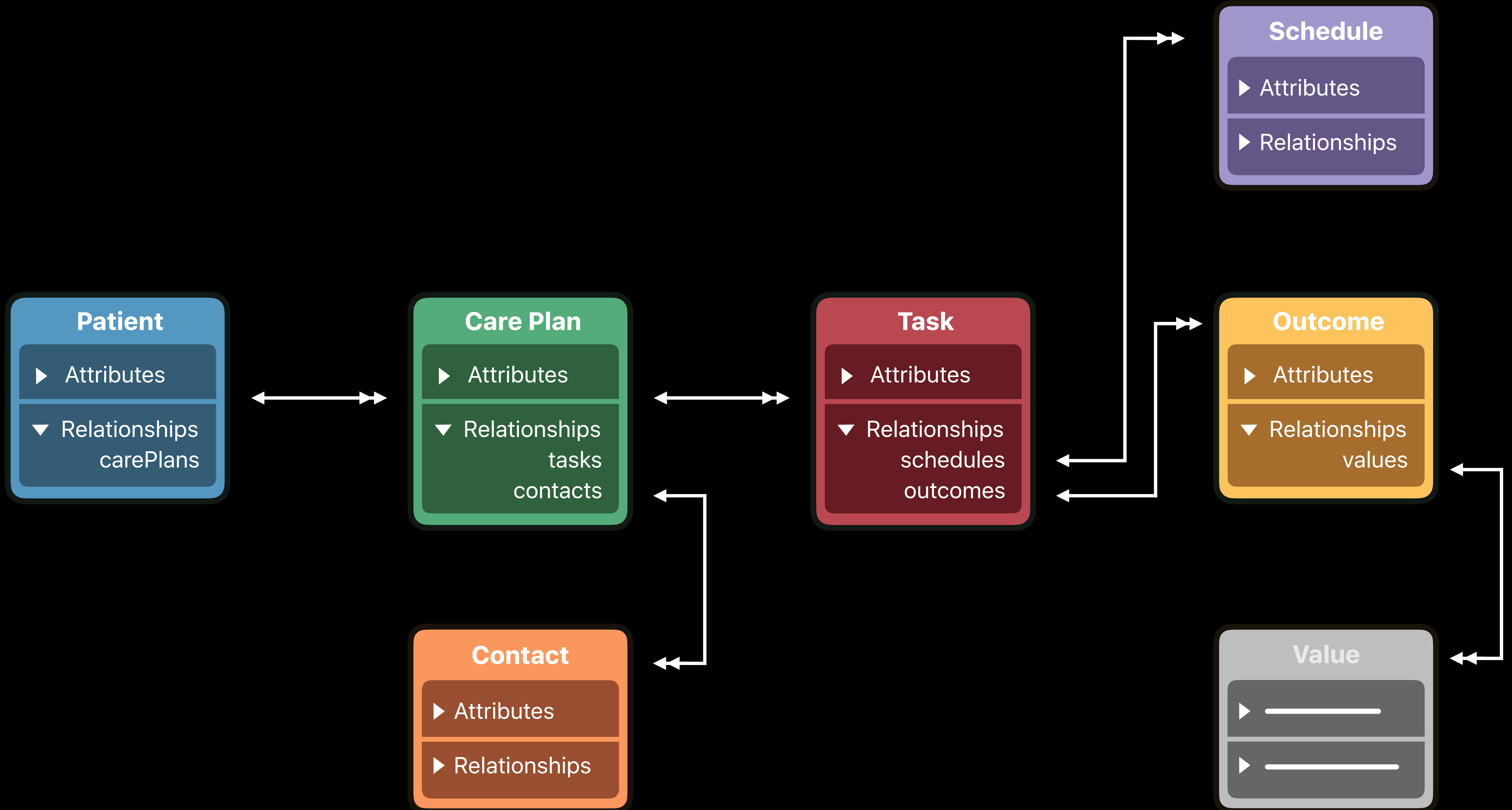
// schedule a medication to be taken everyday at 7am
let breakfastTime = DateComponents(year: 2019, month: 6, day: 5, hour: 7, minute: 0)
let breakfastDose = OCKSchedule.dailyAtTime(start: breakfastTime)

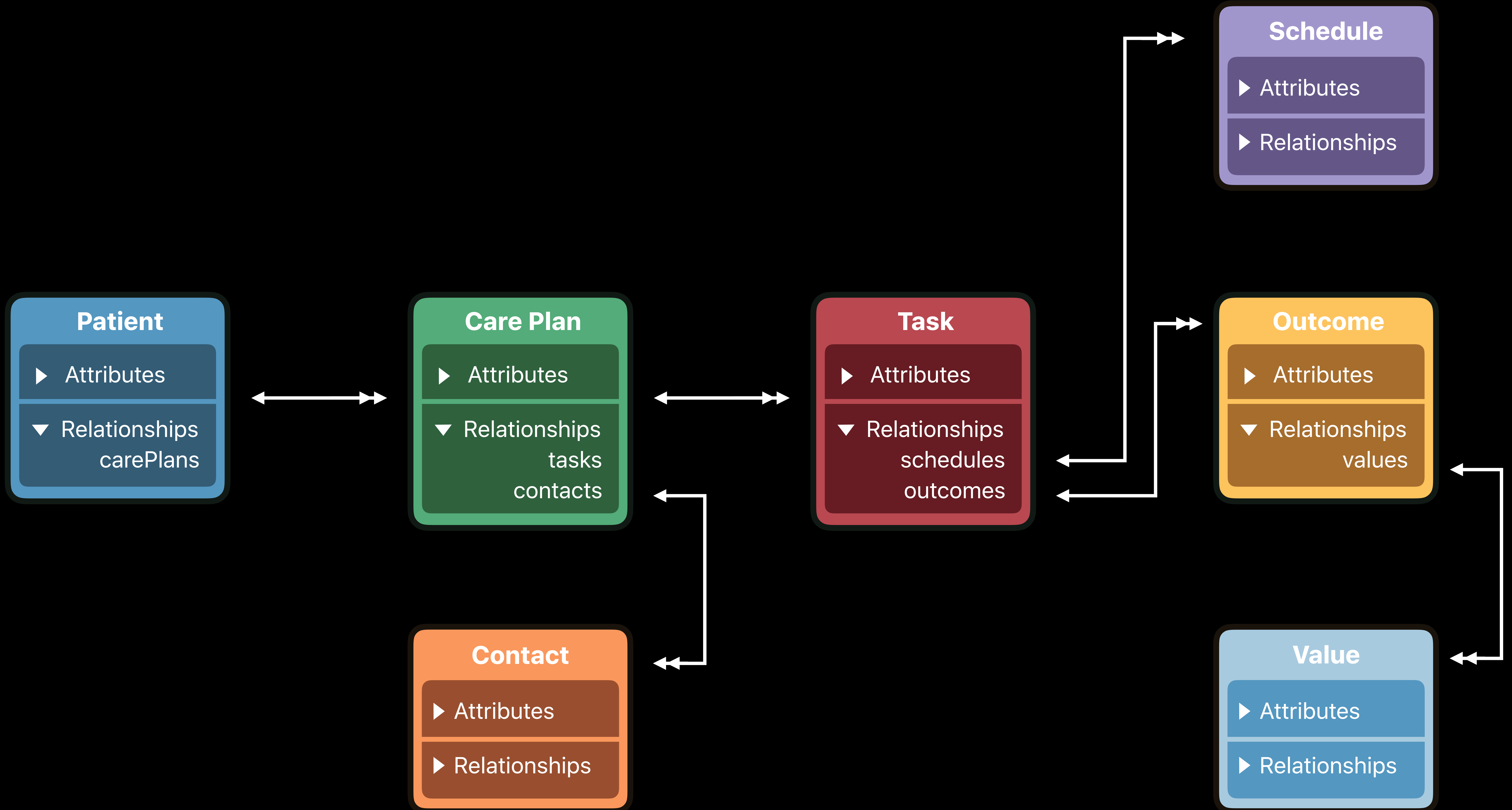
// schedule a medication to be taken every other day at 12pm
let lunchTime = DateComponents(year: 2019, month: 6, day: 5, hour: 12, minute: 0)
let lunchDose = OCKScheduleElement(start: lunchTime, interval: DateComponents(day: 2))

// compose these schedules together
let schedule = OCKSchedule(composing: [breakfastDose, lunchDose])

// create a new task to take Ibuprofen medication with the composed schedule
var task = OCKTask(identifier: "medicationTask", title: "Doxylamine", schedule: schedule)
task.instructions = "Take the tablet with a full glass of water."
```







```
import CareKitStore
```

```
let store = OCKStore(identifier: "store")
```

```
import CareKitStore

let store = OCKStore(identifier: "store")

