

# MCH Kenya

## Patient Mobile Application

### Design & Implementation Plan

<b>Version:</b>	1.0.0
<b>Date:</b>	December 04, 2025
<b>Target Platform:</b>	Android, iOS, Web
<b>Framework:</b>	Flutter

### Executive Summary

The MCH Kenya Patient Mobile Application empowers mothers and caregivers with easy access to maternal and child health information. Designed with a warm, approachable interface using pink and purple color schemes, the app provides appointment management, vaccination tracking, growth monitoring, and health education—all while maintaining offline-first capabilities for reliable access in areas with limited connectivity.

# Table of Contents

1.	Overview & Objectives	3
2.	User Experience Design	4
3.	App Structure & Navigation	5
4.	Screen Designs	6
5.	Design System & Branding	9
6.	Technical Architecture	10
7.	Key Features	11
8.	Implementation Phases	12
9.	Data Security & Privacy	13
10.	Future Enhancements	14

# 1. Overview & Objectives

## Purpose

The MCH Kenya Patient App serves as a companion application for mothers and caregivers to actively engage in their family's health journey. It provides read-access to health records created by health workers, appointment reminders, vaccination schedules, and educational resources.

## Target Users

- Pregnant women attending antenatal care
- Mothers with children aged 0-5 years
- Caregivers managing multiple children's health records
- Postnatal mothers requiring continued care

## Key Objectives

Objective	Description
Empowerment	Give mothers control and visibility of their health data
Accessibility	Provide offline-first access to critical health information
Engagement	Encourage active participation in maternal and child health
Prevention	Reduce missed appointments and vaccinations through reminders
Education	Provide age-appropriate health tips and guidance

## 2. User Experience Design

### Design Philosophy

The patient app adopts a warm, caring, and approachable design philosophy. Unlike the clinical blue tones of the health worker app, the patient app uses pink and purple colors to create a nurturing, feminine aesthetic that resonates with mothers and caregivers.

### UX Principles

- **Simplicity First:** Avoid medical jargon, use plain language
- **Visual Clarity:** Large text, clear icons, color-coded status indicators
- **Intuitive Navigation:** Maximum 4 taps to reach any information
- **Proactive Guidance:** Smart reminders and contextual tips
- **Offline Resilience:** Full functionality without internet connection
- **Accessible Design:** Support for multiple languages (English, Swahili)

### User Personas

Persona	Age	Needs	Tech Literacy
First-time Mother	22-28	Guidance, reassurance, appointment reminders	Medium
Experienced Mother	28-35	Multiple child tracking, efficiency, quick access	High
Caregiver (Grandmother)	45-60	Simple interface, larger text, basic features	Low
Working Mother	25-35	Time-saving features, notifications, offline access	High

### 3. App Structure & Navigation

#### Bottom Navigation Structure

The app uses a 4-tab bottom navigation bar for easy thumb access on mobile devices. Each tab represents a core user need and provides immediate access to critical information.

Tab	Icon	Primary Purpose	Key Features
Home	■	Dashboard & Overview	Pregnancy tracker, urgent reminders, quick actions
Children	■	Child Management	Child profiles, growth charts, vaccination status
Visits	■	Appointments	Upcoming visits, past history, calendar view
Me	■	Profile & Settings	Maternal health, app settings, support

#### Information Architecture

- **Level 1:** Bottom Navigation (4 main sections)
- **Level 2:** Section Landing Pages (lists, dashboards)
- **Level 3:** Detail Screens (individual records, forms)
- **Level 4:** Action Screens (edit, share, view history)

#### Navigation Patterns

- **Tab Switching:** Instant access between main sections
- **Drill-Down:** Tap cards to view detailed information
- **Back Navigation:** Consistent back button in AppBar
- **Quick Actions:** Floating action buttons for common tasks
- **Deep Links:** Direct access from notifications

## 4. Screen Designs

### 4.1 Home Screen (Dashboard)

The home screen provides a personalized overview of the mother's health journey and urgent action items. It's designed for quick daily check-ins.

Section	Content	Interaction
Greeting	Personalized welcome message	Static display
Pregnancy Card	Current week, due date, next ANC visit	Tap to view full maternal profile
Urgent Alerts	Vaccines due, overdue appointments	Tap to navigate to relevant screen
Children Quick View	Summary cards for all children	Tap to open child detail
Health Tips	Age-appropriate guidance	Swipe carousel, tap to read full article

### 4.2 Children Tab

Displays all registered children with key health metrics. Designed for mothers managing multiple children.

