MVCP (Myant Virtual Clinic Portal) - Complete Application Reconstruction

Overview

The Myant Virtual Clinic Portal (MVCP) is a comprehensive web application designed for clinicians to manage patients, monitor Holter studies, review ECG data, and track symptoms. This document provides a complete reconstruction of the application based on screenshot analysis.

Application Structure

The MVCP application consists of several main sections accessible through a navigation menu:

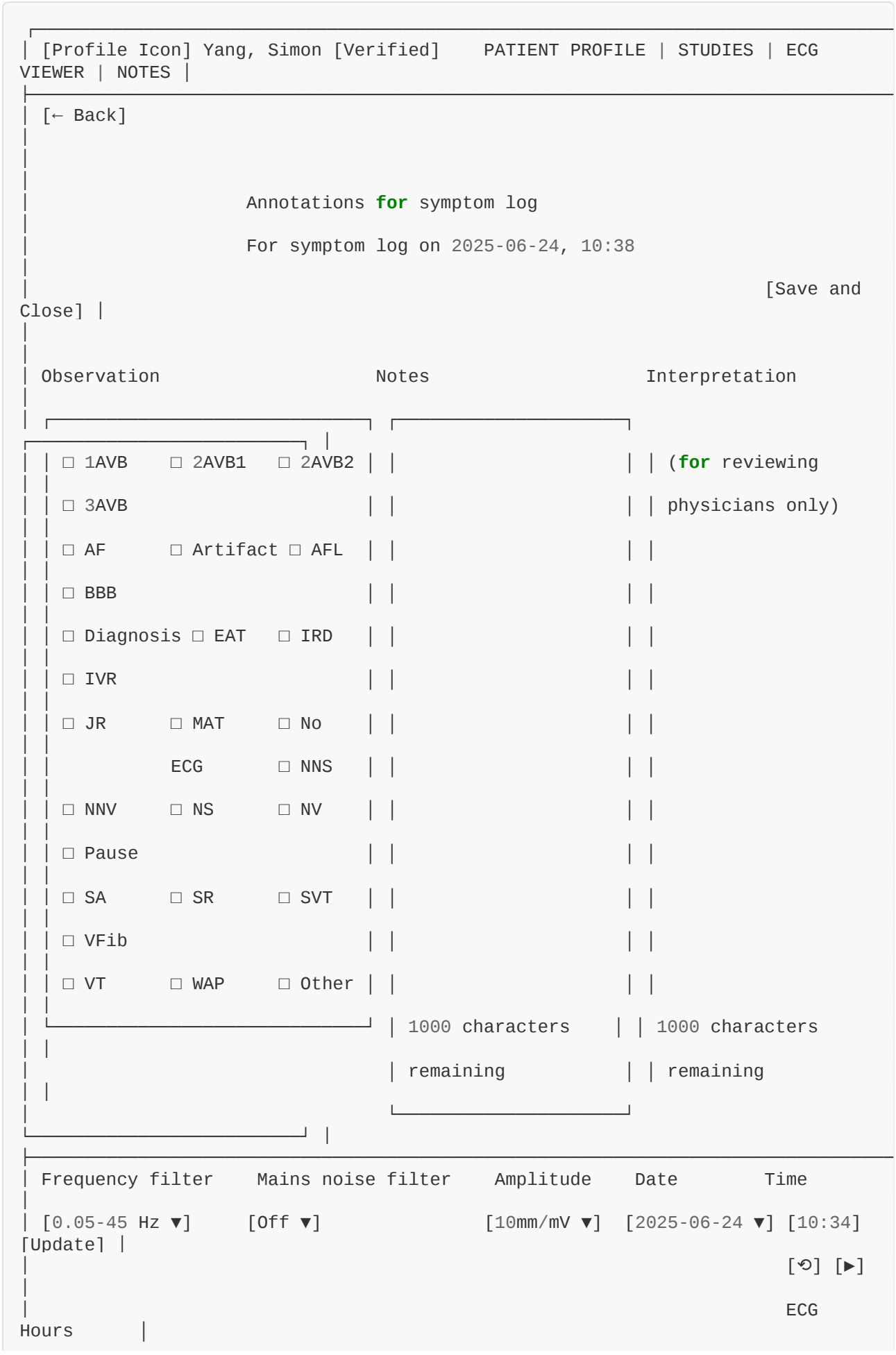
1. **Symptom Log** - Main dashboard for reviewing patient symptoms
2. **Patients** - Patient management and registration
3. **Studies** - Holter study management and monitoring
4. **ECG Viewer** - Advanced ECG data visualization and analysis
5. **Notes** - Clinical notes and documentation
6. **Organization** - Team and member management

Screen-by-Screen Analysis

1. ECG Viewer - Symptom Annotation Screen

File: MVCP2025-06-24at10.39.26.png

Layout:


[Profile Icon] Yang, Simon [Verified]
PATIENT PROFILE | STUDIES | ECG VIEWER | NOTES
[← Back]
Annotations for symptom log
For symptom log on 2025-06-24, 10:38
[Save and Close]
Observation
Notes
Interpretation
□ 1AVB □ 2AVB1 □ 2AVB2
□ 3AVB
□ AF □ Artifact □ AFL
□ BBB
□ Diagnosis □ EAT □ IRD
□ IVR
□ JR □ MAT □ No ECG □ NNS
□ NNV □ NS □ NV
□ Pause
□ SA □ SR □ SVT
□ VFib
□ VT □ WAP □ Other
1000 characters remaining
1000 characters remaining
(for reviewing physicians only)
Frequency filter
[0.05-45 Hz ▼]
Mains noise filter
[Off ▼]
Amplitude
[10mm/mV ▼]
Date
[2025-06-24 ▼]
Time
[10:34]
[Update]
[⟲] [▶]
ECG Hours

```
├──────────────────────────────────────────────────────────────────────────────────────┐
| Full View: 10:34:30 - 10:38:30    Channel ● 1 ○ 2 ○ 3    ◄ Previous. 4m
Next. 4m ►|
|
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
|
|
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
|
|
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
|
|
|
|
| Expanded View: 10:38:20 - 10:38:30                          All channels
|
| [ECG waveform grid with detailed view]
|
└──────────────────────────────────────────────────────────────────────────────────────┘
```

Right Panel:

```
 ┌──────────────────────────────┐
| [Symptom Details] [Contextual|
|                   Metrics]   |
├──────────────────────────────┤
| Sweating                     |
|                              |
| Severity      Duration       |
| 5/10          On Going       |
|                              |
| Possible Triggers            |
| Caffeine                     |
|                              |
| Patient's note               |
└──────────────────────────────┘
```

Interactive Elements: - Back button: Returns to previous screen - Save and Close button: Saves annotations and closes modal - Observation checkboxes: Multiple selection for ECG observations - Notes text area: Free text input (1000 char limit) - Interpretation text area: Free text input (1000 char limit) - Filter controls: Dropdown menus for ECG display settings - Update button: Applies filter changes - Channel selection: Radio buttons for ECG channels - Navigation arrows: Previous/Next 4-minute segments - ECG Hours link: Likely opens time-based navigation - Symptom Details/Contextual Metrics tabs: Switch between views

2. ECG Viewer - Symptom Logs Tab

File: MVCP2025-06-24at10.39.14.png

Layout:

```
┌──────────────────────────────────────────────────────────────────────────────
│ [Profile Icon] Yang, Simon [Verified]    PATIENT PROFILE | STUDIES | ECG
VIEWER | NOTES │
├──────────────────────────────────────────────────────────────────────────────
│ [Symptom logs] [ECG tags]
│
│
│
│ Status (All) ▼    Date (All) ▼    [Reset]    [?]                   Page 1 of
1    │
│
│
│ SYMPTOM DATE AND TIME | REPORTED DATE AND TIME | STATUS ▼ | SYMPTOMS
EXPERIENCED | ANNOTATIONS │
│ 2025-06-24 10:38      | 2025-06-24 10:38       | [Pending review ▼] | Sweating
│ Add annotations │
│                       |                          |                      |
│ Holter Dates    │
├──────────────────────────────────────────────────────────────────────────────
│ Frequency filter    Mains noise filter    Amplitude    Date        Time
│
│ [0.05-45 Hz ▼]     [Off ▼]              [10mm/mV ▼]  [2025-06-24 ▼] [10:35]
[Update] │
│                                                                       [⟲] [▶]
│
│                                                                       ECG
Hours      │
├──────────────────────────────────────────────────────────────────────────────
│ Full View: 10:35:30 - 10:39:30    Channel ● 1 ○ 2 ○ 3    ◀ Previous. 4m
Next. 4m ▶│
│
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
│
│
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
│
│
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
│
│
│
│ Expanded View: 10:35:30 - 10:35:40                       All channels
│
│ [ECG waveform grid with detailed view - Ch1 labeled]
│
└──────────────────────────────────────────────────────────────────────────────
```

Right Panel:

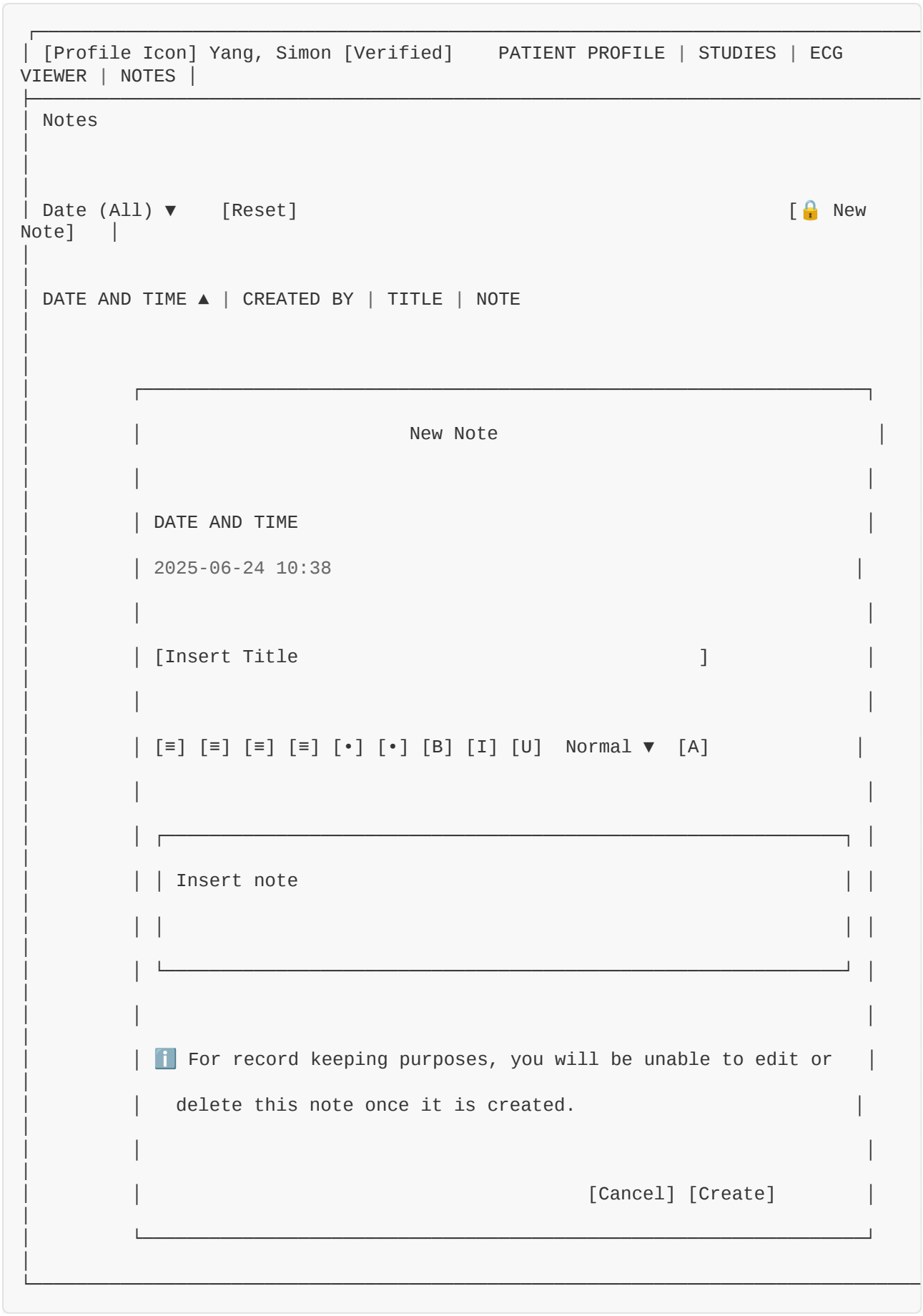
```
┌──────────────────────────────────┐
| [Symptom Details] [Contextual|
|                   Metrics]  |
├──────────────────────────────────┤
| Click on a symptom log to   |
| view more details about     |
| what the patient           |
| experienced.               |
└──────────────────────────────────┘
```

Interactive Elements: - Symptom logs/ECG tags tabs: Switch between different views - Status filter dropdown: Filter symptoms by status (All, Pending review, etc.) - Date filter dropdown: Filter by date range - Reset button: Clear all filters - Help icon (?): Provides contextual help - Status dropdown in table: Change individual symptom status - "Add annotations" link: Opens annotation modal for specific symptom - "Holter Dates" link: Likely shows study date information - All ECG viewer controls same as previous screen - Symptom log rows: Clickable to view details in right panel

3. Notes Section - New Note Modal

File: MVCP2025-06-24at10.38.06.png

Layout:


[Profile Icon] Yang, Simon [Verified]
PATIENT PROFILE | STUDIES | ECG VIEWER | NOTES
Notes
Date (All) ▼
[Reset]
[🔒 New Note]
DATE AND TIME ▲ | CREATED BY | TITLE | NOTE
New Note
DATE AND TIME
2025-06-24 10:38
[Insert Title]
[≡] [≡] [≡] [≡] [•] [•] [B] [I] [U] Normal ▼ [A]
Insert note
ℹ️ For record keeping purposes, you will be unable to edit or delete this note once it is created.
[Cancel] [Create]