// query elements that were generated in the past week
let startDate = Calendar.current.date(byAdding: .day, value: -7, to: Date())
let query = OCKInsightQuery(startDate: startDate, endDate: Date())
```

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import CareKitStore

let store = OCKStore(identifier: "store")

// query elements that were generated in the past week
let startDate = Calendar.current.date(byAdding: .day, value: -7, to: Date())
let query = OCKInsightQuery(startDate: startDate, endDate: Date())
store.fetchInsights(forTask: "medicationTask", query: query, dailyAggregator: { events in
    // this block provides all events generated on a daily basis and should return a Double
    var dailyDosage = 0.0
    for event in events {
        if let outcome = event.outcome {
            dailyDosage += outcome.values?.first?.doubleValue ?? 0.0
        }
    }
    return dailyDosage
}, completion: { values in
    // use the computed values for further analysis or for charting
}))
```



```
import CareKitStore

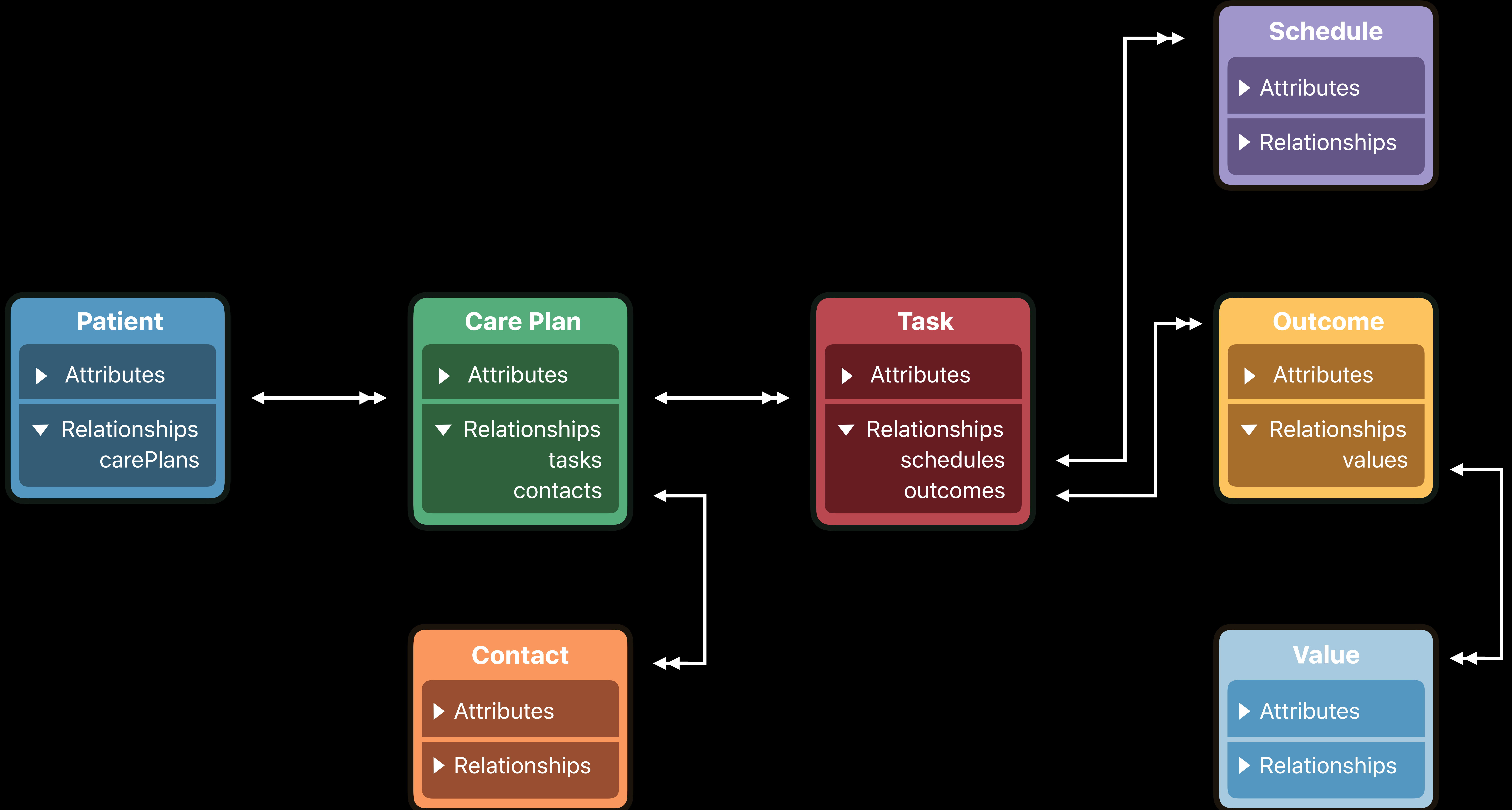
let store = OCKStore(identifier: "store")

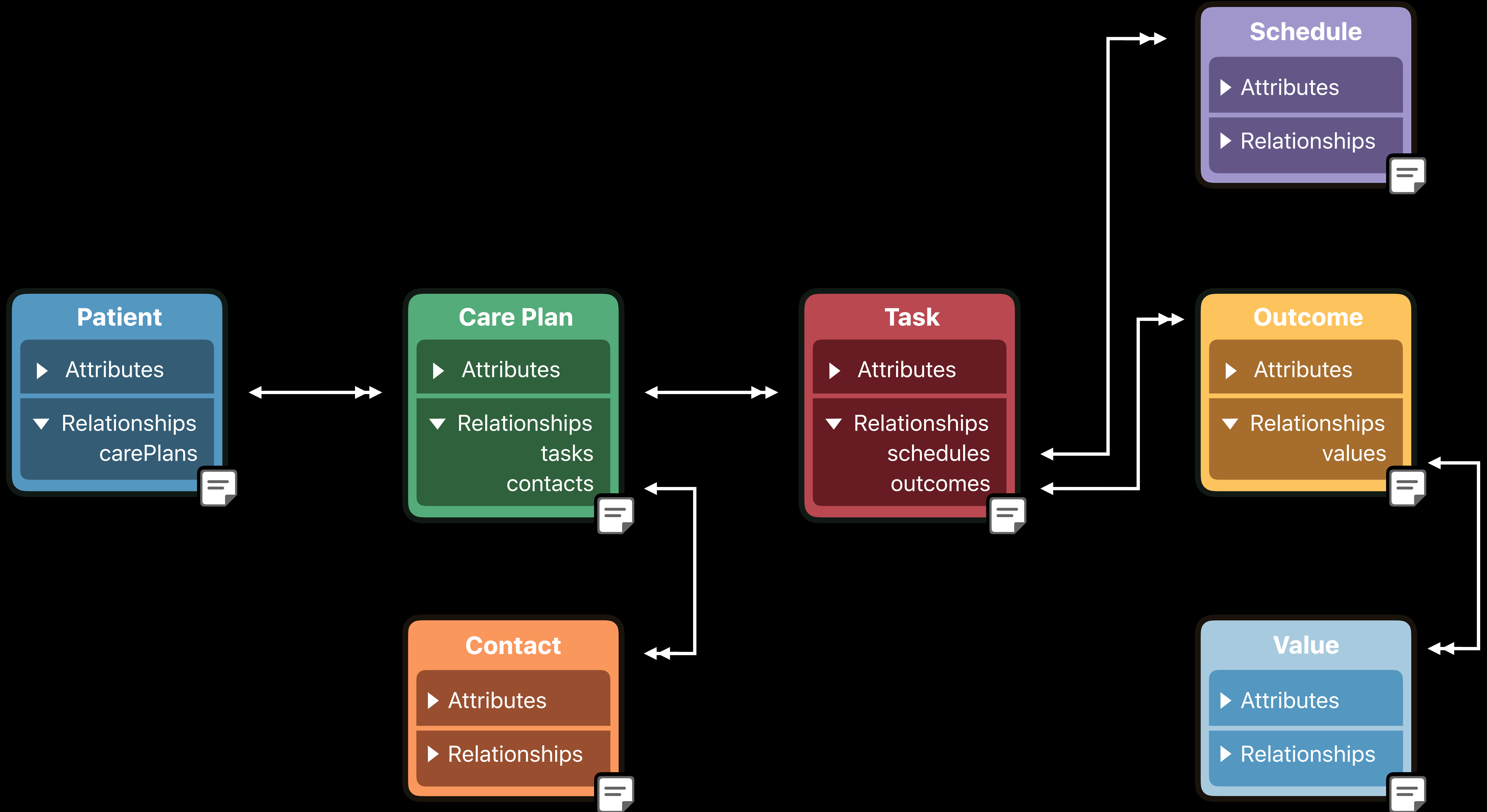
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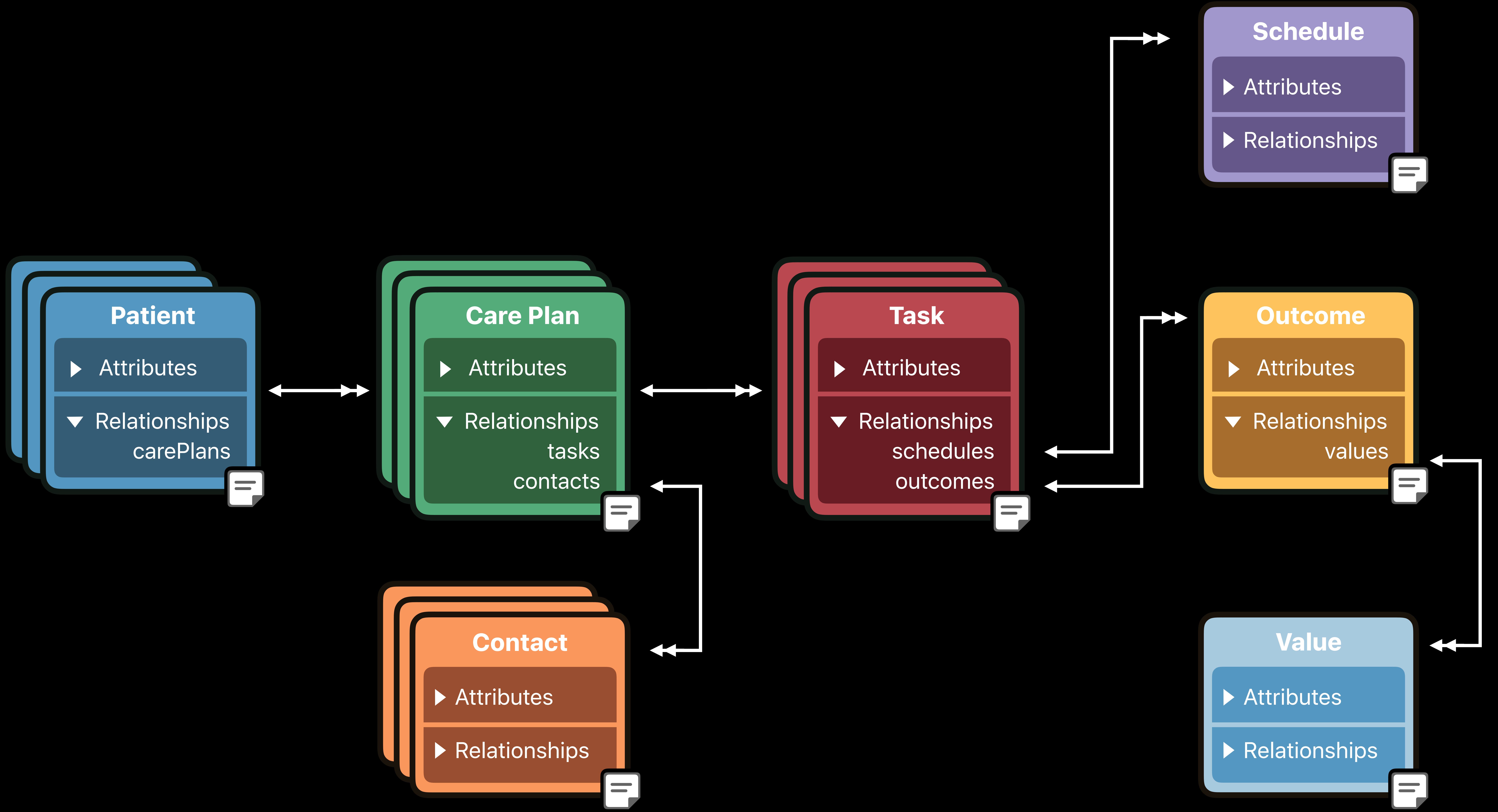
