Product Design Document: Health Twin App

1. Product Overview

The Health Twin App is an AI-powered proactive health management platform that creates a digital twin of users' health. It integrates data from wearables, lab reports, and manual inputs to provide actionable insights, predict risks, and automate health tasks. The app features two interfaces:
- Doctor Portal: For creating patient profiles, prescribing medications, and uploading reports.
- Patient Portal: For accessing health insights, calendar, reminders, and AI-driven recommendations.

Core Value Proposition: Shift from reactive to proactive healthcare by predicting risks and automating health management through AI agents and virtual doctors.

2. User Roles & Access

Role	Access Method	Permissions
Doctor	Signup with Doc ID, name, phone number	Create patient accounts, prescribe meds, upload reports, schedule appointments.
Patient	Login with CNIC + password (set by doctor)	View health data, calendar, reminders, chat with AI doctor, log wearable data.

3. Core Features & Workflows

A. Doctor Portal

1. Authentication
- Signup: Doc ID + name + phone (verified via OTP).
- Login: Doc ID + password.

2. Patient Management
- Create patient profile (name, CNIC, contact).
- Auto-generate password for patient.
- Assign credentials in-person.

3. Prescription Module
- Add medications (name, dosage, frequency).
- Upload lab reports (PDF, images).
- Attach custom instructions.

4. Appointment Scheduling
- Set appointments synced to patient’s calendar.

B. Patient Portal

1. Authentication
- Login: CNIC + password (provided by doctor).

2. Health Dashboard
- Health metrics (steps, heart rate, sleep).
- Risk predictions (e.g., "High blood sugar risk").
- AI-generated action plans (meals, workouts).

3. AI Agent
- Auto-schedule appointments.
- Manage calendar/medication reminders.

- Send notifications.

4. Virtual Doctor Chatbot
- GLM API-powered chat for medical queries.
- Symptom analysis and first-aid advice.

5. Manual Wearable Data Entry
- Log steps, heart rate, sleep, etc. (for testing).

6. Calendar & Alarms
- Animated calendar with appointments/meds.
- Customizable reminders with sound.

C. Shared Features

- Theme Toggle: Light (green/cream) ↔ Dark (charcoal/dark green).
- Responsive Design: Adapts to mobile/tablet/desktop.
- Animations: Sliding transitions, hover effects, bottom nav bar morphing.

4. UI/UX Design

A. Color Scheme

Element	Light Theme	Dark Theme
Primary	Green (#4CAF50)	Dark Green (#2E7D32)
Secondary	Light Green (#A5D6A7)	Charcoal (#1C1C1C)
Background	Cream White (#FFFDD0)	Charcoal (#1C1C1C)
Text	Charcoal (#333333)	Cream White (#FFFDD0)

B. Animations & Interactions

- Hover Effects: Buttons/cards scale (1.05x) + color shift.
- Sliding Animations: Pages slide right→left on nav; drawers slide from edges.
- Bottom Nav Bar: Icons morph (e.g., heart → pulse on hover) with smooth transitions.
- Calendar: Events "drop in" on load; months slide horizontally.
- Alarms: Pop-up with bounce animation + gradient pulse.

C. Responsive Layout

- Mobile: Bottom nav, stacked cards, touch-friendly buttons.
- Desktop: Side nav, grid layouts, hover tooltips.

5. Page-by-Page Design

A. Doctor Portal

1. Login/Signup
- Minimalist form with theme toggle.
- Doc ID verification badge animation.

2. Dashboard
- Patient list (searchable).
- Quick stats: Active patients, pending reports.
- "Add Patient" FAB (floating action button).

3. Patient Profile

- Health metrics charts (Chart.js).
- Tabs: Prescriptions, Reports, Appointments.
- "Upload Report" button with file-icon animation.

4. Prescription Module
- Drag-and-drop medication builder.
- Auto-fill dosage suggestions.

B. Patient Portal

1. Login
- CNIC/password fields with show/hide toggle.
- Forgot password → "Contact your doctor."

2. Dashboard
- Health summary cards (steps, sleep, heart rate).
- Risk alerts (color-coded: red/yellow/green).
- AI action plan carousel (swipeable).

3. Health Twin
- Manual data entry form (wearable simulation).
- Trend charts (7-day/30-day views).
- "Ask AI Doctor" button → chatbot drawer.

4. Calendar
- Month/week/day views with animated transitions.
- Color-coded events (meds: blue, appointments: green).
- "Add Reminder" FAB.

5. Virtual Doctor Chatbot
- Chat bubble interface with typing indicators.
- Quick-reply buttons (e.g., "Explain results").

6. Settings
- Theme toggle, notification prefs, alarm sounds.

6. Technology Stack

Layer	Tech	Purpose
Frontend	React + TypeScript + Tailwind CSS	UI, animations, responsive design.
Backend	Firebase (Firestore, Functions, Auth)	Database, serverless logic, user auth.
AI	GLM API (chatbot) + Custom ML models	Health predictions, virtual doctor.
PWA	Workbox + Service Workers	Offline support, app-like experience.
Animations	Framer Motion + CSS Transitions	Sliding/hover effects, calendar animations.

7. Key Enhancements

1. Emergency Mode: One-tap SOS alert to doctor/emergency contacts.
2. Progress Sharing: Share weekly health reports with doctors via secure link.
3. Gamification: Earn badges for consistent logging (e.g., "7-Day Streak").
4. Multi-Language Support: English, Spanish, Urdu (expandable).
5. Voice Commands: "Log my steps" or "Schedule a checkup" via mic.

8. Workflow Diagrams

Doctor Onboarding Patient

A[Doctor Signup] --> B[Verify Doc ID]
B --> C[Create Patient Profile]
C --> D[Generate CNIC + Password]
D --> E[Share Credentials In-Person]

Patient Health Management
F[Patient Login] --> G[View Dashboard]
G --> H[Log Wearable Data]
H --> I[AI Analyzes Trends]
I --> J[Risk Alerts + Action Plans]
J --> K[Calendar/Reminders Updated]

9. Next Steps for Development

1. Setup Firebase Project
- Enable Firestore, Auth, Functions, Storage.
2. Build React Frontend
- Implement routing (React Router), responsive layout.
3. Core Features
- Doctor/patient auth → patient creation → manual data logging.
4. Integrate AI
- GLM API for chatbot; rule-based risk prediction (ML later).
5. Animations
- Framer Motion for sliding/nav effects; CSS for hovers.
6. PWA Configuration
- Service worker for offline access; manifest for app install.

10. UI Mockups (Key Screens)

A. Patient Dashboard (Light Theme)
- Header: Theme toggle (sun/moon icon), notifications bell.
- Body: Health cards (steps, sleep) with progress rings.
- Risk alert banner ("Low activity detected!").
- AI action plan: "Today’s meals: 3 options →".
- Bottom Nav: Animated icons (Home, Calendar, Chat, Settings).

B. Doctor Prescription Module (Dark Theme)
- Header: Patient name + "Back" button.
- Body: Medication list (add/remove with trash icon animation).
- "Upload Report" button with cloud-upload animation.
- "Save" button with pulse effect on hover.

Final Notes:
- Prioritize manual wearable data entry for MVP.
- Use Firebase Security Rules to isolate doctor/patient data.
- Test animations on low-end devices for performance.