Interactive Elements: - New Note button: Opens note creation modal - Date filter dropdown: Filter notes by date - Reset button: Clear filters - Title input field: Text input for note title - Rich text editor toolbar: Text formatting options (alignment, lists, bold, italic, underline) - Style dropdown: Text style selection - Note content area: Rich text editor for note body - Cancel button: Close modal without saving - Create button: Save new note

4. Notes Section - Empty State

File: MVCP2025-06-24at10.38.01.png

Layout:

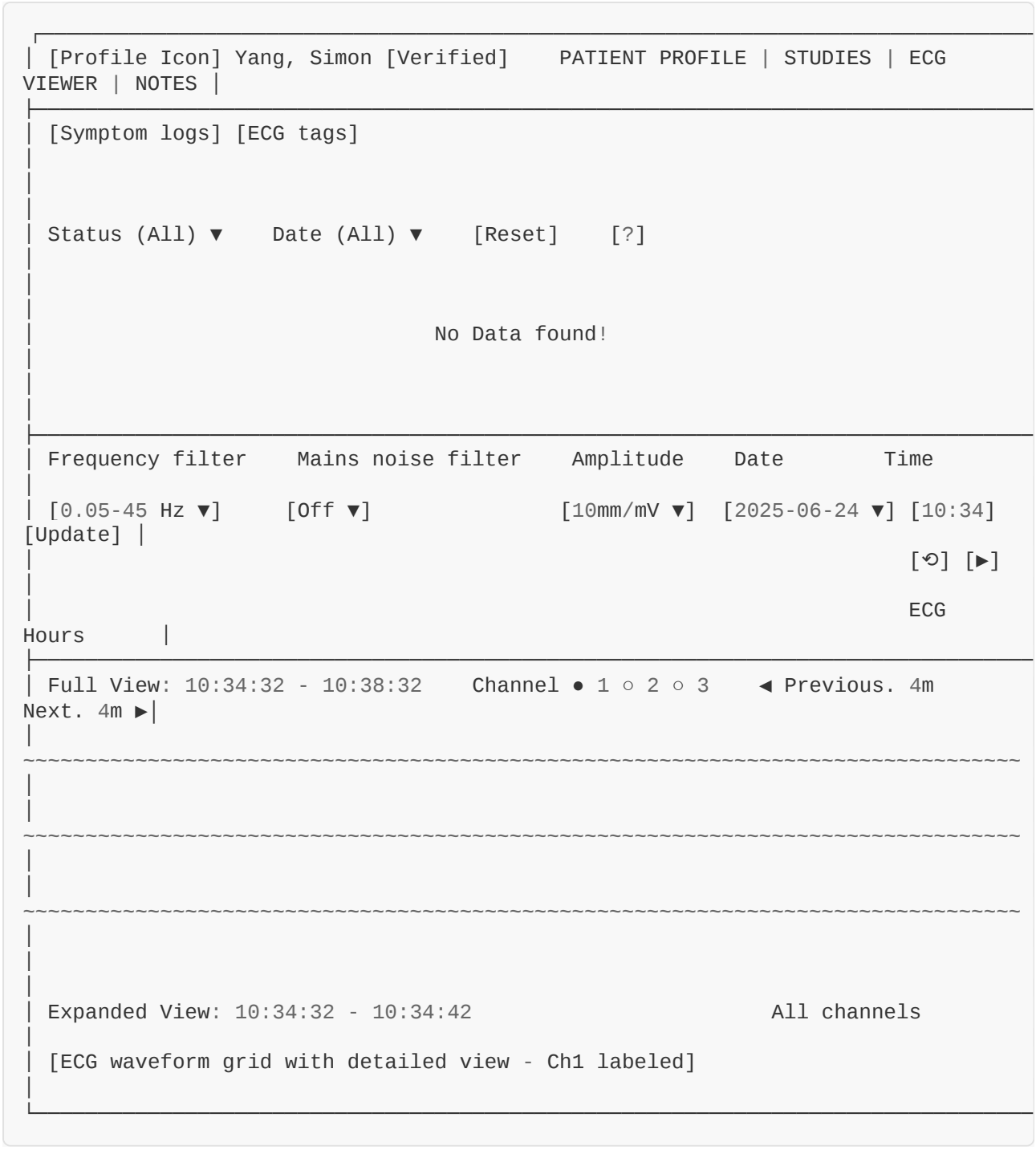
```
┌─────────────────────────────────────────────────────────────────────────────────
│ [Profile Icon] Yang, Simon [Verified]    PATIENT PROFILE | STUDIES | ECG VIEWER | NOTES │
├─────────────────────────────────────────────────────────────────────────────────
│ Notes
│
│
│
│ Date (All) ▼    [Reset]                                           [🔒 New Note]   │
│
│
│ DATE AND TIME ▲ | CREATED BY | TITLE | NOTE
│
│
│
│
│
│                          No Notes found for the given filters!
│
│
│
│
│
└─────────────────────────────────────────────────────────────────────────────────
```

Interactive Elements: - Same header controls as new note modal - Empty state message when no notes match current filters

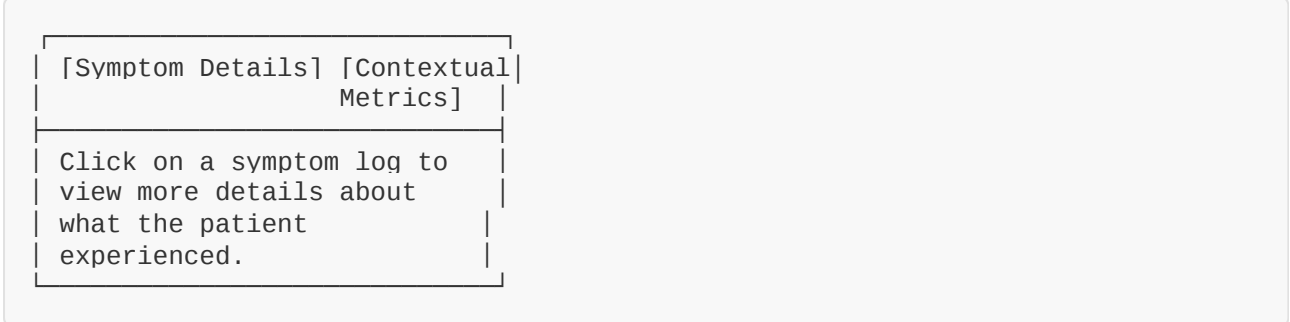
5. ECG Viewer - ECG Tags Tab (Empty State)

File: MVCP2025-06-24at10.37.54.png

Layout:


[Profile Icon] Yang, Simon [Verified]
PATIENT PROFILE | STUDIES | ECG VIEWER | NOTES
[Symptom logs] [ECG tags]
Status (All) ▼
Date (All) ▼
[Reset]
[?]
No Data found!
Frequency filter
Mains noise filter
Amplitude
Date
Time
[0.05-45 Hz ▼]
[Off ▼]
[10mm/mV ▼]
[2025-06-24 ▼]
[10:34]
[Update]
[⟲] [▶]
ECG Hours
Full View: 10:34:32 - 10:38:32
Channel ● 1 ○ 2 ○ 3
◄ Previous. 4m
Next. 4m ►
Expanded View: 10:34:32 - 10:34:42
All channels
[ECG waveform grid with detailed view - Ch1 labeled]

Right Panel:


[Symptom Details]
[Contextual Metrics]
Click on a symptom log to view more details about what the patient experienced.

6. Studies Section - Holter Study Setup Modal

File: MVCP2025-06-24at10.37.46.png

Layout:


[Profile Icon] Yang, Simon [Verified]
PATIENT PROFILE | STUDIES | ECG VIEWER | NOTES
Studies
[Set up Holter study]
Holter studies
Page 1 of 1
START DATE ▼ | STUDY DURATION | ... | STUDY PROGRESS | EDF DOWNLOAD
2025-06-24 10:21 | 14-days | ... | Avg. 0 hrs of usable ECG/day | -
Set up Holter study
Select the duration of the Holter study
○ 24-hour ○ 48-hour ○ 72-hour
○ 7-day ● 14-day
Select study start date
Year Month
[2025 ▼] [June ▼]
SUN MON TUE WED THU FRI SAT
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 [24] 25 26 27 28
29 30
Select study start time
[10:37]
Holter Study setup information

Interactive Elements: - Set up Holter study button: Opens study creation modal - Duration radio buttons: Select study length (24-hour, 48-hour, 72-hour, 7-day, 14-day) - Year/Month dropdowns: Navigate calendar - Calendar grid: Select start date (24th is selected) - Time input: Set start time - Setup Type dropdown: Choose setup method - Garment Type dropdown: Select device type - Garment Size dropdown: Select size

7. Studies Section - Study Progress Modal

File: MVCP2025-06-24at10.37.37.png

Layout:

```
┌──────────────────────────────────────────────────────────────────────────────
| [Profile Icon] Yang, Simon [Verified]    PATIENT PROFILE | STUDIES | ECG
VIEWER | NOTES |
├──────────────────────────────────────────────────────────────────────────────
| Studies                                                       [Set up Holter
study] |
|
|
| Holter studies                                                         Page
1 of 1 |
|
|
| START DATE ▼ | STUDY DURATION | ... | STUDY PROGRESS | EDF DOWNLOAD
|
| 2025-06-24 10:21 | 14-days     | ... | Avg. 0 hrs of usable ECG/day | -
|
|
|
|
┌─────────────────────────────────────────────────────────────────────────────┐
|
|    |        Study progress for 14-days Holter study started on 2025-06-24,
10:21| |
|    |
| |
|    | Select a date on the calendar to view an hour by hour breakdown of the
| |
|    | patient's ECG data collection progress.
| |
|    |
| |
|    |                          Usable ECG / Total ECG
| |
|    | Year        Month
| |
|    | [2025 ▼]    [June ▼]
| |
|    |
| |
|    | SUN MON TUE WED THU FRI SAT
| |
|    |  1   2   3   4   5   6   7
| |
|    |  8   9  10  11  12  13  14
| |
|    | 15  16  17  18  19  20  21
| |
|    | 22  23 [24] 25  26  27  28
| |
|    | 29  30
| |
|    |
| |
|    | 00:00  0 mins / 0 mins    12:00  0 mins / 0 mins
| |
|    | 01:00  0 mins / 0 mins    13:00  0 mins / 0 mins
| |
|    | 02:00  0 mins / 0 mins    14:00  0 mins / 0 mins
| |
|    | 03:00  0 mins / 0 mins    15:00  0 mins / 0 mins
| |
```

```
|     | 04:00  0 mins / 0 mins    16:00  0 mins / 0 mins
| |
|     | 05:00  0 mins / 0 mins    17:00  0 mins / 0 mins
| |
|     | 06:00  0 mins / 0 mins    18:00  0 mins / 0 mins
| |
|     | 07:00  0 mins / 0 mins    19:00  0 mins / 0 mins
| |
|     | 08:00  0 mins / 0 mins    20:00  0 mins / 0 mins
| |
|     | 09:00  0 mins / 0 mins    21:00  0 mins / 0 mins
| |
|     | 10:00  0 mins / 0 mins    22:00  0 mins / 0 mins
| |
|     | 11:00  0 mins / 0 mins    23:00  0 mins / 0 mins
| |
|     |
| |
|     | Legend (Percentage of Usable Data Collected for Each Hour):
| |
|     | [Gray] 0%  [Light Green] 1-24%  [Green] 25-50%  [Dark Green] >50%
| |
|     |
| |
|     | 0 hr 0 min of usable ECG / 0 hr 0 min of total ECG for the day
| |
|     |
| |
|     |                                      [Close]
| |
|
└──────────────────────────────────────────────────────────────────────────────┘
|
└──────────────────────────────────────────────────────────────────────────────
```

8. Studies Section - Main List View

File: MVCP2025-06-24at10.37.31.png

Layout:

```
┌─────────────────────────────────────────────────────────────────────────────────
│ [Profile Icon] Yang, Simon [Verified]    PATIENT PROFILE | STUDIES | ECG
VIEWER | NOTES │
├─────────────────────────────────────────────────────────────────────────────────
│ Studies                                                        [Set up Holter
study] │
│
│
│ Holter studies                                                          Page
1 of 1 │
│
│
│ START DATE ▼ | STUDY DURATION | STATUS | ESTIMATED END DATE | ACTUAL END DATE
| STUDY PROGRESS | EDF DOWNLOAD │
│ 2025-06-24 10:21 | 14-days | Ongoing | 2025-07-08 | -- | Avg. 0 hrs of usable
ECG/day | - │
└─────────────────────────────────────────────────────────────────────────────────
```

Interactive Elements: - Study progress modal: - Year/Month dropdowns: Navigate calendar - Calendar dates: Click to view hourly breakdown - Close button: Close modal - Hourly data display: Shows usable vs total ECG minutes - Color-coded legend: Visual indicator for data quality - Studies list: - Column headers: Sortable (START DATE has sort indicator) - Study progress link: Opens progress modal - Set up Holter study button: Opens study creation modal