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import CareKitStore

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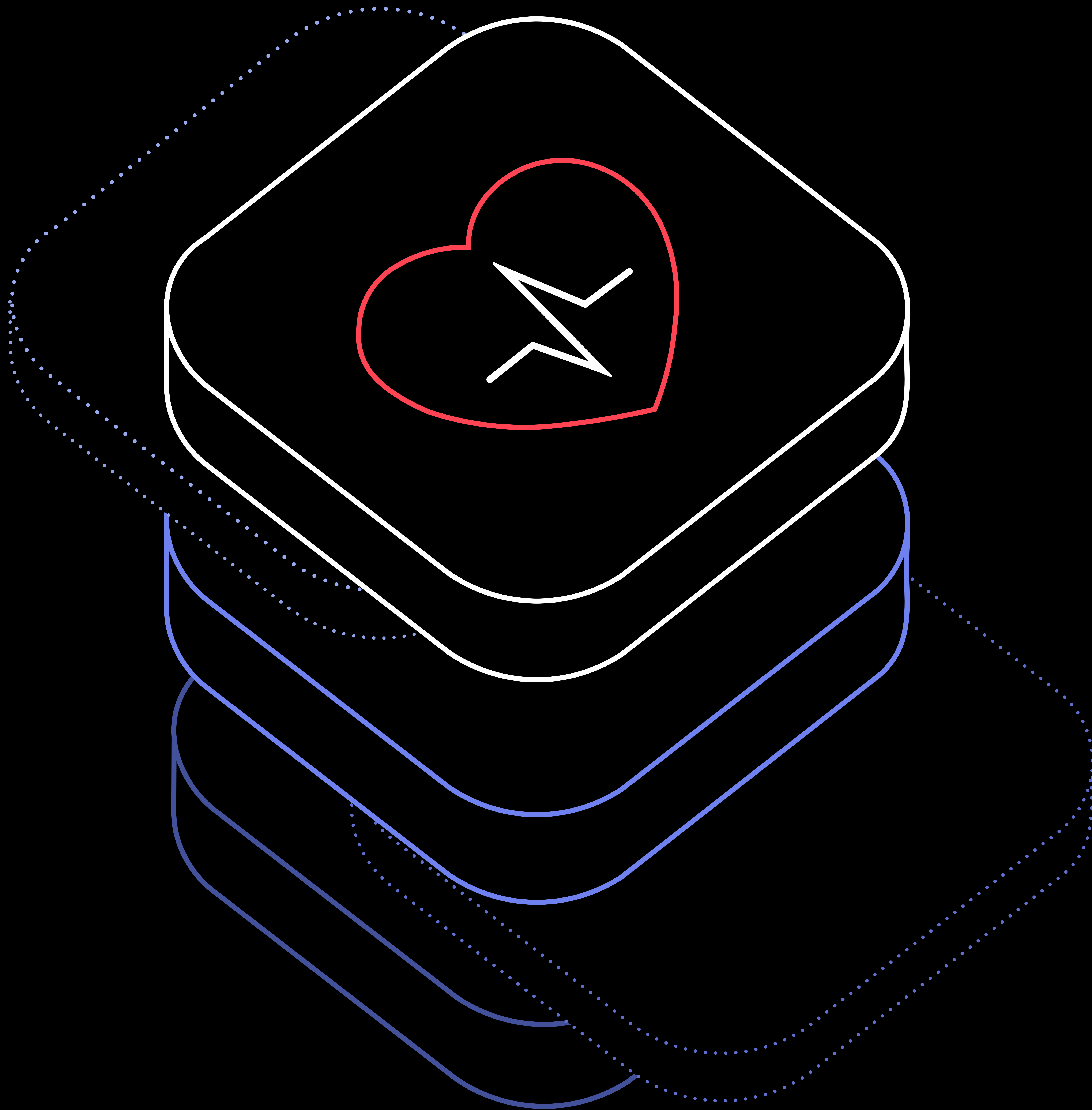
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**CareKit UI**  
Naive UI Views

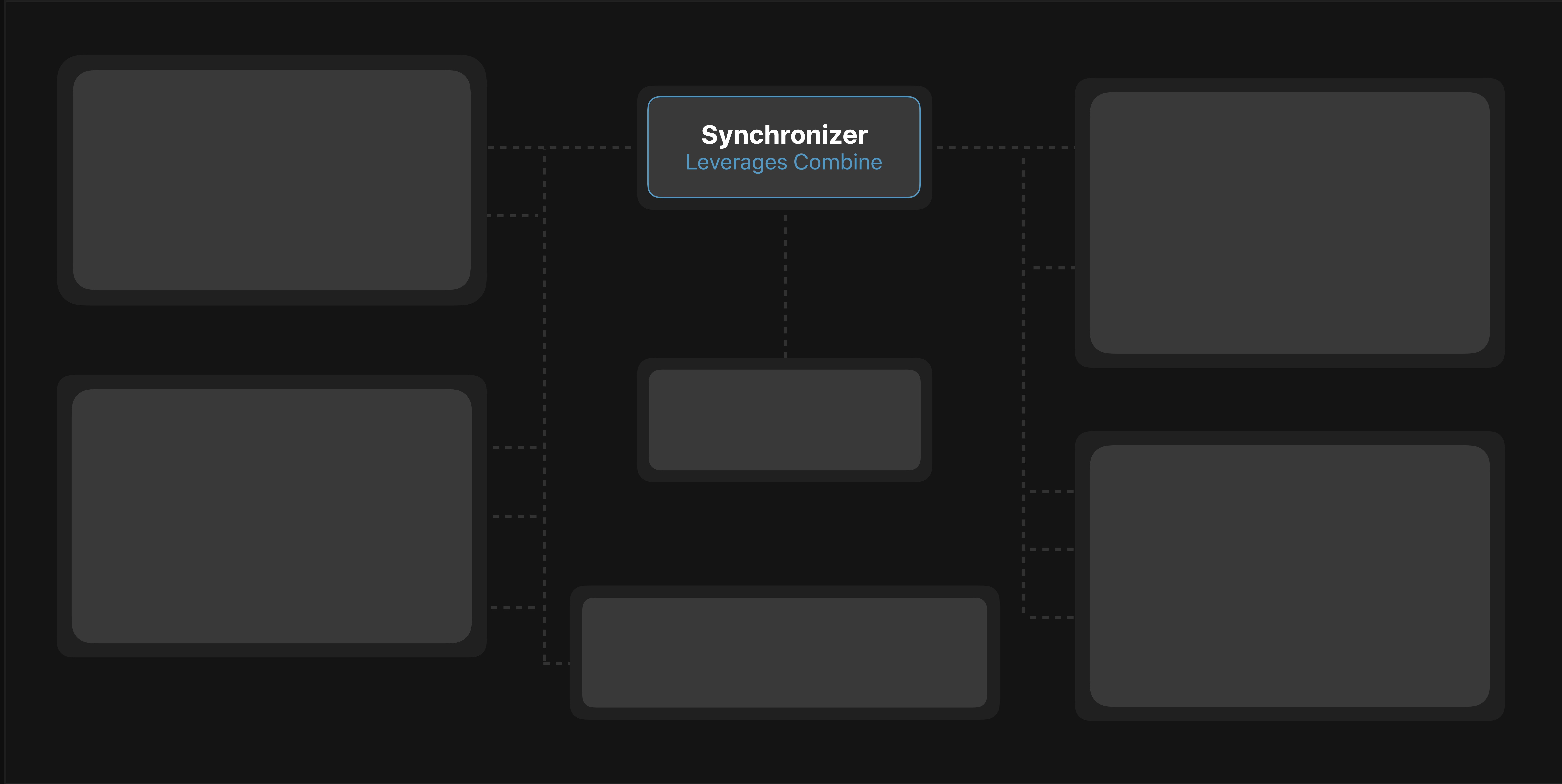


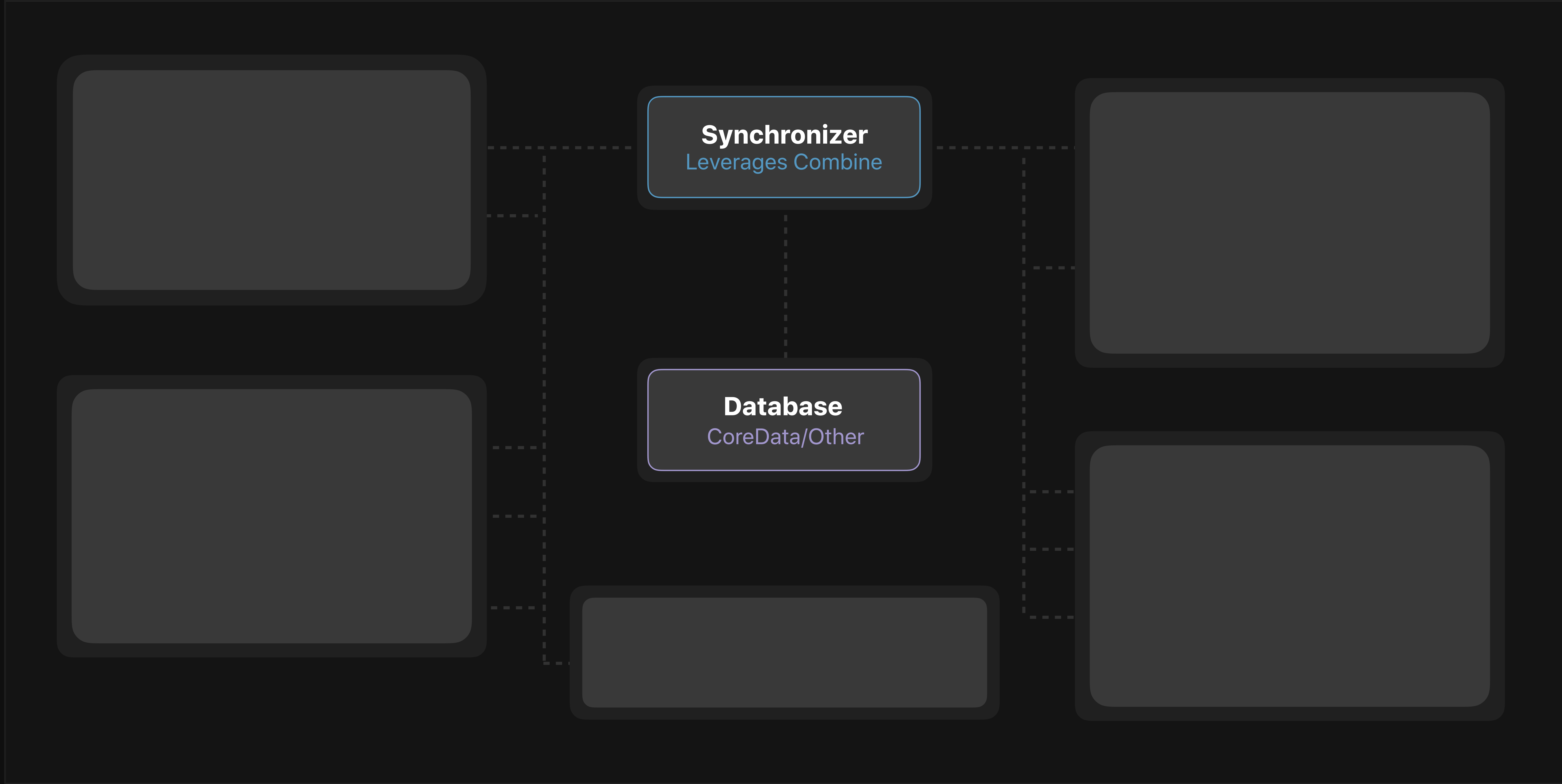
**CareKit Store**  
On-Device Database











### Synchronizer Leverages Combine

### Database CoreData/Other

#### Doxylamine

1 event remaining today

7:30 AM 2:00 PM

Take the tablet with a full glass of water.