Component	Information Displayed
Child Card	Photo, name, age, next vaccination, recent weight
Status Badges	Green (up-to-date), Orange (due soon), Red (overdue)
Add Button	Floating action button to register new child (navigates to form)
Sort/Filter	By age, by vaccination status, by last visit

### 4.3 Child Detail Screen

Comprehensive view of an individual child's health records:

- **Profile Header:** Photo, name, date of birth, current age
- **Growth Chart:** Weight-for-age and height-for-age percentile curves
- **Vaccination Schedule:** Completed (✓), upcoming (clock), overdue (warning)
- **Recent Visits:** Timeline of health facility visits with summaries
- **Lab Results:** If any tests were conducted (malaria, nutrition assessment)
- **Action Buttons:** Share record, view full history, edit basic info

## 4.4 Visits Tab (Appointments)

Manages all health-related appointments for both mother and children. Provides calendar and list views.

View Mode	Description	Benefits
Calendar View	Monthly calendar with colored dots for appointments	Visual overview of busy days
List View	Chronological list grouped by date	Detailed appointment information
Filter Options	By person (mother/child), by type (ANC/vaccination/consultation)	Focus on specific needs

### Appointment Card Details:

- Date and time
- Appointment type (icon + text)
- Person (mother or specific child)
- Health facility name and location
- Action buttons: View details, Get directions, Add to phone calendar

## 4.5 Me Tab (Profile & Settings)

Section	Contents
User Profile	Photo, name, contact info, age, location
Maternal Health	Current/past pregnancies, medical history, lab results, birth history
Settings	Notifications preferences, language, theme (light/dark), data sync
Privacy & Security	Data visibility, sharing permissions, PIN/biometric lock
Support	Help & FAQ, contact support, emergency contacts, about app
Account Actions	Sign out, delete account

## 5. Design System & Branding

### 5.1 Color Palette

The patient app uses warm, nurturing colors that differ from the clinical blue of the health worker app, creating a distinct, caring identity.

Color	Hex Code	Usage	Example
Primary Pink	#E91E63	Main brand color, primary actions, headers	Buttons, AppBar
Purple Accent	#9C27B0	Secondary actions, highlights, links	Tab indicators, icons
Success Green	#4CAF50	Positive states, completed items	Up-to-date badges
Warning Orange	#FF9800	Attention needed, due soon	Due soon badges
Error Red	#F44336	Urgent, overdue, errors	Overdue alerts
Grey Text	#424242	Body text, secondary information	Descriptions, labels
Light Grey	#F5F5F5	Backgrounds, cards, dividers	Card backgrounds

### 5.2 Typography

Style	Font	Size	Weight	Usage
H1 - Page Title	Roboto	24sp	Bold	Screen titles
H2 - Section	Roboto	20sp	Bold	Section headers
H3 - Subsection	Roboto	16sp	Medium	Card titles
Body - Regular	Roboto	14sp	Regular	Main text
Body - Small	Roboto	12sp	Regular	Captions, metadata
Button Text	Roboto	14sp	Medium	Action buttons

### 5.3 Visual Components

- **Cards:** Rounded corners (12dp), elevation (2dp), white background
- **Buttons:** Primary (pink fill), Secondary (purple outline), Text (no background)
- **Icons:** Material Design icons, 24dp size, pink/purple tint
- **Status Badges:** Small circular indicators with color coding
- **Avatar Images:** Circular crop, 48dp (lists) or 80dp (profiles)



## 6. Technical Architecture

### Technology Stack

Layer	Technology	Purpose
Frontend Framework	Flutter 3.x	Cross-platform UI development
State Management	Riverpod 2.x	Reactive state management
Local Database	Hive	Offline data storage
Backend & Auth	Supabase	Cloud database, authentication, real-time sync
Routing	go_router	Declarative navigation
HTTP Client	dio	Network requests
Notifications	flutter_local_notifications	Local reminders & alerts

### Offline-First Architecture

The app uses a hybrid Hive + Supabase architecture identical to the health worker app, ensuring data availability even without internet connection.

#### Data Flow:

1. **Read Operations:** Always fetch from local Hive database first
2. **Background Sync:** Periodic sync from Supabase when online (every 5 minutes)
3. **Write Operations:** Not applicable (patients have read-only access)
4. **Sync Indicator:** UI shows last sync time and connectivity status

### Shared Package Integration

The patient app uses the **mch\_core** shared package containing data models, enums, and repository interfaces. This ensures consistency between health worker and patient apps.