9. Patient Profile Section

File: MVCP2025-06-24at10.37.24.png

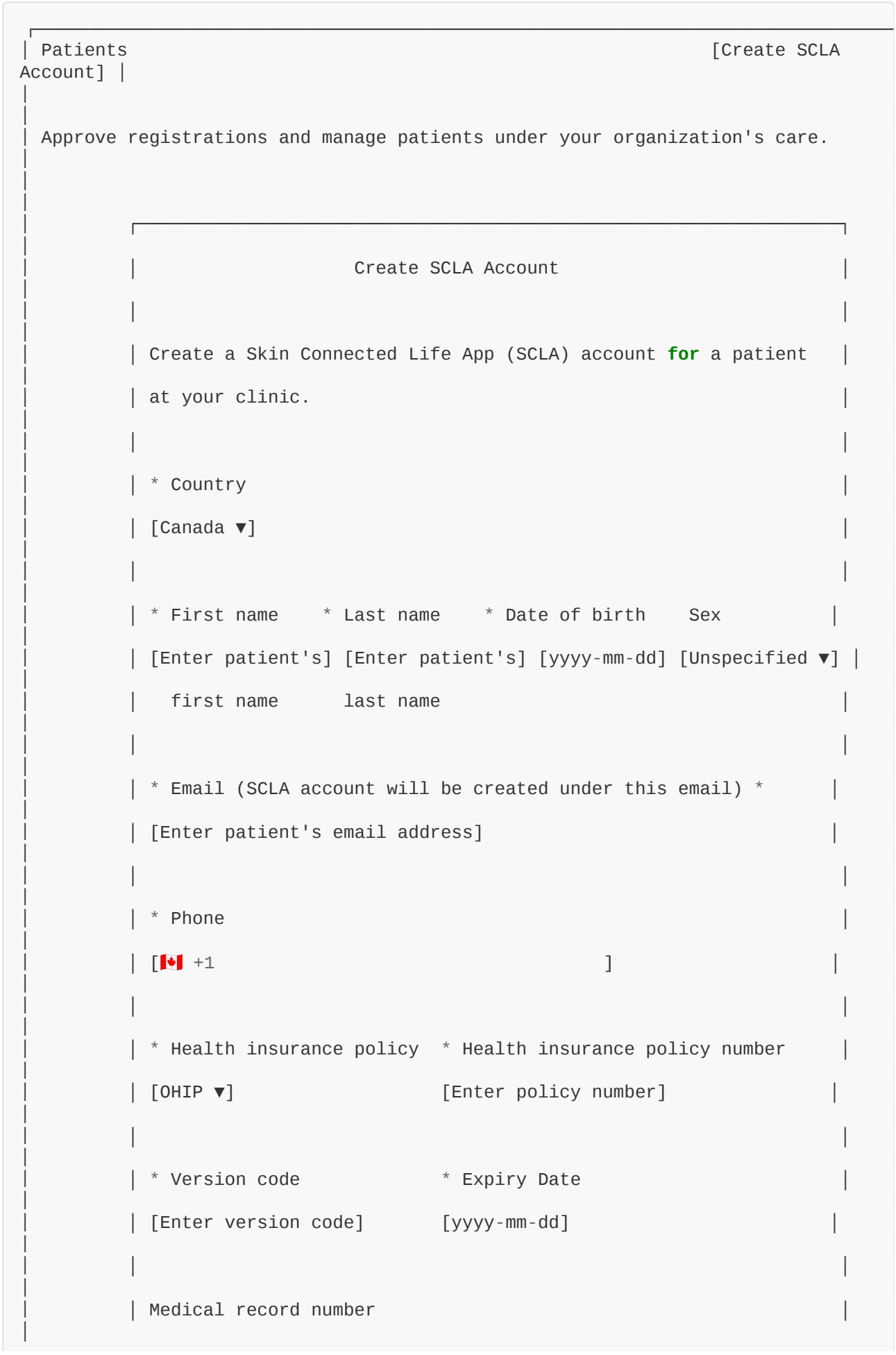
Layout:

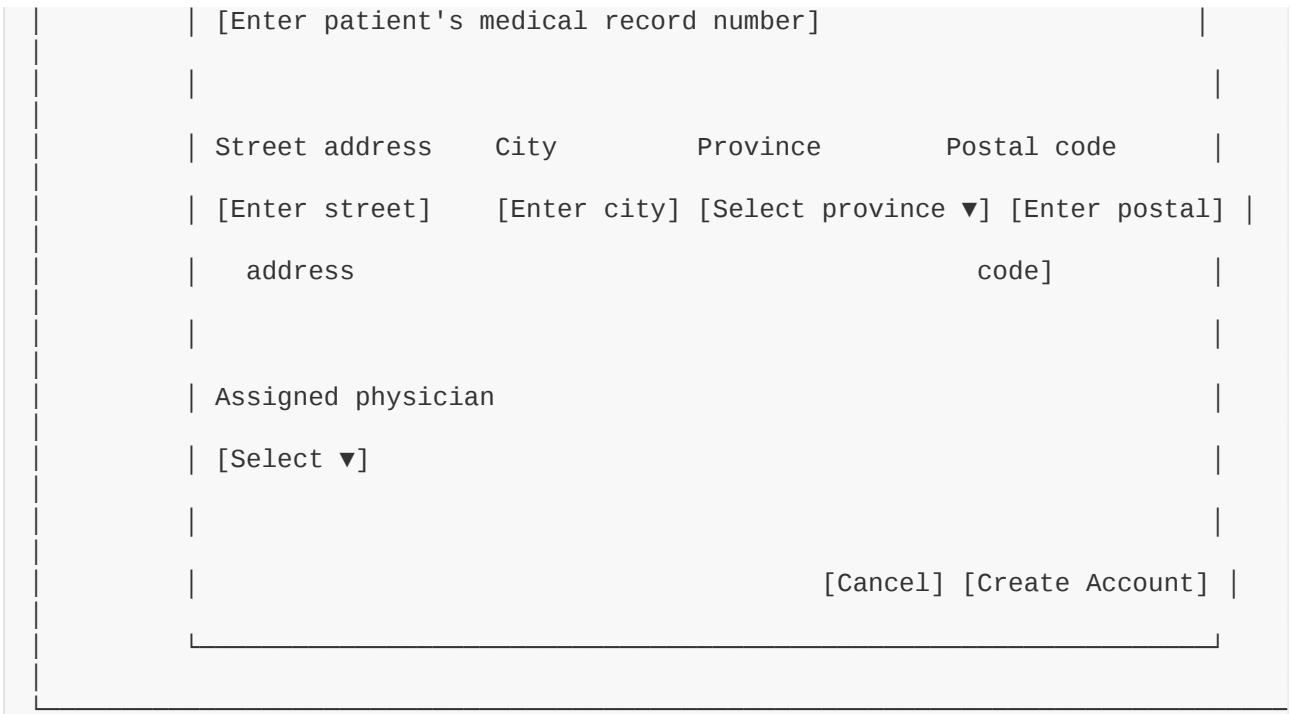
```
┌──────────────────────────────────────────────────────────────────────────────
│ [Profile Icon] Yang, Simon [Verified]    PATIENT PROFILE | STUDIES | ECG
VIEWER | NOTES │
├──────────────────────────────────────────────────────────────────────────────
│ Patient Profile                                [Edit]                [SCLA
Login Code] │
│
│
│ Country
│
│ [Switzerland ▼]
│
│
│
│ First name        Last name         Date of birth      Sex
│
│ [Simon]           [Yang]            [1989-07-10]       [Male ▼]
│
│
│
│ Email                                 Phone
│
│ [simon.yang.ch@gmail.com]            [🇨🇭 +41 78 795 00 09]
│
│
│
│ Health insurance policy               Insurance number
│
│ [Avenir (Groupe Mutuel) ▼]           [7561234567897]
│
│
│
│ Medical record number
│
│ [                                ]
│
│
│
│ Street address      City              Postal code
│
│ [Ackersteinstrasse 76] [Zurich]       [8049]
│
│
│
│ Assigned physician
│
│ [Peter Wood ▼]
│
│
│
│ [Archive Patient]                     Associated Pod: 31067601890 (view
history)     │
└──────────────────────────────────────────────────────────────────────────────
```

10. Patients Section - Create SCLA Account Modal (Form)

File: MVCP2025-06-24at10.37.13.png

Layout:


Patients
[Create SCLA Account]
Approve registrations and manage patients under your organization's care.
Create SCLA Account
Create a Skin Connected Life App (SCLA) account for a patient at your clinic.
* Country
[Canada ▼]
* First name
[Enter patient's first name]
* Last name
[Enter patient's last name]
* Date of birth
[yyyy-mm-dd]
Sex
[Unspecified ▼]
* Email (SCLA account will be created under this email) *
[Enter patient's email address]
* Phone
[+1]
* Health insurance policy
[OHIP ▼]
* Health insurance policy number
[Enter policy number]
* Version code
[Enter version code]
* Expiry Date
[yyyy-mm-dd]
Medical record number

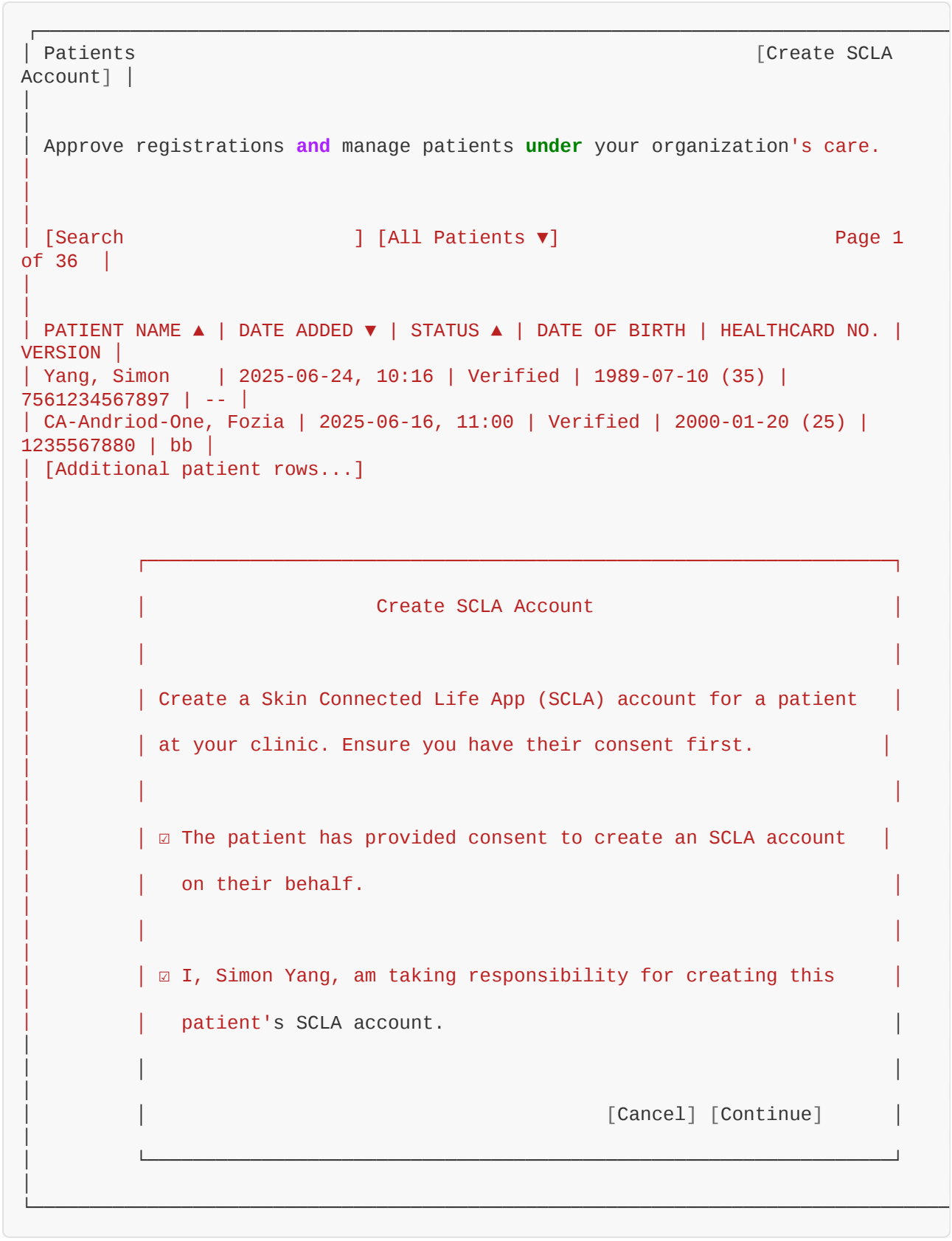


Interactive Elements: - Patient Profile: - Edit button: Enable form editing - SCLA Login Code button: Generate/view login code - All form fields: Editable when in edit mode - Archive Patient button: Archive patient record - View history link: Show pod association history - Create SCLA Account Modal: - All form fields with validation (asterisk indicates required) - Country dropdown: Select patient's country - Date inputs: Date picker for birth date and expiry - Phone field: Country code selector with phone input - Cancel button: Close modal without saving - Create Account button: Submit form and create account

11. Patients Section - Create SCLA Account Confirmation

File: MVCP2025-06-24at10.37.07.png

Layout:



12. Patients Section - Main List View

File: MVCP2025-06-24at10.37.00.png

Layout:

[Profile Icon] Simon Yang

Staging Clinic

373535

Turn on multi-factor authentication

≡ Symptom Log

👥 Patients

📋 Studies

🏢 Organization

❓ User Manual

🚪 Logout

Patients [Create SCLA Account]

Approve registrations and manage patients under your organization's care.