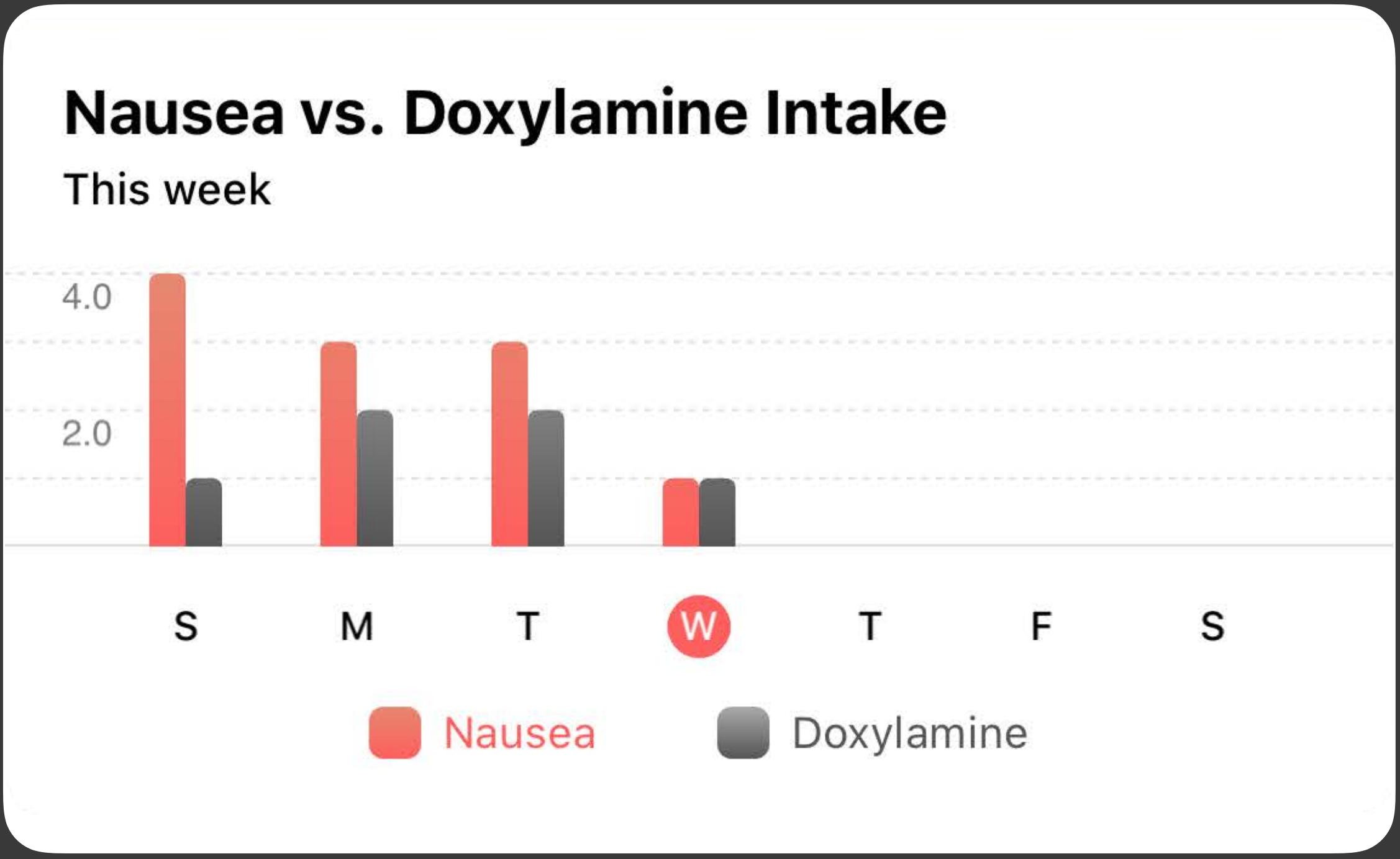
#### Doxylamine

1 event remaining today

7:30 AM

2:00 PM

Take the tablet with a full glass of water.



02 03 04 05 06 07 08

03 04

#### Track your Nausea

Anytime today

Tap the button below anytime you experience nausea.

I'm Feeling Nauseous

9:10 PM Value logged

### Synchronizer Leverages Combine

### Database CoreData/Other

#### Doxylamine

0 events remaining today

7:30 AM 2:00 PM

Take the tablet with a full glass of water.

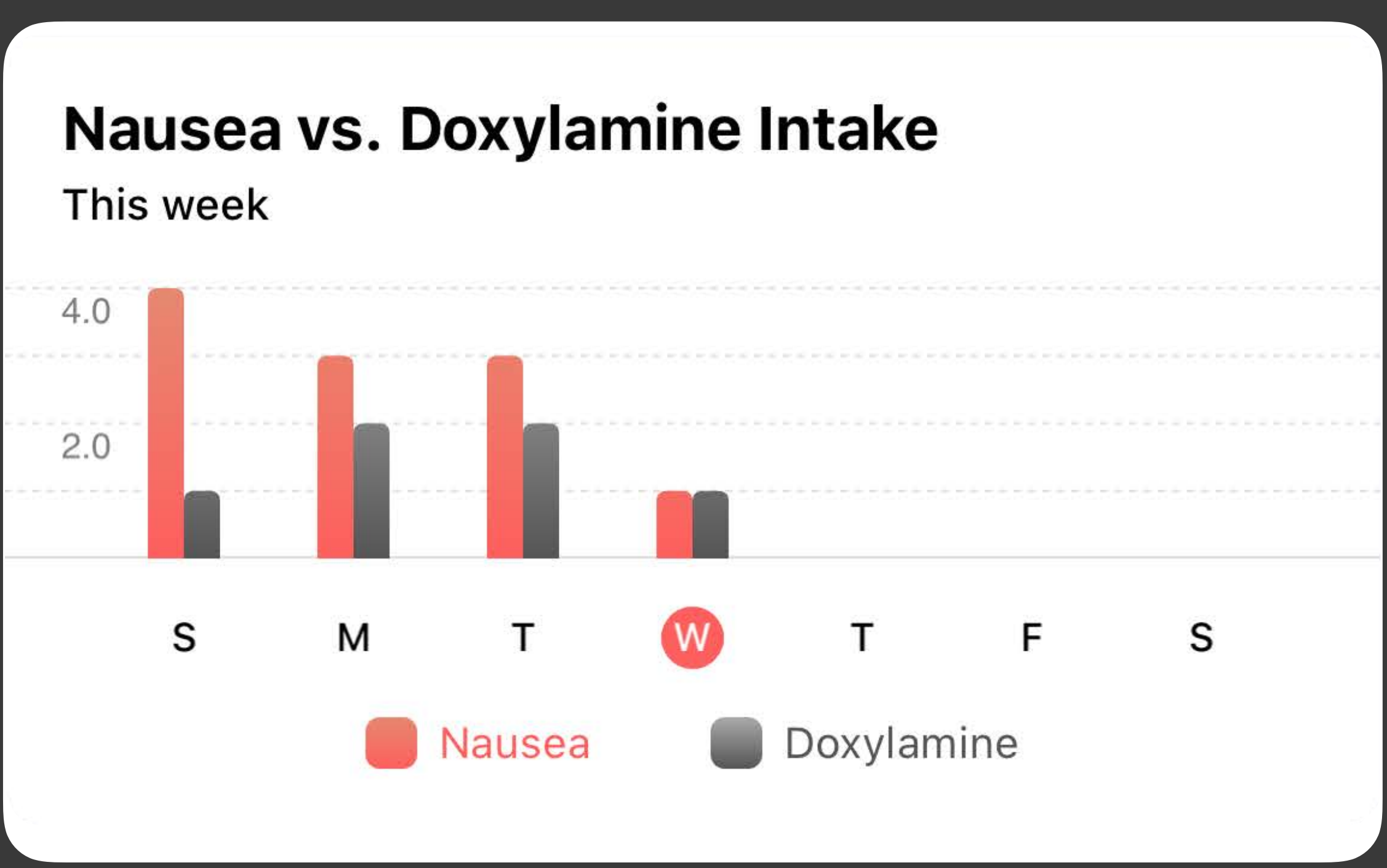
#### Doxylamine

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7:30 AM