[Search] [All Patients ▼] Page 1 of 36

PATIENT NAME ▲	DATE ADDED ▼	STATUS ▲	DATE OF BIRTH	HEALTHCARD NO.	VERSION
Yang, Simon	2025-06-24, 10:16	Verified	1989-07-10 (35)	7561234567897	--
CA-Andriod-One, Fozia	2025-06-16, 11:00	Verified	2000-01-20 (25)	1235567880	bb
CA-Andriod, Fozia	2025-06-16, 10:27	Verified	2000-01-20 (25)	1235567880	bb
Prabhakaran, Praseena	2025-06-12, 16:06	Verified	1990-10-04 (34)	2433243434	ff
Rhino, Rick-HolterCloseTestOne	2025-06-11, 11:49	Verified	1985-06-11 (40)	9876543211	RR
Prabhakaran, Praseena	2025-06-10, 13:57	Verified	1989-10-16 (35)	1234567890	PP
MHDS 2.3.1 test, Praseena	2025-05-12, 15:10	Verified	1990-10-04 (34)	1234567890	PP
android, Fozia 2.3.1	2025-05-12, 12:29	Verified	2000-01-20 (25)	1236567880	bb
MHDS 2.3 Study Test, Praseena	2025-04-23, 14:25	Verified	1001-08-08 (1023)	1234567890	zz
MHDS 2.3 Regression Test, Praseena	2025-04-23, 13:01	Verified	1989-10-16 (35)	1234567890	VV

Interactive Elements: - Left sidebar navigation: - Symptom Log: Navigate to symptom log section - Patients: Current section (highlighted) - Studies: Navigate to studies section - Organization: Navigate to organization management - User Manual: Open help documentation - Logout: Sign out of application - Patient list: - Search field: Filter patients by name - All Patients dropdown: Filter by patient status - Column headers: Sortable (arrows indicate sort direction) - Patient rows: Clickable to view patient details - Pagination: Navigate through patient pages - Create SCLA Account confirmation: - Consent checkboxes: Required confirmations - Cancel/Continue buttons: Modal navigation

13. Symptom Log - Main View with Status Filter

File: MVCP2025-06-24at10.36.51.png

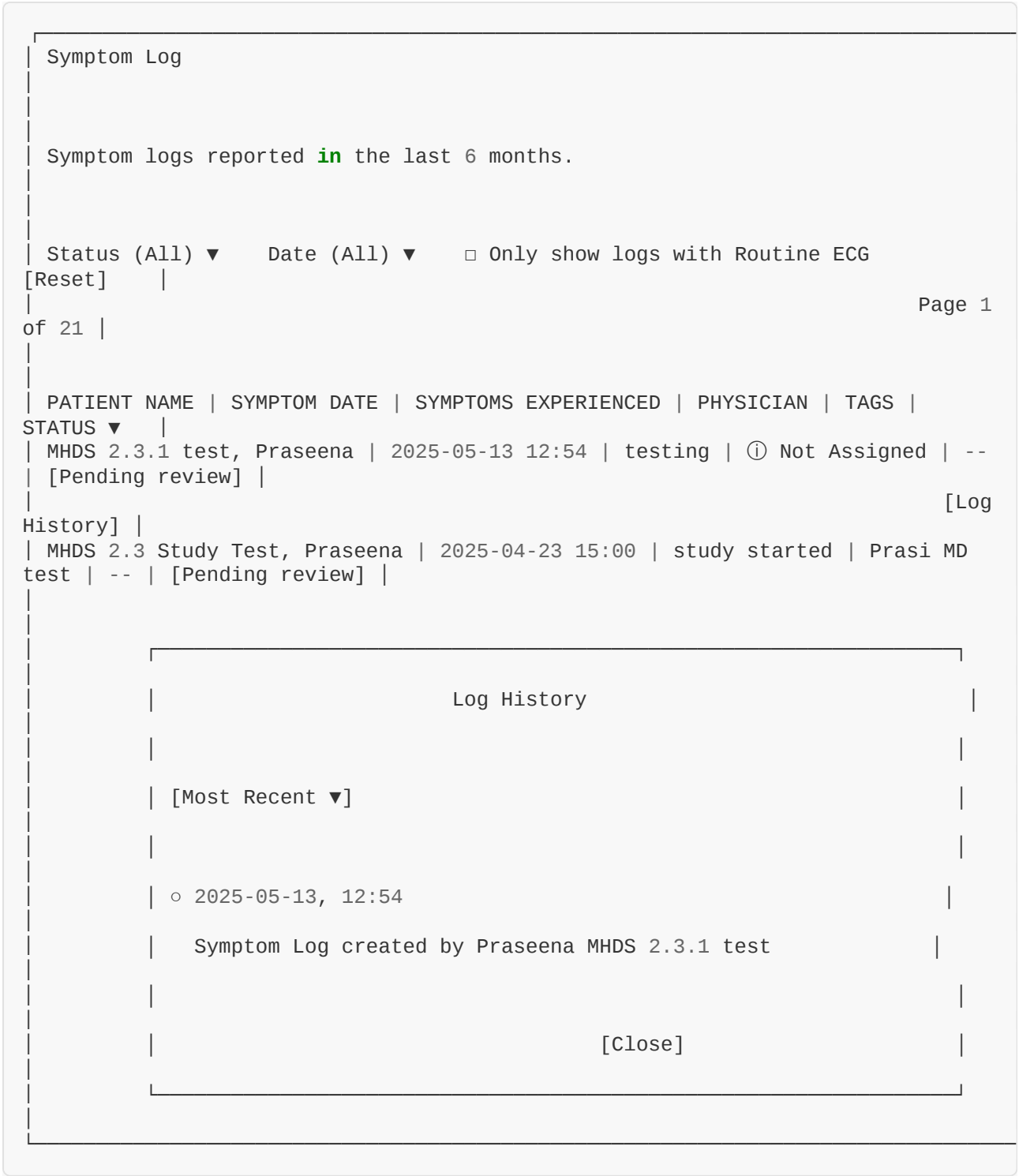
Layout:

```
┌
│ Symptom Log
│
│
│
│ Symptom logs reported in the last 6 months.
│
│
│
│ Status (All) ▲    Date (All) ▼    ☐ Only show logs with Routine ECG
[Reset]    │
│ ┌──────────────────┐                                          Page 1
of 21 │
│ │ ☑ Pending review│
│
│ │ ☑ MD to review  │
│
│ │ ☑ Reviewed by MD│
│
│ │ ☑ Reviewed by tech│
│
│ │ [Cancel] [Apply]│
│
│ └──────────────────┘
│
│
│
│ PATIENT NAME | SYMPTOM DATE | SYMPTOMS EXPERIENCED | PHYSICIAN | TAGS |
STATUS ▼   │
│ MHDS 2.3.1 test, Praseena | 2025-05-13 12:54 | testing | ⓘ Not Assigned | --
| [Pending review] |
│ MHDS 2.3 Study Test, Praseena | 2025-04-23 15:00 | study started | Prasi MD
test | -- | [Pending review] |
│ MHDS 2.3 Regression Test, Praseena | 2025-04-23 14:00 | new patient new study
| ⓘ Not Assigned | -- | [Pending review] |
│ MHDS 2.3 Testing, Praseena | 2025-04-23 12:59 | testing | ⓘ Not Assigned | -
- | [Pending review] |
│ MHDS 2.3 test, Praseena | 2025-04-22 23:25 | Routine ECG | ⓘ Not Assigned |
-- | [Pending review] |
│ Android 1, Fozia 2.3 | 2025-04-21 12:25 | Routine ECG | ⓘ Not Assigned | --
| [Pending review] |
│ Android 1, Fozia 2.3 | 2025-04-21 12:23 | band to left | ⓘ Not Assigned | --
| [Pending review] |
│ Android 1, Fozia 2.3 | 2025-04-21 12:21 | band normal | ⓘ Not Assigned | --
| [Pending review] |
│ Android 1, Fozia 2.3 | 2025-04-21 12:14 | moving band to right | ⓘ Not
Assigned | -- | [Pending review] |
└
```

14. Symptom Log - Log History Modal

File: MVCP2025-06-24at10.36.41.png

Layout:



15. Symptom Log - Main View (Sidebar Visible)

File: MVCP2025-06-24at10.36.25.png

Layout:

[Profile Icon] Simon Yang

Staging Clinic

373535

Turn on multi-factor authentication

≡ Symptom Log

👥 Patients

📋 Studies

🏢 Organization

❓ User Manual

🚪 Logout

Symptom Log

Symptom logs reported in the last 6 months.

Status (All) ▼ Date (All) ▼ ☐ Only show logs with Routine ECG [Reset]

Page 1 of 21

PATIENT NAME	SYMPTOM DATE	SYMPTOMS EXPERIENCED	PHYSICIAN	TAGS	STATUS ▼
MHDS 2.3.1 test, Praseena	2025-05-13 12:54	testing	ⓘ Not Assigned	--	[Pending review]
MHDS 2.3 Study Test, Praseena	2025-04-23 15:00	study started	Prasi MD test	--	[Pending review]
MHDS 2.3 Regression Test, Praseena	2025-04-23 14:00	new patient new study	ⓘ Not Assigned	--	[Pending review]
MHDS 2.3 Testing, Praseena	2025-04-23 12:59	testing	ⓘ Not Assigned	--	[Pending review]
MHDS 2.3 test, Praseena	2025-04-22 23:25	Routine ECG	ⓘ Not Assigned	--	[Pending review]
Android 1, Fozia 2.3	2025-04-21 12:25	Routine ECG	ⓘ Not Assigned	--	[Pending review]
Android 1, Fozia 2.3	2025-04-21 12:23	band to left	ⓘ Not Assigned	--	[Pending review]
Android 1, Fozia 2.3	2025-04-21 12:21	band normal	ⓘ Not Assigned	--	[Pending review]
Android 1, Fozia 2.3	2025-04-21 12:14	moving band to right	ⓘ Not Assigned	--	[Pending review]

16. Organization Management

File: MVCP2025-06-24at10.39.49.png

Layout:

```
┌──────────────────────────────────────────────────────────────────────────────
| Organization                                                         [Add
Member] |
|
|
| Add and manage members in your organization.
|
|
|
| [Search                    ] [All Members ▼]                        Page 1
of 18  |
|
|
| MEMBER NAME | EMAIL | ROLE | DATE ADDED
|
| (invited)   | fozia.noor+da@myant.ca | Desk Admin | --
|
| (invited)   | @gmail.com | Desk Admin | --
|
| (invited)   | gurpreet_test351@mailinator.com | Desk Admin | --
|
| (invited)   | gurpreet_test153@dispostable.com | Cardiac Tech | --
|
| (invited)   | gurpreet_test210@mailinator.com | MD | --
|
| (invited)   | pranali.patel+stagmd@myant.ca | MD | --
|
| (invited)   | augtestingmhp@dispostable.com | Cardiac Tech | --
|
| (invited)   | tetiana.kokorovets+ref2@myant.ca | Desk Admin | --
|
| (invited)   | ppatel@dispostable.com | Cardiac Tech | --
|
└──────────────────────────────────────────────────────────────────────────────
```

Interactive Elements: - Symptom Log: - Status filter dropdown with multi-select checkboxes - Date filter dropdown - Routine ECG checkbox filter - Reset button: Clear all filters - Status dropdown in each row: Change symptom status - Log History link: Opens history modal - Patient name links: Navigate to patient details - Organization: - Add Member button: Invite new organization members - Search field: Filter members by name/email - All Members dropdown: Filter by member type/status - Member rows: Show invitation status and roles

17. ECG Viewer - Contextual Metrics View

File: MVCP2025-06-24at10.39.34.png

Layout:

```
┌─────────────────────────────────────────────────────────────────────────────────
│ Frequency filter    Mains noise filter    Amplitude    Date         Time
│
│ [0.05-45 Hz ▼]     [Off ▼]                [10mm/mV ▼]  [2025-06-24 ▼] [10:34]
[Update] │
│                                                                        [⟲] [▶]
│
│                                                                        ECG
Hours      │
├─────────────────────────────────────────────────────────────────────────────────
│ Full View: 10:34:30 - 10:38:30    Channel ● 1 ○ 2 ○ 3    ◄ Previous. 4m
Next. 4m ►│
│
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
│
│
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
│
│
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
│
│
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
│
│
│
│ Expanded View: 10:38:20 - 10:38:30                     All channels
│
│ [ECG waveform grid - Ch1]
│
│ [ECG waveform grid - Ch2 with glucose trend line]
│
│ [ECG waveform grid - Ch3]
│
└─────────────────────────────────────────────────────────────────────────────────
```

Right Panel - Contextual Metrics:

```
┌──────────────────────────────────┐
│ [Symptom Details] [Contextual|
│                   Metrics]  |
├──────────────────────────────────┤
| 🩸 BLOOD PRESSURE              |
| -- mmHg (closest before)       |
| -- mmHg (closest after)        |
|                                |
| 🫁 OXYGEN SATURATION           |
| -- mmHg (closest before)       |
| -- mmHg (closest after)        |
|                                |
| ⚖ BODY WEIGHT                 |
| -- kg (closest before)         |
| -- kg (closest after)          |
|                                |
| 🍯 GLUCOSE                     |
| -- mmol/L (closest before)     |
| -- mmol/L (closest after)      |
|                                |
| 🌡️ BODY TEMPERATURE            |
| -- °C                          |
|                                |
| 🏃 ACTIVITY                    |
| -- steps                       |
| -- (last posture)              |
└──────────────────────────────────┘
```

18. Studies Section - Overview with Multiple Studies

File: MVCP2025-06-24at10.40.08.png

Layout:

Interactive Elements: - ECG Viewer Contextual Metrics: - Symptom Details/Contextual Metrics tabs: Switch between views - Contextual metrics display: Shows physiological data closest to ECG timepoint - Multiple ECG channels with overlay data (glucose trend on Ch2) - All standard ECG viewer controls - Studies Overview: - Status filter dropdown: Filter studies by status - Column headers: Sortable (START DATE shows sort indicator) - Study progress links: Open detailed progress views - Patient name links: Navigate to

patient details - Multiple study statuses: Ongoing, Closed by Staff, Cancelled - EDF Download column: Access to raw data files

Summary of Interactive Elements and Navigation

The MVCP application provides a comprehensive interface for managing cardiac monitoring studies with the following key interactive patterns:

1. **Tab-based navigation** within sections (Symptom logs/ECG tags, Symptom Details/Contextual Metrics)
2. **Modal dialogs** for complex forms (Create SCLA Account, Set up Holter study, New Note, Study Progress)
3. **Dropdown filters** with multi-select capabilities for data filtering
4. **Sortable table columns** with visual indicators
5. **Rich text editing** capabilities in notes section
6. **Advanced ECG viewer** with multiple channels, filtering, and time navigation
7. **Contextual data display** showing physiological metrics alongside ECG data
8. **Status management** with dropdown controls for workflow progression

Component Interactions and Navigation Flows

Main Navigation Structure

The MVCP application uses a sidebar navigation pattern with the following main sections:

```
Main Navigation:
├── Symptom Log (≡ icon)
├── Patients (👥 icon)
├── Studies (📋 icon)
├── Organization (🏢 icon)
├── User Manual (❓ icon)
└── Logout (🚪 icon)
```

Top-Level Navigation Bar

When viewing a specific patient, a secondary navigation appears:

```
Patient Context Navigation:
├── PATIENT PROFILE
├── STUDIES
├── ECG VIEWER
└── NOTES
```

Detailed Interaction Mappings

1. Symptom Log Section

Main View Interactions: - **Status Filter Dropdown** → Opens multi-select filter with options: - Pending review - MD to review - Reviewed by MD - Reviewed by tech - **Date Filter Dropdown** → Date range selection - **Routine ECG Checkbox** → Filters to show only routine ECG logs - **Reset Button** → Clears all applied filters - **Patient Name Links** → Navigate to Patient Profile for that patient - **Status Dropdown (per row)** → Change individual symptom status - **Log History Link** → Opens Log History modal - **Pagination Controls** → Navigate through symptom log pages

Log History Modal: - **Sort Dropdown** → Change chronological order (Most Recent, Oldest First, etc.) - **Close Button** → Close modal and return to main view

2. Patients Section

Main List View Interactions: - **Create SCLA Account Button** → Opens account creation workflow - **Search Field** → Real-time patient name filtering - **All Patients Dropdown** → Filter by patient status/type - **Column Headers** → Sort patients by different criteria - **Patient Name Links** → Navigate to Patient Profile - **Pagination Controls** → Navigate through patient pages

Create SCLA Account Workflow: 1. **Create SCLA Account Button** → Opens consent confirmation modal 2. **Consent Checkboxes** → Required confirmations 3. **Continue Button** → Opens patient information form 4. **Form Fields** → Patient data entry with validation 5. **Create Account Button** → Submit and create account 6. **Cancel Button** → Exit workflow at any step

3. Patient Profile Section

Profile View Interactions: - **Edit Button** → Enable form editing mode - **SCLA Login Code Button** → Generate/display patient login code - **Form Fields** → Editable when in edit mode - **Dropdown Selectors** → Country, insurance, physician selection - **Archive Patient Button** → Archive patient record - **View History Link** → Show pod association history

4. Studies Section

Main List View Interactions: - **Set up Holter study Button** → Opens study creation modal - **Status Filter Dropdown** → Filter studies by status - **Column Headers** → Sort studies by different criteria - **Study Progress Links** → Opens study progress modal - **Patient Name Links** → Navigate to Patient Profile - **EDF Download Links** → Download study data files

Set up Holter Study Modal: - **Duration Radio Buttons** → Select study length (24h, 48h, 72h, 7-day, 14-day) - **Year/Month Dropdowns** → Navigate calendar - **Calendar Grid** → Select start date - **Time Input** → Set start time - **Setup Type Dropdown** → Choose setup method - **Garment Type/Size Dropdowns** → Select device configuration

Study Progress Modal: - **Year/Month Dropdowns** → Navigate calendar - **Calendar Dates** → Click to view hourly breakdown - **Hourly Data Display** → Shows usable vs total ECG minutes - **Close Button** → Return to studies list

5. ECG Viewer Section

Main Viewer Interactions: - **Symptom logs/ECG tags Tabs** → Switch between data views - **Filter Controls:** - Frequency filter dropdown → Adjust ECG frequency filtering - Mains noise filter dropdown → Noise reduction settings - Amplitude dropdown → Adjust ECG amplitude scaling - Date picker → Select viewing date - Time input → Set specific time - Update button → Apply filter changes - **Channel Selection** → Radio buttons for ECG channels (1, 2, 3) - **Navigation Controls:** - Previous/Next 4m buttons → Time-based navigation - ECG Hours link → Time-based navigation interface - **Symptom Details/Contextual Metrics Tabs** → Switch right panel view

Symptom Logs Tab: - **Status/Date Filters** → Filter symptom data - **Reset Button** → Clear filters - **Help Icon (?)** → Contextual help - **Add annotations Link** → Opens

annotation modal - **Holter Dates Link** → Study date information - **Symptom Rows** → Click to view details in right panel

Annotation Modal: - **Back Button** → Return to previous view - **Observation Checkboxes** → Multiple selection for ECG findings - **Notes Text Area** → Free text input (1000 char limit) - **Interpretation Text Area** → Clinical interpretation (1000 char limit) - **Save and Close Button** → Save annotations and close modal

6. Notes Section

Main View Interactions: - **New Note Button** → Opens note creation modal - **Date Filter Dropdown** → Filter notes by date - **Reset Button** → Clear filters - **Column Headers** → Sort notes

New Note Modal: - **Title Input** → Note title - **Rich Text Toolbar** → Text formatting options - **Style Dropdown** → Text style selection - **Content Area** → Rich text editor - **Cancel Button** → Close without saving - **Create Button** → Save new note

7. Organization Section

Main View Interactions: - **Add Member Button** → Invite new organization members - **Search Field** → Filter members by name/email - **All Members Dropdown** → Filter by member type/status - **Member Rows** → View member details and status

Modal and Popup Behaviors

Modal Types: 1. **Form Modals** (Create SCLA Account, Set up Holter study, New Note) - Overlay main content - Require user action to close - Include Cancel/Submit buttons - Form validation before submission

1. **Information Modals** (Study Progress, Log History)
2. Display read-only information
3. Single Close button
4. Click outside to close (implied)
5. **Annotation Modal** (ECG Viewer)
6. Complex form with multiple sections
7. Save and Close functionality

8. Back button navigation

Popup Behaviors: 1. **Dropdown Filters** - Click to open/close - Multi-select capability (Status filters) - Apply/Cancel buttons for complex filters

1. **Status Dropdowns**
2. Inline editing capability
3. Immediate save on selection
4. Visual feedback on status change

ECG Viewer Advanced Functionality

Time Navigation: - 4-minute segments with Previous/Next navigation - Full view shows 4-minute window - Expanded view shows 10-second detailed window - ECG Hours link provides time-based navigation interface

Channel Management: - 3 ECG channels available - Radio button selection - Individual channel viewing - "All channels" view in expanded mode

Filter Controls: - Real-time ECG signal processing - Frequency filtering (0.05-45 Hz standard) - Mains noise filtering options - Amplitude scaling (10mm/mV standard) - Update button applies all filter changes

Contextual Data Integration: - Right panel shows physiological metrics - Blood pressure, oxygen saturation, body weight, glucose, temperature, activity - "Closest before/after" temporal correlation - Glucose trend overlay on ECG Channel 2

Visual App Structure and Relationship Mapping

Application Hierarchy

```
MVCP (Myant Virtual Clinic Portal)
│
├── Authentication Layer
│   ├── Login
│   ├── Multi-factor Authentication
│   └── Session Management
│
├── Main Application Shell
│   ├── User Profile Header
│   │   ├── Profile Icon
│   │   ├── User Name & Clinic
│   │   ├── User ID
│   │   └── MFA Toggle
│   │
│   ├── Primary Navigation Sidebar
│   │   ├── Symptom Log (≡)
│   │   ├── Patients (👥)
│   │   ├── Studies (📋)
│   │   ├── Organization (🏢)
│   │   ├── User Manual (❓)
│   │   └── Logout (🚪)
│   │
│   └── Main Content Area
│       ├── Section-Specific Content
│       └── Modal Overlay Layer
│
└── Patient Context Shell (when patient selected)
    ├── Patient Header
    │   ├── Patient Name
    │   ├── Verification Status
    │   └── Patient Context Navigation
    │       ├── PATIENT PROFILE
    │       ├── STUDIES
    │       ├── ECG VIEWER
    │       └── NOTES
    │
    └── Patient-Specific Content Area
```

Section-Level Structure

1. Symptom Log Section

```
Symptom Log
├── Filter Controls
│   ├── Status Multi-Select Filter
│   ├── Date Range Filter
│   ├── Routine ECG Checkbox
│   └── Reset Button
├── Data Table
│   ├── Patient Name (→ Patient Profile)
│   ├── Symptom Date
│   ├── Symptoms Experienced
│   ├── Physician Assignment
│   ├── Tags
│   └── Status Dropdown
├── Pagination Controls
└── Modals
    └── Log History Modal
        ├── Sort Controls
        ├── History Timeline
        └── Close Button
```

2. Patients Section

```
Patients
├── Action Bar
│   ├── Create SCLA Account Button
│   ├── Search Field
│   └── Patient Type Filter
├── Data Table
│   ├── Patient Name (→ Patient Profile)
│   ├── Date Added
│   ├── Status
│   ├── Date of Birth
│   ├── Healthcare Number
│   └── Version
├── Pagination Controls
└── Modals
    ├── Create SCLA Account Workflow
    │   ├── Consent Confirmation
    │   │   ├── Consent Checkboxes
    │   │   ├── Cancel Button
    │   │   └── Continue Button
    │   └── Patient Information Form
    │       ├── Personal Information Fields
    │       ├── Contact Information Fields
    │       ├── Insurance Information Fields
    │       ├── Address Information Fields
    │       ├── Medical Information Fields
    │       ├── Cancel Button
    │       └── Create Account Button
    └── Account Creation Confirmation
```

3. Patient Profile Section

```
Patient Profile
├── Action Bar
│   ├── Edit Button
│   └── SCLA Login Code Button
├── Patient Information Form
│   ├── Country Selection
│   ├── Personal Information
│   │   ├── First Name
│   │   ├── Last Name
│   │   ├── Date of Birth
│   │   └── Sex
│   ├── Contact Information
│   │   ├── Email
│   │   └── Phone
│   ├── Insurance Information
│   │   ├── Health Insurance Policy
│   │   └── Insurance Number
│   ├── Medical Information
│   │   └── Medical Record Number
│   ├── Address Information
│   │   ├── Street Address
│   │   ├── City
│   │   └── Postal Code
│   └── Care Team
│       └── Assigned Physician
├── Patient Actions
│   └── Archive Patient Button
└── Associated Data
    └── Pod Association (with history link)
```

4. Studies Section

```
Studies
├── Action Bar
│   ├── Set up Holter study Button
│   └── Status Filter
├── Data Table
│   ├── Patient Name (→ Patient Profile)
│   ├── Start Date
│   ├── Study Duration
│   ├── Status
│   ├── Estimated End Date
│   ├── Actual End Date
│   ├── Study Progress (→ Progress Modal)
│   └── EDF Download
├── Pagination Controls
└── Modals
    ├── Set up Holter Study
    │   ├── Duration Selection
    │   ├── Start Date Calendar
    │   ├── Start Time Input
    │   └── Study Configuration
    │       ├── Setup Type
    │       ├── Garment Type
    │       └── Garment Size
    └── Study Progress Modal
        ├── Calendar Navigation
        ├── Date Selection
        ├── Hourly Data Display
        ├── Quality Legend
        └── Close Button
```

5. ECG Viewer Section

```
ECG Viewer
├── Tab Navigation
│   ├── Symptom logs Tab
│   └── ECG tags Tab
├── Filter Controls (per tab)
│   ├── Status Filter
│   ├── Date Filter
│   ├── Reset Button
│   └── Help Icon
├── Data Table (tab-specific)
│   ├── Symptom Date/Time
│   ├── Reported Date/Time
│   ├── Status Dropdown
│   ├── Symptoms Experienced
│   └── Actions
│       ├── Add annotations (→ Annotation Modal)
│       └── Holter Dates
├── ECG Viewer Controls
│   ├── Filter Controls
│   │   ├── Frequency Filter
│   │   ├── Mains Noise Filter
│   │   ├── Amplitude Control
│   │   ├── Date Picker
│   │   ├── Time Input
│   │   └── Update Button
│   ├── Navigation Controls
│   │   ├── Channel Selection (1, 2, 3)
│   │   ├── Previous/Next 4m
│   │   └── ECG Hours Link
│   └── View Controls
│       ├── Full View (4-minute window)
│       └── Expanded View (10-second detail)
├── ECG Display Area
│   ├── Multi-channel ECG Waveforms
│   ├── Time Axis
│   └── Amplitude Scaling
├── Right Panel
│   ├── Tab Navigation
│   │   ├── Symptom Details Tab
│   │   └── Contextual Metrics Tab
│   └── Content Area
│       ├── Symptom Information
│       │   ├── Symptom Type
│       │   ├── Severity
│       │   ├── Duration
│       │   ├── Triggers
│       │   └── Patient Notes
│       └── Contextual Metrics
│           ├── Blood Pressure
│           ├── Oxygen Saturation
│           ├── Body Weight
│           ├── Glucose
│           ├── Body Temperature
│           └── Activity Data
└── Modals
    └── Annotation Modal
        ├── Navigation
        │   └── Back Button
        ├── Observation Section
```

```
        │   └── Medical Observation Checkboxes
        ├── Notes Section
        │   └── Free Text Area (1000 chars)
        ├── Interpretation Section
        │   └── Clinical Interpretation Area (1000 chars)
        └── Actions
            └── Save and Close Button
```

6. Notes Section

```
Notes
├── Action Bar
│   ├── New Note Button
│   ├── Date Filter
│   └── Reset Button
├── Data Table
│   ├── Date and Time
│   ├── Created By
│   ├── Title
│   └── Note Content
├── Pagination Controls
└── Modals
    └── New Note Modal
        ├── Date and Time (auto-populated)
        ├── Title Input
        ├── Rich Text Editor
        │   ├── Formatting Toolbar
        │   │   ├── Alignment Controls
        │   │   ├── List Controls
        │   │   ├── Text Formatting (B, I, U)
        │   │   ├── Style Dropdown
        │   │   └── Text Color
        │   └── Content Area
        ├── Information Notice
        └── Actions
            ├── Cancel Button
            └── Create Button
```

7. Organization Section

```
Organization
├── Action Bar
│   ├── Add Member Button
│   ├── Search Field
│   └── Member Type Filter
├── Data Table
│   ├── Member Name
│   ├── Email
│   ├── Role
│   └── Date Added
└── Pagination Controls
```

Cross-Section Relationships

Patient-Centric Navigation Flow

```
Patient Selection (from any section)
    ↓
Patient Context Activated
    ↓
Patient Context Navigation Available:
    ├── PATIENT PROFILE → Patient Profile Section
    ├── STUDIES → Studies filtered for this patient
    ├── ECG VIEWER → ECG data for this patient
    └── NOTES → Notes for this patient
```

Data Relationship Flow

```
Patient Creation (Patients Section)
    ↓
Patient Profile (Patient Profile Section)
    ↓
Study Creation (Studies Section)
    ↓
ECG Data Collection (automatic)
    ↓
Symptom Logging (patient-initiated)
    ↓
Symptom Review (Symptom Log Section)
    ↓
ECG Analysis (ECG Viewer Section)
    ↓
Clinical Notes (Notes Section)
```

Modal Interaction Patterns

```
Primary Action Buttons → Form Modals
    ├── Create SCLA Account → Multi-step form workflow
    ├── Set up Holter study → Configuration form
    ├── New Note → Rich text editor
    └── Add annotations → Clinical observation form

Information Links → Display Modals
    ├── Study Progress → Calendar with hourly data
    ├── Log History → Timeline view
    └── View History → Pod association history

Status Changes → Inline Dropdowns
    ├── Symptom Status → Workflow progression
    └── Study Status → Study lifecycle management
```