2:00 PM

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02 03 04 05 06 07 08

Progress indicator showing completion status for days 02 through 08.

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### Synchronizer Leverages Combine

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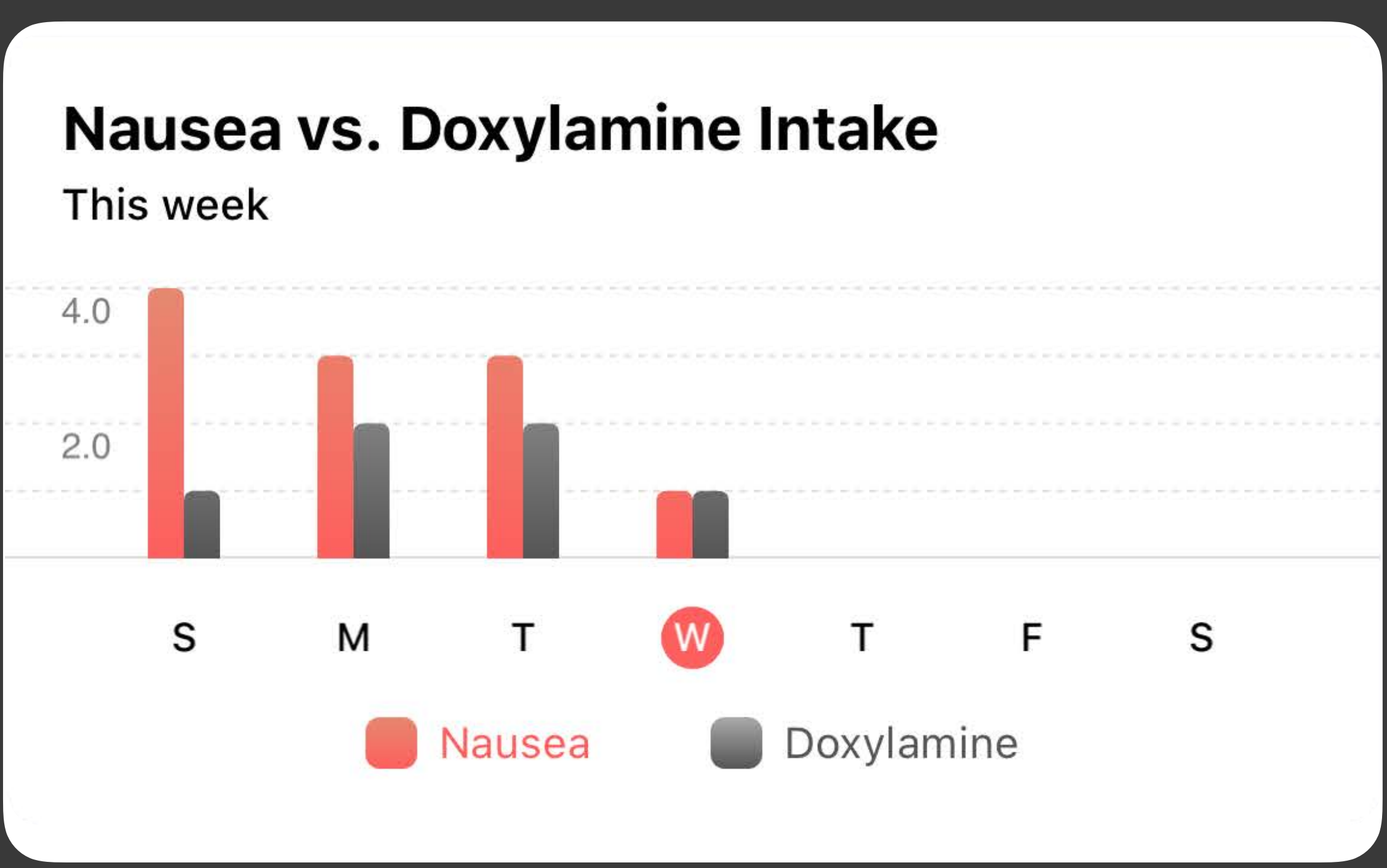
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### Database CoreData/Other

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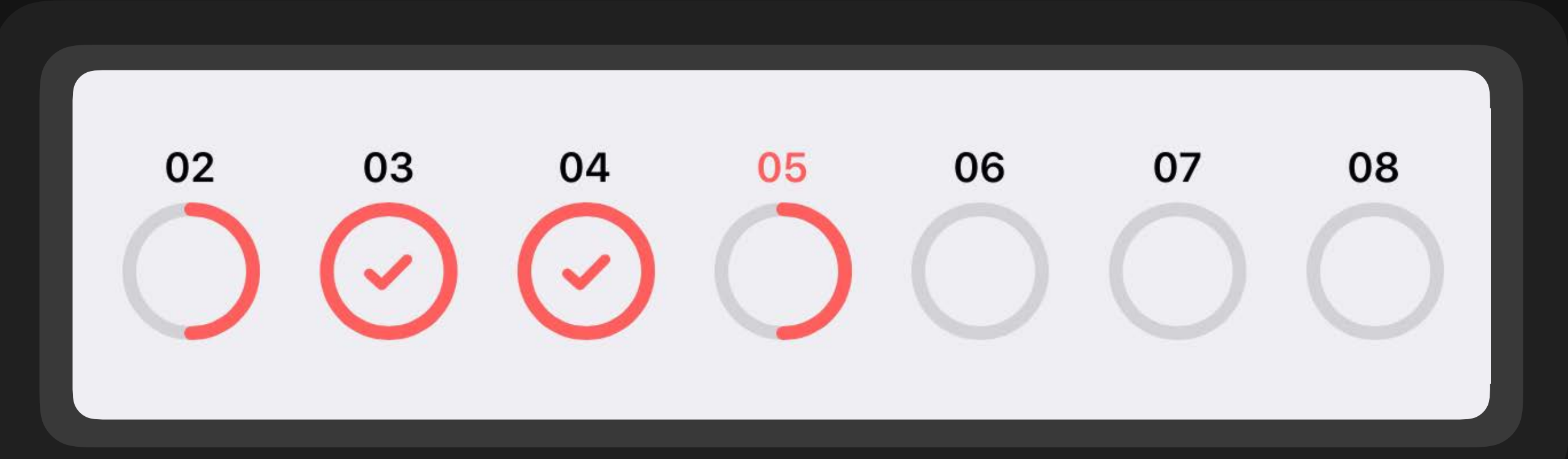
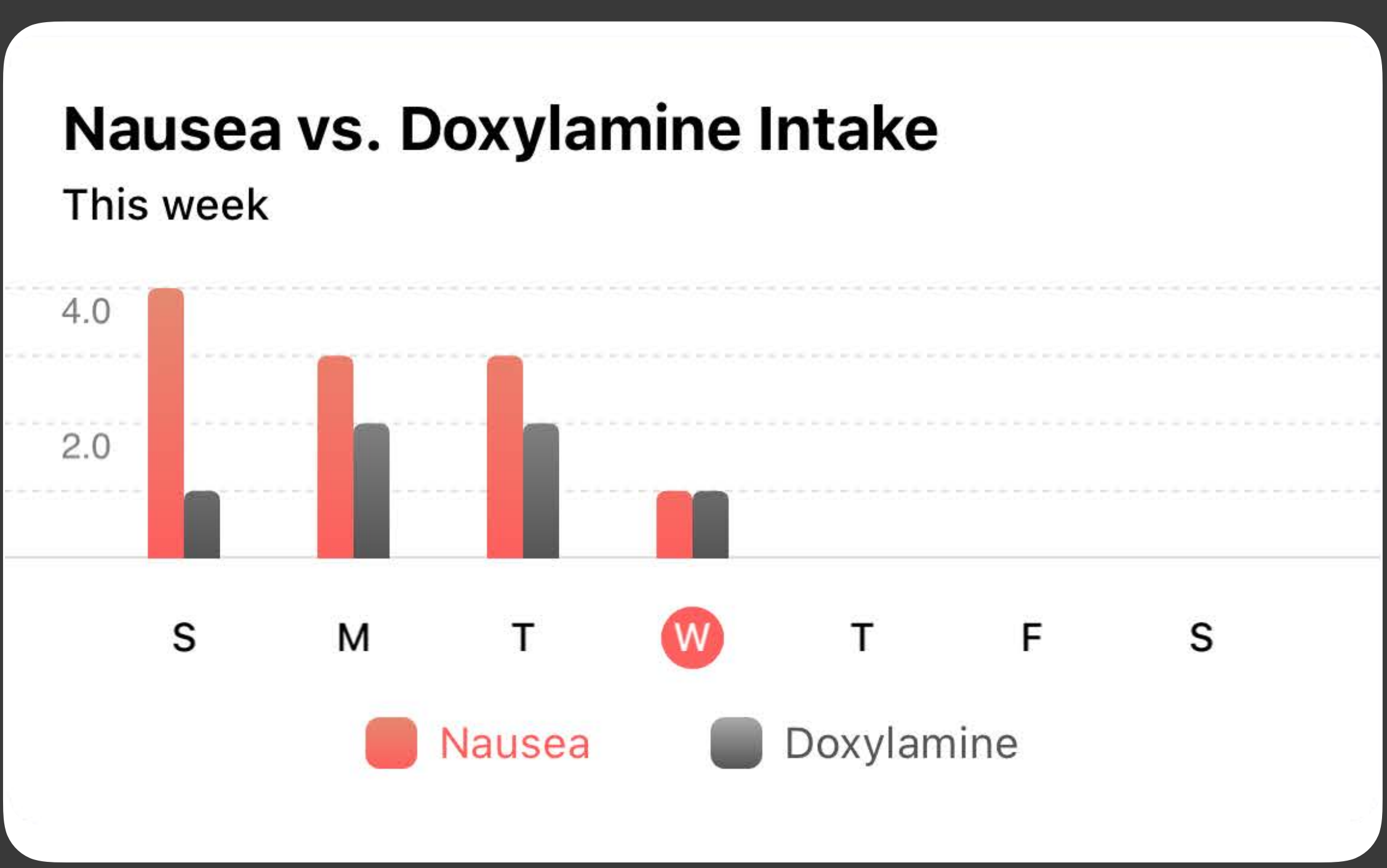
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**Synchronizer**  