Component Reusability Map

Shared Components

```
 Data Tables
├── Sortable Headers
├── Pagination Controls
├── Search/Filter Controls
└── Action Buttons

Form Components
├── Dropdown Selectors
├── Date Pickers
├── Text Inputs
├── Rich Text Editors
└── Validation Messages

Navigation Components
├── Tab Navigation
├── Breadcrumb Navigation
├── Sidebar Navigation
└── Modal Navigation

Filter Components
├── Multi-select Dropdowns
├── Date Range Pickers
├── Checkbox Filters
└── Reset Controls
```

Specialized Components

```
 ECG Viewer
├── Waveform Renderer
├── Channel Selector
├── Time Navigation
├── Filter Controls
└── Overlay Data Display

Study Progress
├── Calendar Grid
├── Quality Indicators
├── Hourly Data Display
└── Legend Components

Patient Context
├── Patient Header
├── Verification Badge
├── Context Navigation
└── Associated Data Display
```

User Flows and Workflows

Primary User Roles

The MVCP system supports multiple user roles with different access levels: - **Desk Admin**: Administrative functions, patient management - **MD (Medical Doctor)**: Clinical review, diagnosis, patient care - **Cardiac Tech**: Technical ECG analysis, device management - **Organization Admin**: User management, system configuration

Core User Workflows

1. Create Patient Account Workflow

Trigger: Clinician needs to register a new patient for cardiac monitoring

Flow Steps:

```
1. Navigate to Patients Section
   └── Click "Patients" in sidebar navigation

2. Initiate Account Creation
   └── Click "Create SCLA Account" button

3. Consent Verification
   ├── Review consent requirements
   ├── Check "Patient has provided consent" checkbox
   ├── Check "I am taking responsibility" checkbox
   └── Click "Continue" button

4. Patient Information Entry
   ├── Select Country (required)
   ├── Enter Personal Information
   │   ├── First Name (required)
   │   ├── Last Name (required)
   │   ├── Date of Birth (required)
   │   └── Sex (optional)
   ├── Enter Contact Information
   │   ├── Email (required - becomes SCLA login)
   │   └── Phone (required)
   ├── Enter Insurance Information
   │   ├── Health Insurance Policy (required)
   │   ├── Policy Number (required)
   │   ├── Version Code (required)
   │   └── Expiry Date (required)
   ├── Enter Medical Information
   │   └── Medical Record Number (optional)
   ├── Enter Address Information
   │   ├── Street Address (optional)
   │   ├── City (optional)
   │   ├── Province (optional)
   │   └── Postal Code (optional)
   └── Assign Physician (optional)

5. Account Creation
   ├── Click "Create Account" button
   ├── System validates all required fields
   ├── System creates SCLA account
   └── Patient appears in patients list with "Verified" status

6. Post-Creation Actions
   ├── Generate SCLA Login Code (if needed)
   └── Navigate to Patient Profile for additional configuration
```

Error Handling: - Form validation prevents submission with missing required fields - Email validation ensures proper format - Phone number validation with country code - Insurance policy validation

2. Create Holter Study Workflow

Trigger: Patient requires cardiac monitoring study

Prerequisites: Patient account must exist and be verified

Flow Steps:

```
1. Navigate to Studies Section
   └── Click "Studies" in sidebar navigation

2. Initiate Study Creation
   └── Click "Set up Holter study" button

3. Study Configuration
   ├── Select Study Duration (required)
   │   ├── 24-hour
   │   ├── 48-hour
   │   ├── 72-hour
   │   ├── 7-day
   │   └── 14-day (default shown)
   ├── Select Start Date (required)
   │   ├── Navigate to desired month/year
   │   └── Click on calendar date
   ├── Set Start Time (required)
   │   └── Enter time in HH:MM format
   └── Configure Study Setup
       ├── Setup Type (required)
       │   └── In-Clinic Setup (default)
       ├── Garment Type (required)
       │   └── Skiip-Band (default)
       └── Garment Size (required)
           └── XS (default)

4. Study Creation
   ├── System validates configuration
   ├── System creates study record
   ├── Study appears in studies list with "Ongoing" status
   └── System calculates estimated end date

5. Study Monitoring
   ├── Study progress tracked automatically
   ├── Hourly data quality monitoring
   └── Real-time status updates
```

3. Review Holter Quality Data Workflow

Trigger: Clinician needs to assess study data quality

Flow Steps:

```
1. Access Study Progress
   ├── Navigate to Studies section
   ├── Locate target study in list
   └── Click "Study Progress" link

2. Study Progress Modal
   ├── View overall study information
   ├── Navigate to specific date using calendar
   ├── Select date to view hourly breakdown
   └── Review hourly data quality

3. Quality Assessment
   ├── Review "Usable ECG / Total ECG" metrics
   ├── Interpret color-coded quality indicators
   │   ├── Gray: 0% usable data
   │   ├── Light Green: 1-24% usable data
   │   ├── Green: 25-50% usable data
   │   └── Dark Green: >50% usable data
   ├── Identify problematic time periods
   └── Note overall study quality trends

4. Quality-Based Actions
   ├── If quality is poor:
   │   ├── Contact patient for device adjustment
   │   ├── Schedule device replacement
   │   └── Consider study extension
   └── If quality is good:
       └── Continue monitoring until study completion

5. Documentation
   └── Add clinical notes about quality assessment
```

4. Extend Study Workflow

Trigger: Study needs extension due to insufficient data or clinical requirements

Flow Steps:

```
1. Study Assessment
   ├── Review current study progress
   ├── Evaluate data quality
   └── Determine extension requirements

2. Study Modification
   ├── Access study configuration (implied from UI)
   ├── Modify end date
   ├── Update study duration
   └── Notify patient of extension

3. System Updates
   ├── Update estimated end date
   ├── Continue data collection
   └── Reset quality monitoring for extended period

Note: Specific UI for study extension not visible in screenshots,
but workflow inferred from study management patterns
```

5. Review ECG Strips per Symptom Workflow

Trigger: Patient reports symptoms that require ECG correlation

Flow Steps:

```
1. Access Symptom Logs
   ├── Navigate to Symptom Log section
   ├── Review list of reported symptoms
   ├── Filter by status if needed
   └── Identify symptoms requiring review

2. Symptom Selection
   ├── Click on specific symptom entry
   ├── Note symptom details:
   │   ├── Date and time
   │   ├── Symptoms experienced
   │   ├── Patient description
   │   └── Current status
   └── Click patient name to enter patient context

3. ECG Viewer Access
   ├── Navigate to ECG VIEWER tab
   ├── System automatically loads ECG data for symptom timepoint
   └── ECG viewer displays relevant time period

4. ECG Analysis
   ├── Review ECG waveforms at symptom time
   ├── Use filter controls to optimize display:
   │   ├── Adjust frequency filtering
   │   ├── Modify amplitude scaling
   │   ├── Apply noise filtering
   │   └── Select appropriate channels
   ├── Navigate through time periods:
   │   ├── Use Previous/Next 4m controls
   │   ├── Review expanded 10-second views
   │   └── Correlate with symptom timing
   └── Review contextual metrics:
       ├── Blood pressure
       ├── Activity level
       ├── Other physiological data
       └── Temporal correlation

5. Clinical Annotation
   ├── Click "Add annotations" for the symptom
   ├── Complete observation checklist:
   │   ├── Select relevant ECG findings
   │   ├── Note arrhythmias or abnormalities
   │   └── Document technical observations
   ├── Add clinical notes (1000 char limit)
   ├── Provide interpretation (for reviewing physicians)
   └── Save annotations

6. Status Update
   ├── Update symptom status:
   │   ├── "Pending review" → "MD to review"
   │   ├── "MD to review" → "Reviewed by MD"
   │   └── "Reviewed by tech" (for technical review)
   └── System tracks review workflow

7. Clinical Documentation
   ├── Navigate to Notes section
   ├── Create clinical note documenting findings
   ├── Include symptom correlation
   └── Document clinical significance
```

6. Clinical Review and Diagnosis Workflow

Trigger: MD needs to review and provide clinical interpretation

Flow Steps:

```
1. Review Queue Access
   ├── Navigate to Symptom Log
   ├── Filter by "MD to review" status
   └── Prioritize by clinical urgency

2. Symptom Review
   ├── Select symptom requiring MD review
   ├── Review technical annotations
   ├── Access ECG viewer for detailed analysis
   └── Review patient context and history

3. Clinical Analysis
   ├── Correlate ECG findings with symptoms
   ├── Consider patient medical history
   ├── Evaluate clinical significance
   └── Determine diagnosis or recommendations

4. Clinical Documentation
   ├── Update interpretation section in annotations
   ├── Provide clinical diagnosis
   ├── Document treatment recommendations
   └── Note follow-up requirements

5. Status Completion
   ├── Update status to "Reviewed by MD"
   ├── System tracks completion
   └── Triggers any required notifications

6. Patient Communication
   ├── Generate patient report (implied)
   ├── Schedule follow-up if needed
   └── Coordinate care team communication
```

7. Organization Management Workflow

Trigger: Need to manage team members and access

Flow Steps:

```
1. Access Organization Section
   └── Navigate to Organization in sidebar

2. Member Management
   ├── Review current team members
   ├── Check member roles and status
   └── Identify access needs

3. Add New Members
   ├── Click "Add Member" button
   ├── Enter member email address
   ├── Assign appropriate role:
   │   ├── Desk Admin
   │   ├── MD
   │   ├── Cardiac Tech
   │   └── Organization Admin
   ├── Send invitation
   └── Track invitation status

4. Member Administration
   ├── Monitor invitation acceptance
   ├── Update member roles as needed
   ├── Manage access permissions
   └── Remove members when necessary
```

Workflow Integration Points

Cross-Section Data Flow

```
 Patient Creation → Study Setup → Data Collection → Symptom Logging → Clinical
Review → Documentation

Each step creates data dependencies:
├── Patient Profile enables Study Creation
├── Active Study enables ECG Data Collection
├── ECG Data enables Symptom Correlation
├── Symptom Reports trigger Clinical Review
└── Clinical Review generates Documentation
```

Status Progression Workflows

```
 Symptom Status Progression:
Patient Reports → "Pending review" → "MD to review" → "Reviewed by MD"
                                   ↘ "Reviewed by tech" ↗

Study Status Progression:
Setup → "Ongoing" → "Completed" → "Closed by Staff"
                ↘ "Cancelled" (if needed)

Patient Status Progression:
Registration → "Pending" → "Verified" → "Active" → "Archived"
```

Quality Assurance Workflows

```
 Data Quality Monitoring:
Continuous ECG Collection → Hourly Quality Assessment → Quality Alerts →
Intervention Actions

Clinical Quality Assurance:
Technical Review → MD Review → Documentation → Quality Metrics → Process
Improvement
```

Error Handling and Edge Cases

Common Error Scenarios

1. **Incomplete Patient Information**: Form validation prevents submission
2. **Study Setup Conflicts**: Date/time validation prevents scheduling conflicts
3. **Poor ECG Quality**: Quality monitoring triggers intervention workflows
4. **Missing Symptom Correlation**: System prompts for ECG review
5. **Incomplete Clinical Review**: Status tracking ensures completion

Recovery Workflows

1. **Data Loss Recovery**: System maintains audit trails for data reconstruction
2. **Device Malfunction**: Study extension and device replacement workflows
3. **Clinical Escalation**: Urgent findings trigger immediate notification workflows
4. **System Downtime**: Offline data collection with sync capabilities

Data Model and Backend Structure

Database Schema Inference

Based on the UI elements and workflows observed, the following database structure can be inferred:

1. Users Table

Purpose: Manages clinician accounts and authentication

```sql
CREATE TABLE users (
    id BIGINT PRIMARY KEY AUTO_INCREMENT,
    email VARCHAR(255) UNIQUE NOT NULL,
    password_hash VARCHAR(255) NOT NULL,
    first_name VARCHAR(100) NOT NULL,
    last_name VARCHAR(100) NOT NULL,
    role ENUM('desk_admin', 'md', 'cardiac_tech', 'organization_admin') NOT
NULL,
    organization_id BIGINT NOT NULL,
    is_active BOOLEAN DEFAULT TRUE,
    mfa_enabled BOOLEAN DEFAULT FALSE,
    mfa_secret VARCHAR(255),
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    updated_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP,
    last_login_at TIMESTAMP,

    FOREIGN KEY (organization_id) REFERENCES organizations(id)
);
```

Key Fields Observed: - Email: Used for login (simon.yang.ch@gmail.com) - Name: Displayed in header (Simon Yang) - Role: Determines access permissions (MD, Desk Admin, Cardiac Tech) - Organization: Links to clinic (Staging Clinic, ID: 373535) - MFA: Multi-factor authentication toggle visible

2. Organizations Table

Purpose: Manages clinic/organization information

```sql
CREATE TABLE organizations (
    id BIGINT PRIMARY KEY AUTO_INCREMENT,
    name VARCHAR(255) NOT NULL,
    organization_code VARCHAR(50) UNIQUE NOT NULL,
    address TEXT,
    phone VARCHAR(50),
    email VARCHAR(255),
    country VARCHAR(100),
    timezone VARCHAR(100),
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    updated_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP
);
```

Key Fields Observed: - Name: "Staging Clinic" - Organization Code: "373535" - Multiple organizations supported (member invitations across organizations)