Leverages Combine

**Database**  
CoreData/Other

### Doxylamine

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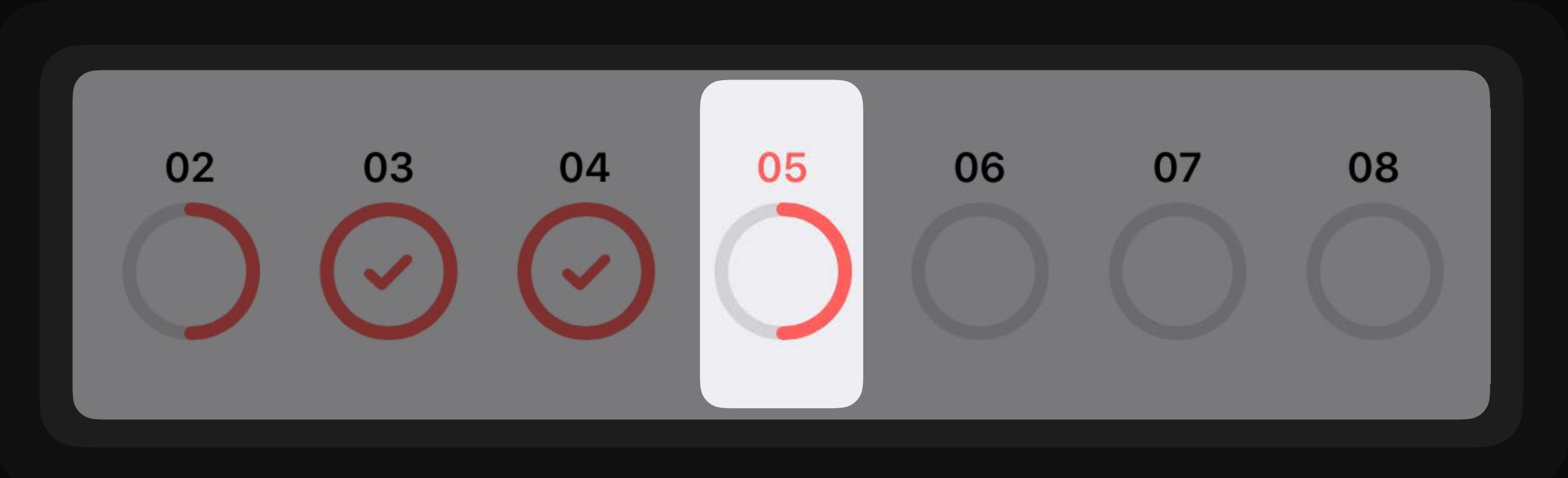
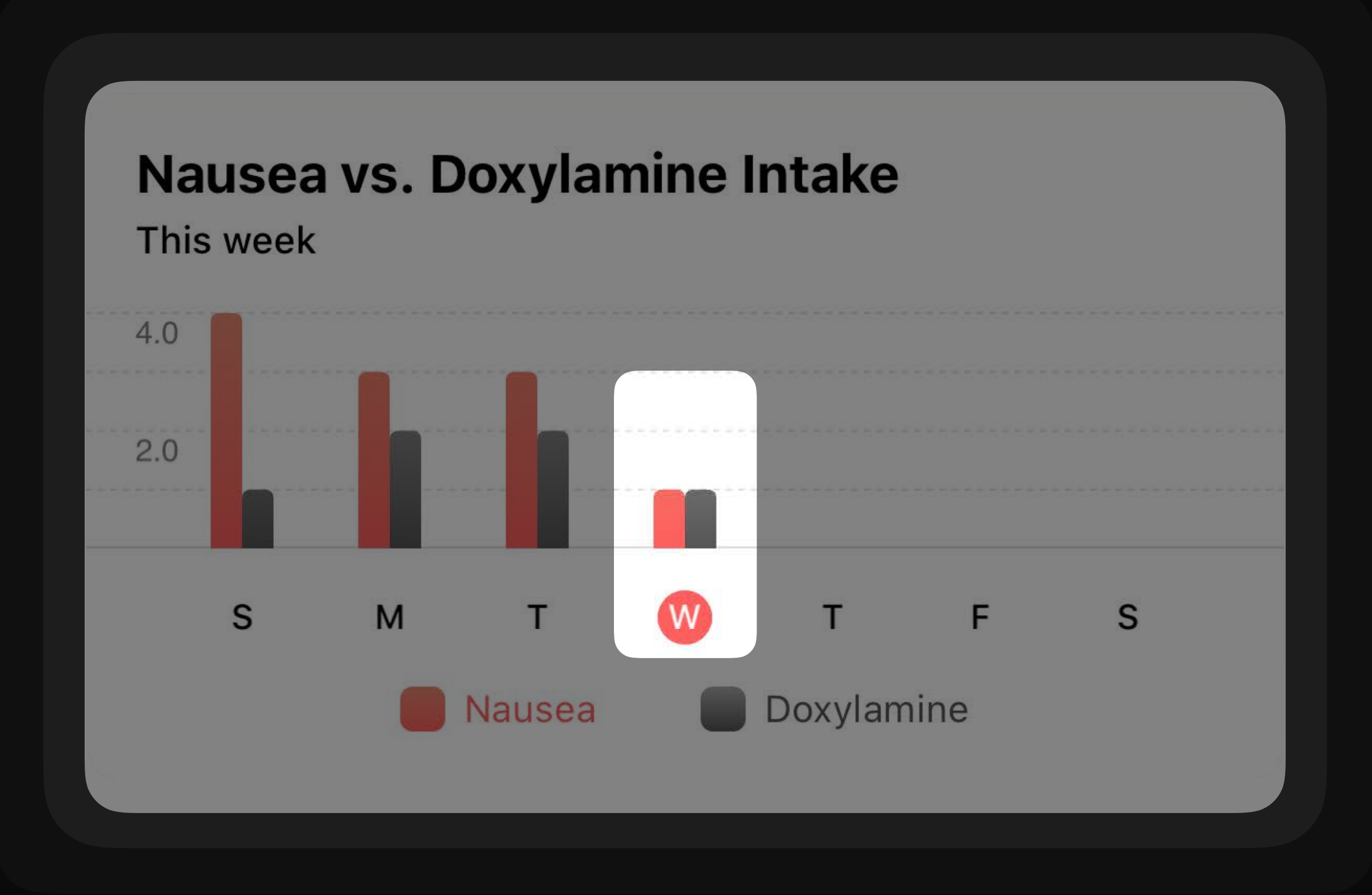
### Doxylamine

1 event remaining today

7:30 AM

2:00 PM

Take the tablet with a full glass of water.



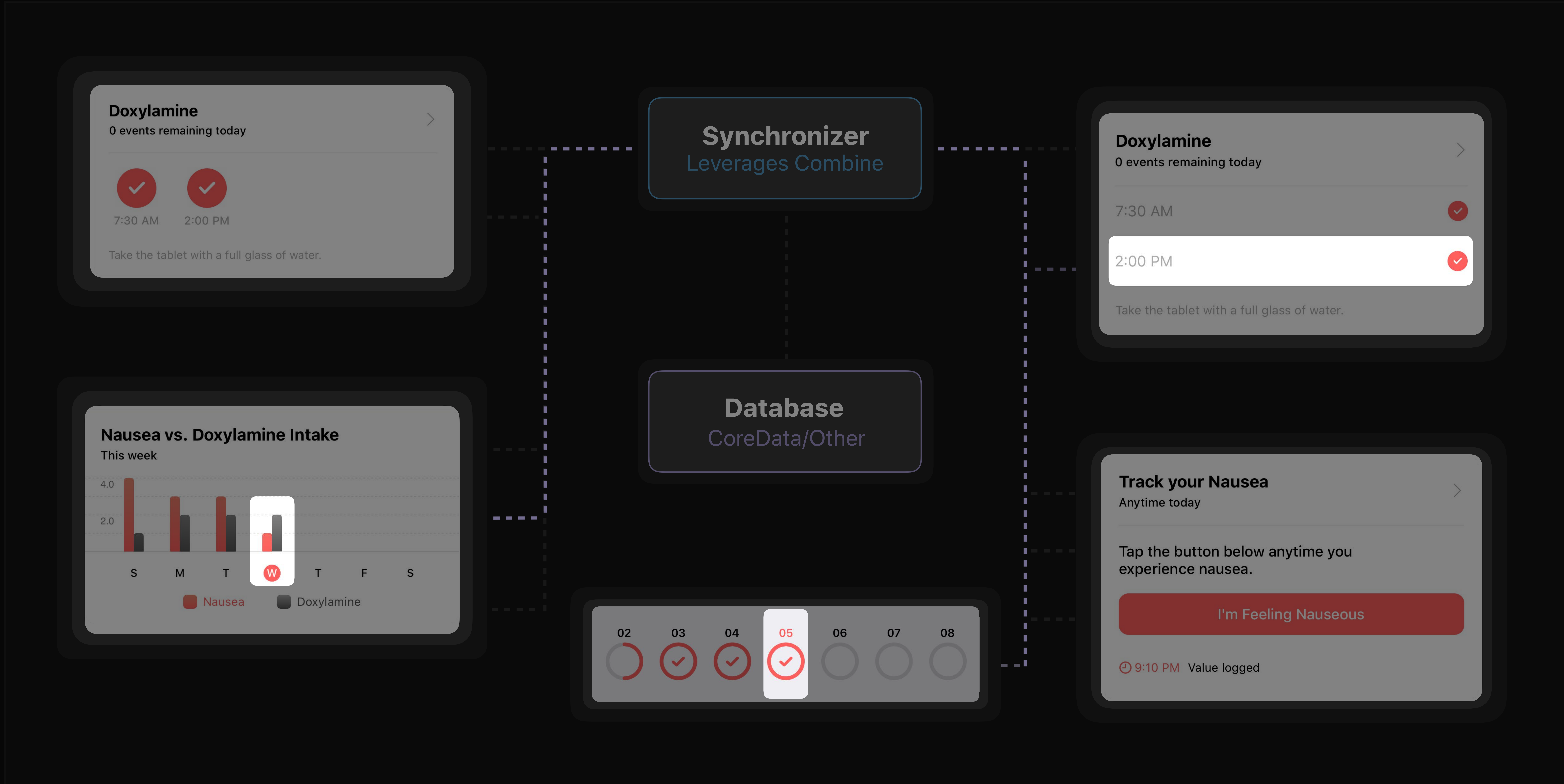
### Track your Nausea

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I'm Feeling Nauseous

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```
// importing CareKit also imports CareKitUI and CareKitStore  
import CareKit
```

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// importing CareKit also imports CareKitUI and CareKitStore
import CareKit

// create an instance of the CareKitStore with a unique identifier
let store = OCKStore(identifier: "store")
```

```
// importing CareKit also imports CareKitUI and CareKitStore
import CareKit

// create an instance of the CareKitStore with a unique identifier
let store = OCKStore(identifier: "store")

// instantiate a SynchronizedStoreManager by passing in the store
let manager = OCKSynchronizedStoreManager(wrapping: store)
```

```
// importing CareKit also imports CareKitUI and CareKitStore
import CareKit

// create an instance of the CareKitStore with a unique identifier
let store = OCKStore(identifier: "store")

// instantiate a SynchronizedStoreManager by passing in the store
let manager = OCKSynchronizedStoreManager(wrapping: store)

// create a stand-alone view controller that displays all scheduled tasks on a daily basis
let taskListViewController = OCKTaskListViewController(storeManager: manager)

present(taskListViewController, animated: true, completion: nil)
```

9:41



### Wednesday, Jun 5

#### Kegel Exercises

2 more times today



9:00 AM



12:00 PM



3:00 PM



6:00 PM

#### Nausea

Anytime today

Press the button anytime you feel nauseous

I'm Feeling Nauseous

🕒 11:21 AM Logged

#### Take Doxylamine

1 more time today

7:30 AM



2:00 PM



Tasks



Charts



Care Team

9:41

02 03 04 05 06 07 08

Wednesday, Jun 5

### Kegel Exercises

2 more times today

9:00 AM 12:00 PM 3:00 PM 6:00 PM

### Nausea

Anytime today

Press the button anytime you feel nauseous

I'm Feeling Nauseous

11:21 AM Logged

### Take Doxylamine

1 more time today

7:30 AM 2:00 PM

Tasks Charts Care Team

9:41

## Charts

### Nausea vs. Doxylamine Intake

This week

Day	Nausea	Doxylamine
S	4.0	1.0
M	3.0	2.0
T	3.0	2.0
W	1.0	1.0
T	0.0	0.0
F	0.0	0.0
S	0.0	0.0

### Hours of Sleep

Day	Last week	This week
S	6.0	5.0
M	6.0	8.0
T	6.0	8.0
W	6.0	6.0
T	9.0	6.0
F	5.0	6.0
S	6.0	6.0

### Nausea vs. Exercise

This month

0 10 20 30 40 50 60 min

Tasks Charts Care Team

9:41

## Care Team

**Matthew Reiff**  
OBGYN

Dr. Reiff is an OBGYN with 13 years of experience.

Call Message E-mail

**Address**  
396 El Verano Way  
San Francisco CA 94127

**Jane Daniels**  
Family Practice Doctor

Dr. Daniels is a family practice doctor with 8 years of experience.

Call Message E-mail

**Address**  
2598 Reposa Way  
San Francisco CA 94127

Tasks Charts Care Team

***Demo***

Erik Hornberger, Software Engineer

9:41

02 03 04 05 06 07 08

Wednesday, Jun 5

### Kegel Exercises

2 more times today

9:00 AM 12:00 PM 3:00 PM 6:00 PM

### Nausea

Anytime today

Press the button anytime you feel nauseous

I'm Feeling Nauseous

11:21 AM Logged

### Take Doxylamine

1 more time today

7:30 AM 2:00 PM

Tasks Charts Care Team

9:41

## Charts

### Nausea vs. Doxylamine Intake

This week

Day	Nausea	Doxylamine
S	4.0	1.0
M	3.0	2.0
T	3.0	2.0
W	1.0	1.0
T	0.0	0.0
F	0.0	0.0
S	0.0	0.0

### Hours of Sleep

Day	Last week	This week
S	6.0	5.5
M	6.0	8.0
T	6.0	8.0
W	6.0	6.0
T	7.0	6.0
F	5.0	6.0
S	6.0	6.0

### Nausea vs. Exercise

This month

0 10 20 30 40 50 60 min

Tasks Charts Care Team

9:41

## Care Team

**Matthew Reiff**  
OBGYN

Dr. Reiff is an OBGYN with 13 years of experience.

Call Message E-mail

**Address**  
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**Jane Daniels**  
Family Practice Doctor

Dr. Daniels is a family practice doctor with 8 years of experience.

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**Address**  
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Tasks Charts Care Team





**CareKit**



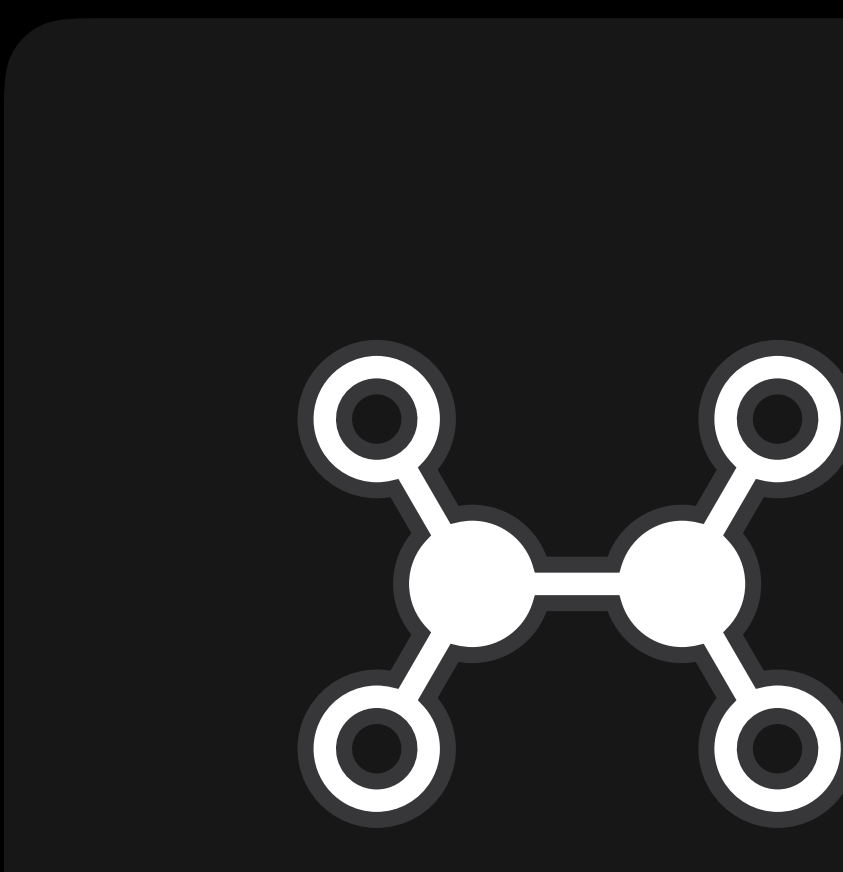
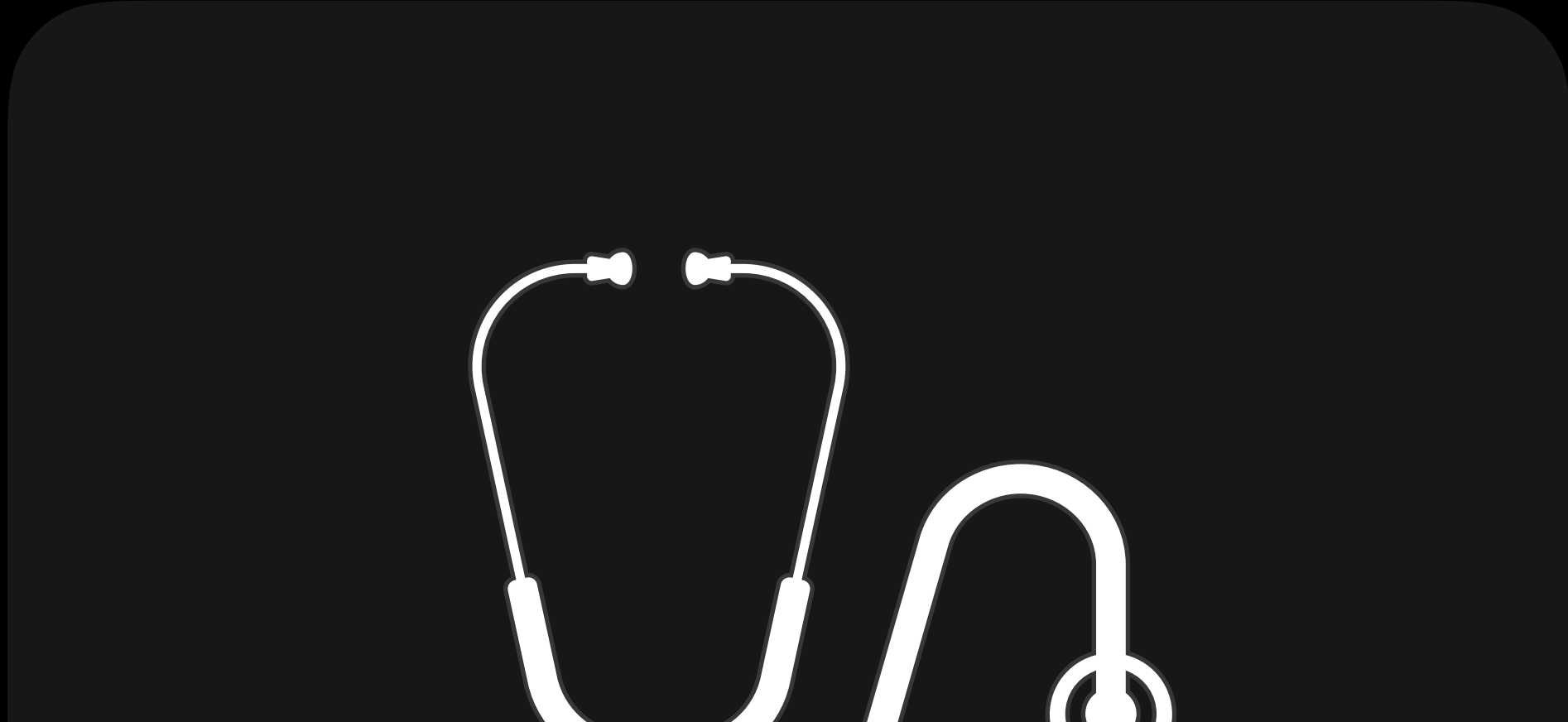
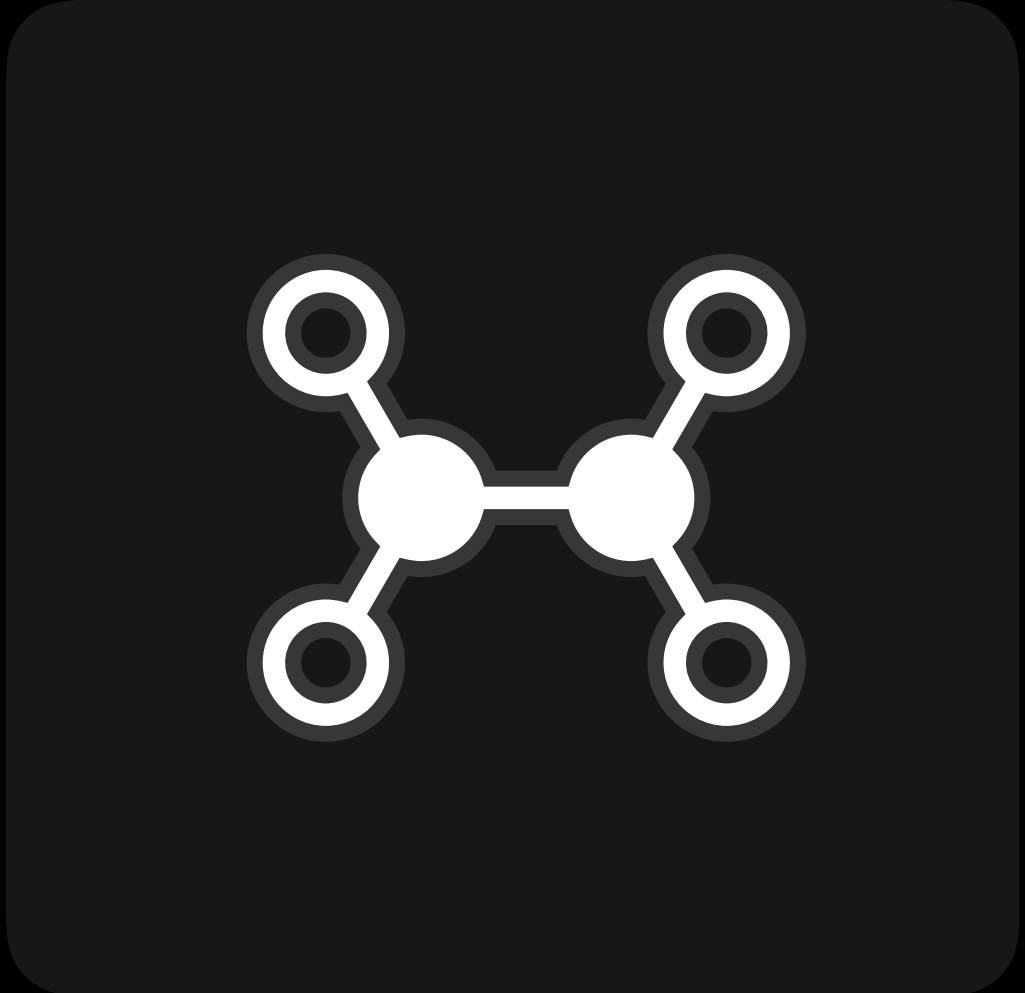
CareKit



ResearchKit



**Community Support**



# Available on GitHub!



**ResearchKit**

[github.com/researchkit/researchkit](https://github.com/researchkit/researchkit)



**CareKit**

[github.com/carekit-apple/CareKit/](https://github.com/carekit-apple/CareKit/)

2019  
**WWDC**  
TODAY



2019  
**WWDC**  
TODAY

2019  
**STABLE**  
SEPTEMBER

Please contribute!

# More Information

[developer.apple.com/wwdc19/217](https://developer.apple.com/wwdc19/217)

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Health and Fitness Technologies Lab

Wednesday, 3:00

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Introducing Combine and Advances in Foundation

Thursday, 10:00

---

ResearchKit and CareKit Lab

Thursday, 12:00

---



 WWDC19