3. Patients Table

Purpose: Stores patient demographic and medical information

```sql
CREATE TABLE patients (
    id BIGINT PRIMARY KEY AUTO_INCREMENT,
    scla_account_id VARCHAR(255) UNIQUE,
    organization_id BIGINT NOT NULL,
    first_name VARCHAR(100) NOT NULL,
    last_name VARCHAR(100) NOT NULL,
    date_of_birth DATE NOT NULL,
    sex ENUM('male', 'female', 'unspecified'),
    email VARCHAR(255) NOT NULL,
    phone VARCHAR(50) NOT NULL,
    country VARCHAR(100) NOT NULL,

    -- Insurance Information
    health_insurance_policy VARCHAR(255) NOT NULL,
    insurance_number VARCHAR(100) NOT NULL,
    insurance_version_code VARCHAR(50),
    insurance_expiry_date DATE,

    -- Medical Information
    medical_record_number VARCHAR(100),
    assigned_physician_id BIGINT,

    -- Address Information
    street_address VARCHAR(255),
    city VARCHAR(100),
    province_state VARCHAR(100),
    postal_code VARCHAR(20),

    -- System Fields
    status ENUM('pending', 'verified', 'active', 'archived') DEFAULT 'pending',
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    updated_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP,
    created_by BIGINT NOT NULL,

    FOREIGN KEY (organization_id) REFERENCES organizations(id),
    FOREIGN KEY (assigned_physician_id) REFERENCES users(id),
    FOREIGN KEY (created_by) REFERENCES users(id)
);
```

Key Fields Observed: - Personal: Yang, Simon, 1989-07-10, Male - Contact: simon.yang.ch@gmail.com, +41 78 795 00 09 - Insurance: Avenir (Groupe Mutuel), 7561234567897 - Address: Ackersteinstrasse 76, Zurich, 8049 - Status: "Verified" badge visible - Physician: Peter Wood (assigned)

4. Studies Table

Purpose: Manages Holter monitoring studies

```sql
CREATE TABLE studies (
    id BIGINT PRIMARY KEY AUTO_INCREMENT,
    patient_id BIGINT NOT NULL,
    organization_id BIGINT NOT NULL,
    study_type ENUM('holter') DEFAULT 'holter',
    duration_type ENUM('24_hour', '48_hour', '72_hour', '7_day', '14_day') NOT
NULL,

    -- Study Timeline
    start_date DATE NOT NULL,
    start_time TIME NOT NULL,
    estimated_end_date DATE NOT NULL,
    actual_end_date DATE,

    -- Study Configuration
    setup_type VARCHAR(100) DEFAULT 'in_clinic_setup',
    garment_type VARCHAR(100) DEFAULT 'skiip_band',
    garment_size VARCHAR(20) DEFAULT 'xs',

    -- Study Status
    status ENUM('ongoing', 'completed', 'cancelled', 'closed_by_staff') DEFAULT
'ongoing',

    -- Quality Metrics
    total_ecg_minutes INT DEFAULT 0,
    usable_ecg_minutes INT DEFAULT 0,
    average_daily_usable_hours DECIMAL(4,2) DEFAULT 0.00,

    -- Associated Data
    pod_id VARCHAR(255),
    edf_file_path VARCHAR(500),

    -- System Fields
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    updated_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP,
    created_by BIGINT NOT NULL,

    FOREIGN KEY (patient_id) REFERENCES patients(id),
    FOREIGN KEY (organization_id) REFERENCES organizations(id),
    FOREIGN KEY (created_by) REFERENCES users(id)
);
```

Key Fields Observed: - Duration: 14-days, 48-hours, 24-hours options - Dates: 2025-06-24 10:21 start, 2025-07-08 estimated end - Status: "Ongoing", "Closed by Staff", "Cancelled" - Quality: "Avg. 0 hrs of usable ECG/day" - Pod Association: "31067601890"

5. Study_Quality Table

Purpose: Stores hourly ECG data quality metrics

```sql
CREATE TABLE study_quality (
    id BIGINT PRIMARY KEY AUTO_INCREMENT,
    study_id BIGINT NOT NULL,
    date DATE NOT NULL,
    hour TINYINT NOT NULL, -- 0-23

    -- Quality Metrics
    total_minutes TINYINT DEFAULT 0, -- 0-60
    usable_minutes TINYINT DEFAULT 0, -- 0-60
    quality_percentage DECIMAL(5,2) DEFAULT 0.00,
    quality_category ENUM('none', 'low', 'medium', 'high') DEFAULT 'none',

    -- Technical Metrics
    signal_quality_score DECIMAL(5,2),
    noise_level DECIMAL(5,2),
    artifact_count INT DEFAULT 0,

    -- System Fields
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    updated_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP,

    FOREIGN KEY (study_id) REFERENCES studies(id),
    UNIQUE KEY unique_study_hour (study_id, date, hour)
);
```

Key Fields Observed: - Hourly breakdown: 00:00-23:00 time slots - Quality metrics: "0 mins / 0 mins" (usable/total) - Quality categories: Color-coded (0%, 1-24%, 25-50%, >50%) - Date-specific tracking: Calendar navigation for specific dates

6. Symptoms Table

Purpose: Stores patient-reported symptoms

```sql
CREATE TABLE symptoms (
    id BIGINT PRIMARY KEY AUTO_INCREMENT,
    patient_id BIGINT NOT NULL,
    study_id BIGINT,

    -- Symptom Information
    symptom_date TIMESTAMP NOT NULL,
    reported_date TIMESTAMP NOT NULL,
    symptoms_experienced TEXT NOT NULL,
    severity TINYINT, -- 1-10 scale
    duration VARCHAR(100),
    triggers TEXT,
    patient_notes TEXT,

    -- Clinical Review
    status ENUM('pending_review', 'md_to_review', 'reviewed_by_md',
'reviewed_by_tech') DEFAULT 'pending_review',
    assigned_physician_id BIGINT,

    -- ECG Correlation
    ecg_start_time TIMESTAMP,
    ecg_end_time TIMESTAMP,
    has_routine_ecg BOOLEAN DEFAULT FALSE,

    -- System Fields
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    updated_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP,

    FOREIGN KEY (patient_id) REFERENCES patients(id),
    FOREIGN KEY (study_id) REFERENCES studies(id),
    FOREIGN KEY (assigned_physician_id) REFERENCES users(id)
);
```

Key Fields Observed: - Timing: "2025-06-24 10:38" symptom and reported dates - Symptoms: "Sweating", "testing", "study started", "Routine ECG" - Status: "Pending review" with dropdown options - Severity: "5/10" scale - Duration: "On Going" - Triggers: "Caffeine"

7. ECG_Data Table

Purpose: Links to ECG binary data stored in S3

```sql
CREATE TABLE ecg_data (
    id BIGINT PRIMARY KEY AUTO_INCREMENT,
    study_id BIGINT NOT NULL,
    patient_id BIGINT NOT NULL,

    -- Temporal Information
    start_timestamp TIMESTAMP NOT NULL,
    end_timestamp TIMESTAMP NOT NULL,
    duration_seconds INT NOT NULL,

    -- ECG Channels
    channel_1_s3_path VARCHAR(500),
    channel_2_s3_path VARCHAR(500),
    channel_3_s3_path VARCHAR(500),

    -- Data Quality
    signal_quality ENUM('poor', 'fair', 'good', 'excellent'),
    noise_level DECIMAL(5,2),
    artifact_flags JSON,

    -- Processing Information
    sampling_rate INT DEFAULT 250, -- Hz
    amplitude_scale DECIMAL(8,4) DEFAULT 10.0, -- mm/mV
    frequency_filter_low DECIMAL(6,3) DEFAULT 0.05, -- Hz
    frequency_filter_high DECIMAL(6,3) DEFAULT 45.0, -- Hz

    -- System Fields
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    processed_at TIMESTAMP,

    FOREIGN KEY (study_id) REFERENCES studies(id),
    FOREIGN KEY (patient_id) REFERENCES patients(id),

    INDEX idx_study_timestamp (study_id, start_timestamp),
    INDEX idx_patient_timestamp (patient_id, start_timestamp)
);
```

Key Fields Observed: - Time ranges: "10:34:30 - 10:38:30" (4-minute segments) - Channels: 1, 2, 3 with radio button selection - Filters: "0.05-45 Hz (Standard)", "Off" noise filter, "10mm/mV" amplitude - S3 storage: Binary ECG data stored externally

8. Symptom_Annotations Table

Purpose: Stores clinical annotations for symptoms

```sql
CREATE TABLE symptom_annotations (
    id BIGINT PRIMARY KEY AUTO_INCREMENT,
    symptom_id BIGINT NOT NULL,
    annotated_by BIGINT NOT NULL,

    -- Observation Checkboxes (stored as JSON for flexibility)
    observations JSON, -- Array of selected observations

    -- Text Fields
    clinical_notes TEXT, -- 1000 character limit
    interpretation TEXT, -- 1000 character limit (for reviewing physicians
only)

    -- System Fields
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    updated_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP,

    FOREIGN KEY (symptom_id) REFERENCES symptoms(id),
    FOREIGN KEY (annotated_by) REFERENCES users(id)
);
```

Key Fields Observed: - Observations: Checkboxes for 1AVB, 2AVB1, 2AVB2, 3AVB, AF, Artifact, AFL, BBB, Diagnosis, EAT, IRD, IVR, JR, MAT, No ECG, NNS, NNV, NS, NV, Pause, SA, SR, SVT, VFib, VT, WAP, Other - Notes: 1000 character limit - Interpretation: 1000 character limit (physicians only)

9. Clinical_Notes Table

Purpose: Stores clinical documentation

```sql
CREATE TABLE clinical_notes (
    id BIGINT PRIMARY KEY AUTO_INCREMENT,
    patient_id BIGINT NOT NULL,
    created_by BIGINT NOT NULL,

    -- Note Content
    title VARCHAR(255) NOT NULL,
    content TEXT NOT NULL,
    note_type ENUM('clinical', 'administrative', 'technical') DEFAULT
'clinical',

    -- Rich Text Formatting (stored as HTML or markdown)
    formatted_content TEXT,

    -- System Fields
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
    -- Notes cannot be edited or deleted once created (per UI notice)

    FOREIGN KEY (patient_id) REFERENCES patients(id),
    FOREIGN KEY (created_by) REFERENCES users(id)
);
```

Key Fields Observed: - Rich text editor with formatting options - Title field - Immutable once created (per UI warning) - Date/time auto-populated

10. Contextual_Metrics Table

Purpose: Stores physiological data for ECG correlation

```
CREATE TABLE contextual_metrics (
    id BIGINT PRIMARY KEY AUTO_INCREMENT,
    patient_id BIGINT NOT NULL,
    study_id BIGINT,

    -- Temporal Information
    measurement_timestamp TIMESTAMP NOT NULL,

    -- Physiological Metrics
    blood_pressure_systolic INT,
    blood_pressure_diastolic INT,
    oxygen_saturation DECIMAL(5,2),
    body_weight DECIMAL(6,2),
    glucose_level DECIMAL(6,2),
    body_temperature DECIMAL(4,2),
    activity_steps INT,
    last_posture VARCHAR(50),

    -- Data Source
    source_device VARCHAR(100),
    measurement_type ENUM('manual', 'automatic', 'imported'),

    -- System Fields
    created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,

    FOREIGN KEY (patient_id) REFERENCES patients(id),
    FOREIGN KEY (study_id) REFERENCES studies(id),

    INDEX idx_patient_timestamp (patient_id, measurement_timestamp)
);
```

Key Fields Observed: - Blood pressure: "mmHg (closest before/after)" - Oxygen saturation: "mmHg (closest before/after)" - Body weight: "kg (closest before/after)" - Glucose: "mmol/L (closest before/after)" - Temperature: "°C" - Activity: "steps", "last posture"

Backend Architecture Inference

API Structure

Based on the UI interactions, the following API endpoints can be inferred:

```
 Authentication & Users:
POST /api/auth/login
POST /api/auth/logout
GET /api/auth/me
PUT /api/auth/mfa/enable
PUT /api/auth/mfa/disable

Organizations:
GET /api/organizations/{id}/members
POST /api/organizations/{id}/members/invite
DELETE /api/organizations/{id}/members/{userId}

Patients:
GET /api/patients
POST /api/patients
GET /api/patients/{id}
PUT /api/patients/{id}
DELETE /api/patients/{id}/archive
POST /api/patients/{id}/scla-login-code

Studies:
GET /api/studies
POST /api/studies
GET /api/studies/{id}
PUT /api/studies/{id}
GET /api/studies/{id}/progress
GET /api/studies/{id}/quality/{date}
GET /api/studies/{id}/edf-download

Symptoms:
GET /api/symptoms
GET /api/symptoms/{id}
PUT /api/symptoms/{id}/status
GET /api/symptoms/{id}/history
POST /api/symptoms/{id}/annotations

ECG Data:
GET /api/ecg/{studyId}/data
GET /api/ecg/{studyId}/channels/{channel}
GET /api/ecg/{studyId}/timerange/{start}/{end}
POST /api/ecg/filters/apply

Notes:
GET /api/notes
POST /api/notes
GET /api/notes/{id}

Contextual Metrics:
GET /api/metrics/{patientId}/timerange/{start}/{end}
POST /api/metrics/{patientId}
```

Data Storage Architecture

```
Primary Database (MySQL/PostgreSQL):
├── User management and authentication
├── Patient demographics and medical records
├── Study configuration and metadata
├── Symptom logs and annotations
├── Clinical notes and documentation
└── Quality metrics and aggregations

S3 Object Storage:
├── Raw ECG binary data files
├── Processed ECG segments
├── EDF export files
└── System backups

Redis Cache:
├── Session management
├── Real-time ECG data cache
├── Quality metric aggregations
└── API response caching

Time-Series Database (InfluxDB/TimescaleDB):
├── High-frequency ECG data points
├── Contextual physiological metrics
├── Device telemetry data
└── Quality monitoring metrics
```

Integration Points

```
External Systems:
├── SCLA Mobile App (patient-facing)
├── ECG Device APIs (data collection)
├── Healthcare Information Systems (HL7/FHIR)
├── Insurance Verification Services
└── Notification Services (email/SMS)

Internal Services:
├── ECG Processing Engine
├── Quality Assessment Service
├── Clinical Decision Support
├── Report Generation Service
└── Audit Logging Service
```

Data Relationships and Constraints

Primary Relationships

```
 Organizations (1) → (N) Users
Organizations (1) → (N) Patients
Patients (1) → (N) Studies
Studies (1) → (N) ECG_Data
Studies (1) → (N) Study_Quality
Patients (1) → (N) Symptoms
Symptoms (1) → (N) Symptom_Annotations
Patients (1) → (N) Clinical_Notes
Patients (1) → (N) Contextual_Metrics
```

Business Rules and Constraints

1. **Patient-Study Relationship**: One patient can have multiple studies, but each study belongs to one patient
2. **Study Quality**: Quality data is generated hourly for active studies
3. **Symptom Correlation**: Symptoms must be correlated with ECG data within study timeframe
4. **Clinical Review**: Only MDs can provide clinical interpretations
5. **Data Immutability**: Clinical notes cannot be modified once created
6. **Organization Isolation**: Users can only access data within their organization
7. **Study Lifecycle**: Studies progress through defined status states
8. **Quality Thresholds**: Minimum quality requirements for clinical validity

Implementation Guidance

Technology Stack Recommendations

Frontend Technologies

```
Framework: React.js with TypeScript
├── UI Library: Material-UI or Ant Design
├── State Management: Redux Toolkit or Zustand
├── Routing: React Router v6
├── Forms: React Hook Form with Yup validation
├── Charts: Chart.js or D3.js for ECG visualization
├── Rich Text: Draft.js or TinyMCE for notes editor
└── Date/Time: date-fns or moment.js

ECG Visualization:
├── Canvas-based rendering for performance
├── WebGL for real-time data processing
├── Custom waveform components
└── Multi-channel synchronization
```

Backend Technologies

```
Framework: Node.js with Express.js or Python with FastAPI
├── Database: PostgreSQL with TimescaleDB extension
├── ORM: Prisma (Node.js) or SQLAlchemy (Python)
├── Authentication: JWT with refresh tokens
├── File Storage: AWS S3 or compatible object storage
├── Caching: Redis for session and data caching
├── Queue: Bull (Node.js) or Celery (Python) for background jobs
└── Real-time: Socket.io or WebSockets for live updates

ECG Processing:
├── Signal processing libraries (scipy, numpy)
├── Real-time data streaming
├── Quality assessment algorithms
└── Artifact detection and filtering
```

Infrastructure

```
Deployment:
├── Containerization: Docker with docker-compose
├── Orchestration: Kubernetes or Docker Swarm
├── Load Balancing: NGINX or AWS ALB
├── Monitoring: Prometheus + Grafana
├── Logging: ELK Stack (Elasticsearch, Logstash, Kibana)
└── CI/CD: GitHub Actions or GitLab CI

Security:
├── HTTPS/TLS encryption
├── HIPAA compliance measures
├── Data encryption at rest and in transit
├── Regular security audits
└── Access logging and monitoring
```

Component Implementation Details

1. ECG Viewer Component

Core Requirements:

```typescript
interface ECGViewerProps {
  studyId: string;
  patientId: string;
  timeRange: {
    start: Date;
    end: Date;
  };
  channels: number[];
  filters: ECGFilters;
  onAnnotationAdd: (annotation: Annotation) => void;
}

interface ECGFilters {
  frequencyLow: number;    // 0.05 Hz default
  frequencyHigh: number;   // 45 Hz default
  mainsNoiseFilter: boolean;
  amplitude: number;       // 10 mm/mV default
}
```

Implementation Considerations: - Canvas-based rendering for smooth scrolling and zooming - Efficient data loading with pagination for large datasets - Real-time filter application without server round-trips - Multi-channel synchronization with precise time alignment - Annotation overlay system with click-to-annotate functionality

2. Data Table Component

Reusable Table Structure:

```
interface DataTableProps<T> {
  data: T[];
  columns: ColumnDefinition<T>[];
  pagination: PaginationConfig;
  sorting: SortConfig;
  filtering: FilterConfig;
  actions?: ActionConfig<T>[];
}

interface ColumnDefinition<T> {
  key: keyof T;
  title: string;
  sortable: boolean;
  filterable: boolean;
  render?: (value: any, record: T) => React.ReactNode;
}
```

Features to Implement: - Server-side pagination for large datasets - Multi-column sorting with visual indicators - Advanced filtering with multiple criteria - Inline editing for status changes - Bulk actions for multiple selections

3. Modal System

Modal Management:

```
interface ModalConfig {
  id: string;
  component: React.ComponentType<any>;
  props: any;
  size: 'small' | 'medium' | 'large' | 'fullscreen';
  closable: boolean;
  maskClosable: boolean;
}

// Global modal state management
const useModalStore = () => {
  const [modals, setModals] = useState<ModalConfig[]>([]);

  const openModal = (config: ModalConfig) => { /* ... */ };
  const closeModal = (id: string) => { /* ... */ };
  const closeAllModals = () => { /* ... */ };

  return { modals, openModal, closeModal, closeAllModals };
};
```

4. Form Validation System

Validation Schema Examples:

```
// Patient Creation Form
const patientValidationSchema = yup.object({
  firstName: yup.string().required('First name is required'),
  lastName: yup.string().required('Last name is required'),
  dateOfBirth: yup.date().required('Date of birth is required'),
  email: yup.string().email('Invalid email').required('Email is required'),
  phone: yup.string().required('Phone number is required'),
  healthInsurancePolicy: yup.string().required('Insurance policy is required'),
  insuranceNumber: yup.string().required('Insurance number is required'),
});

// Study Creation Form
const studyValidationSchema = yup.object({
  duration: yup.string().oneOf(['24_hour', '48_hour', '72_hour', '7_day',
'14_day']).required(),
  startDate: yup.date().min(new Date(), 'Start date cannot be in the
past').required(),
  startTime: yup.string().matches(/^([0-1]?[0-9]|2[0-3]):[0-5][0-9]$/, 'Invalid
time format').required(),
});
```

API Implementation Specifications

Authentication & Authorization

JWT Token Structure:

```
interface JWTPayload {
  userId: string;
  organizationId: string;
  role: UserRole;
  permissions: string[];
  iat: number;
  exp: number;
}

// Role-based access control
const permissions = {
  desk_admin: ['patients:read', 'patients:write', 'studies:read'],
  md: ['patients:read', 'studies:read', 'symptoms:review', 'notes:write'],
  cardiac_tech: ['studies:read', 'ecg:analyze', 'symptoms:review'],
  organization_admin: ['users:manage', 'organization:manage']
};
```

Real-time Data Handling

WebSocket Events:

```
// Client-side event handling
interface ECGDataEvent {
  studyId: string;
  timestamp: Date;
  channels: {
    channel1: number[];
    channel2: number[];
    channel3: number[];
  };
  quality: QualityMetrics;
}

// Server-side event emission
socket.emit('ecg:data', {
  studyId: study.id,
  timestamp: new Date(),
  channels: processedECGData,
  quality: qualityAssessment
});
```

Data Processing Pipeline

ECG Quality Assessment:

```
def assess_ecg_quality(ecg_data, sampling_rate=250):
    """
    Assess ECG signal quality based on multiple criteria
    """
    quality_score = 0

    # Signal-to-noise ratio
    snr = calculate_snr(ecg_data)
    quality_score += min(snr / 20, 0.3)  # Max 30% from SNR

    # Artifact detection
    artifact_percentage = detect_artifacts(ecg_data)
    quality_score += max(0, 0.3 - artifact_percentage)  # Max 30% from
artifacts

    # Heart rate variability
    hrv_score = assess_hrv_quality(ecg_data, sampling_rate)
    quality_score += hrv_score * 0.2  # Max 20% from HRV

    # Baseline stability
    baseline_score = assess_baseline_stability(ecg_data)
    quality_score += baseline_score * 0.2  # Max 20% from baseline

    return min(quality_score, 1.0)
```

Security Implementation

Data Encryption

Encryption Strategy:

```
// Patient data encryption
const encryptPatientData = (data: PatientData): EncryptedPatientData => {
  const sensitiveFields = ['ssn', 'medicalRecordNumber', 'insuranceNumber'];
  const encrypted = { ...data };

  sensitiveFields.forEach(field => {
    if (encrypted[field]) {
      encrypted[field] = encrypt(encrypted[field], process.env.ENCRYPTION_KEY);
    }
  });

  return encrypted;
};

// ECG data integrity
const generateECGChecksum = (ecgData: ECGData): string => {
  return crypto
    .createHash('sha256')
    .update(JSON.stringify(ecgData))
    .digest('hex');
};
```

Audit Logging

Audit Trail Implementation:

```
interface AuditLog {
  id: string;
  userId: string;
  action: string;
  resourceType: string;
  resourceId: string;
  changes: any;
  ipAddress: string;
  userAgent: string;
  timestamp: Date;
}

const logAuditEvent = async (event: Omit<AuditLog, 'id' | 'timestamp'>) => {
  await auditLogRepository.create({
    ...event,
    id: generateUUID(),
    timestamp: new Date()
  });
};
```

Performance Optimization

ECG Data Optimization

Data Compression and Streaming:

```
// Client-side ECG data management
class ECGDataManager {
  private cache = new Map<string, ECGSegment>();
  private maxCacheSize = 100; // segments

  async loadECGSegment(studyId: string, startTime: Date, duration: number):
Promise<ECGSegment> {
    const cacheKey = `${studyId}-${startTime.getTime()}-${duration}`;

    if (this.cache.has(cacheKey)) {
      return this.cache.get(cacheKey)!;
    }

    const segment = await this.fetchECGData(studyId, startTime, duration);
    this.addToCache(cacheKey, segment);

    return segment;
  }

  private addToCache(key: string, segment: ECGSegment) {
    if (this.cache.size >= this.maxCacheSize) {
      const firstKey = this.cache.keys().next().value;
      this.cache.delete(firstKey);
    }
    this.cache.set(key, segment);
  }
}
```

Database Optimization

Query Optimization Strategies:

```
-- Optimized symptom query with proper indexing
CREATE INDEX idx_symptoms_patient_date ON symptoms(patient_id, symptom_date
DESC);
CREATE INDEX idx_symptoms_status_date ON symptoms(status, symptom_date DESC);

-- Optimized ECG data query for time-range searches
CREATE INDEX idx_ecg_study_time ON ecg_data(study_id, start_timestamp,
end_timestamp);

-- Partitioned study_quality table for better performance
CREATE TABLE study_quality_2025 PARTITION OF study_quality
FOR VALUES FROM ('2025-01-01') TO ('2026-01-01');
```

Testing Strategy

Unit Testing

Component Testing Examples:

```
// ECG Viewer component test
describe('ECGViewer', () => {
  it('should render ECG waveforms correctly', async () => {
    const mockData = generateMockECGData();
    render(<ECGViewer studyId="123" data={mockData} />);

    expect(screen.getByTestId('ecg-canvas')).toBeInTheDocument();
    expect(screen.getByText('Channel 1')).toBeInTheDocument();
  });

  it('should apply filters correctly', async () => {
    const mockData = generateMockECGData();
    const { rerender } = render(<ECGViewer studyId="123" data={mockData} />);

    const filters = { frequencyLow: 0.1, frequencyHigh: 40, amplitude: 15 };
    rerender(<ECGViewer studyId="123" data={mockData} filters={filters} />);

    // Verify filter application
    expect(mockFilterFunction).toHaveBeenCalledWith(mockData, filters);
  });
});
```

Integration Testing

API Integration Tests:

```
describe('Patient API', () => {
  it('should create patient with valid data', async () => {
    const patientData = {
      firstName: 'John',
      lastName: 'Doe',
      dateOfBirth: '1990-01-01',
      email: 'john.doe@example.com',
      // ... other required fields
    };

    const response = await request(app)
      .post('/api/patients')
      .set('Authorization', `Bearer ${validToken}`)
      .send(patientData)
      .expect(201);

    expect(response.body.id).toBeDefined();
    expect(response.body.status).toBe('pending');
  });
});
```

Deployment Configuration

Docker Configuration

Dockerfile Example:

```
# Frontend Dockerfile
FROM node:18-alpine AS builder
WORKDIR /app
COPY package*.json ./
RUN npm ci --only=production
COPY . .
RUN npm run build

FROM nginx:alpine
COPY --from=builder /app/dist /usr/share/nginx/html
COPY nginx.conf /etc/nginx/nginx.conf
EXPOSE 80
CMD ["nginx", "-g", "daemon off;"]
```

Docker Compose Configuration:

```yaml
version: '3.8'
services:
  frontend:
    build: ./frontend
    ports:
      - "3000:80"
    depends_on:
      - backend

  backend:
    build: ./backend
    ports:
      - "8000:8000"
    environment:
      - DATABASE_URL=postgresql://user:pass@db:5432/mvcp
      - REDIS_URL=redis://redis:6379
    depends_on:
      - db
      - redis

  db:
    image: timescale/timescaledb:latest-pg14
    environment:
      - POSTGRES_DB=mvcp
      - POSTGRES_USER=user
      - POSTGRES_PASSWORD=pass
    volumes:
      - postgres_data:/var/lib/postgresql/data

  redis:
    image: redis:alpine
    volumes:
      - redis_data:/data

volumes:
  postgres_data:
  redis_data:
```

Monitoring and Maintenance

Health Checks

Application Health Monitoring:

```
// Health check endpoint
app.get('/health', async (req, res) => {
  const health = {
    status: 'ok',
    timestamp: new Date().toISOString(),
    services: {
      database: await checkDatabaseHealth(),
      redis: await checkRedisHealth(),
      s3: await checkS3Health(),
      ecgProcessor: await checkECGProcessorHealth()
    }
  };

  const isHealthy = Object.values(health.services).every(service =>
service.status === 'ok');
  res.status(isHealthy ? 200 : 503).json(health);
});
```

Performance Monitoring

Key Metrics to Track:

```
const metrics = {
  // Application Performance
  responseTime: 'Average API response time',
  throughput: 'Requests per second',
  errorRate: 'Percentage of failed requests',

  // ECG Processing
  ecgProcessingLatency: 'Time to process ECG segments',
  qualityAssessmentTime: 'Time to assess data quality',
  dataIngestionRate: 'ECG data points per second',

  // User Experience
  pageLoadTime: 'Frontend page load times',
  ecgRenderTime: 'Time to render ECG waveforms',
  modalOpenTime: 'Time to open complex modals',

  // Business Metrics
  activeStudies: 'Number of ongoing studies',
  dailySymptomReports: 'Symptoms reported per day',
  clinicalReviewTime: 'Average time for clinical review'
};
```

This comprehensive documentation provides all the necessary information for an AI system to reconstruct the MVCP application from scratch, including detailed technical specifications, implementation guidance, and operational considerations.