#### Shared Components:

- MaternalProfile, ChildProfile models
- Appointment, Vaccination, LabResult models
- Enums: AppointmentType, VaccinationType, AppointmentStatus
- Repository interfaces for data access

## 7. Key Features

### 7.1 Smart Notifications

Notification Type	Trigger	Timing	Actions
Vaccination Reminder	Due date approaching	3 days, 1 day, morning of	View details, Snooze
ANC Appointment	Scheduled visit	1 day before, 2 hours before	View, Get directions
Checkup Reminder	Routine visit due	1 week before	Book appointment
Missed Appointment	No attendance recorded	Same day evening	Reschedule
Health Tip	Based on child age	Weekly	Read article

### 7.2 Growth Monitoring

Interactive growth charts based on WHO Child Growth Standards:

- Weight-for-age percentile curves (0-5 years)
- Height-for-age percentile curves (0-5 years)
- Weight-for-height/length curves (0-2 years)
- Visual indicators for normal range, at risk, and severe malnutrition
- Historical data points showing growth trajectory over time

### 7.3 Vaccination Schedule

Comprehensive vaccination tracking based on Kenya's immunization schedule:

- Age-appropriate vaccine list with recommended dates
- Visual timeline showing completed, upcoming, and overdue vaccines
- Information about each vaccine (what it prevents, side effects)
- Automatic reminders for upcoming vaccinations
- Certificate view and share functionality

### 7.4 Health Education

Age-appropriate health tips and educational content:

- Pregnancy tips by trimester (nutrition, exercise, warning signs)
- Breastfeeding guidance and techniques
- Child nutrition by age (complementary feeding, meal planning)
- Developmental milestones tracking
- Common illness recognition and when to seek care
- Available in English and Swahili

## 8. Implementation Phases

### Phase 1: MVP (Weeks 1-2)

Feature	Description	Deliverable
Authentication	Login, signup, password reset	Working auth flow
Home Dashboard	Pregnancy card, alerts, child summary	Functional home screen
Children List	View all children with basic info	Children tab with cards
Appointments List	View upcoming and past appointments	Visits tab (list view)
Profile View	Basic maternal profile and settings	Me tab with profile
Offline Storage	Hive integration for all data	Offline-first functionality

### Phase 2: Enhanced Features (Weeks 3-4)

- Child detail screen with full medical history
- Growth charts (weight-for-age, height-for-age)
- Vaccination schedule with status tracking
- Calendar view for appointments
- Basic notifications for upcoming appointments
- Maternal health history view
- Lab results display

### Phase 3: Polish & Advanced Features (Weeks 5-6)

- Smart notification system (multi-type, multi-timing)
- Health education content library
- Swahili language support
- Share vaccination certificate functionality
- Appointment directions (Google Maps integration)
- Dark theme implementation
- Biometric authentication (fingerprint/face)
- Comprehensive user testing and bug fixes

### Success Criteria

- App launches and loads home screen within 3 seconds
- Full offline functionality (view all data without internet)
- Automatic sync completes within 30 seconds when online
- Zero critical bugs in core user flows
- Positive feedback from 10+ user testing sessions

## 9. Data Security & Privacy

### Data Access Model

Patients have **read-only access** to their own health records and their children's records. They cannot create, edit, or delete medical information—this is exclusively managed by health workers through the health worker app.

Data Type	Patient Can View	Patient Can Edit	Created By
Maternal Profile	✓ Own profile only	✗ Contact info only	Health Worker
Child Profiles	✓ Own children only	✗ No	Health Worker
Appointments	✓ Own/children only	✗ No	Health Worker
Vaccinations	✓ Own children only	✗ No	Health Worker
Lab Results	✓ Own/children only	✗ No	Health Worker
Growth Records	✓ Own children only	✗ No	Health Worker
Account Settings	✓ Yes	✓ Yes	Patient

### Security Measures

- **Authentication:** Supabase Auth with email/password, optional biometric
- **Row Level Security:** Database policies ensure users only access their data
- **Local Encryption:** Hive database encrypted with device-specific key
- **HTTPS Only:** All network communication uses TLS 1.3
- **Session Management:** Automatic logout after 30 days of inactivity
- **App Lock:** Optional PIN/biometric required to open app

### Privacy Compliance

- **Data Minimization:** Only collect necessary health information
- **Purpose Limitation:** Data used only for maternal and child health services
- **User Control:** Patients can view all data collected about them
- **Consent:** Clear privacy policy and terms of service during signup
- **Right to Delete:** Account deletion removes all patient data within 30 days
- **Audit Trail:** All data access logged (view-only for patients)

## 10. Future Enhancements

### Short-Term (3-6 months)

Feature	Benefit	Effort
SMS Notifications	Reach mothers without internet	Medium
Offline Maps	Navigate to facilities without data	Medium
Voice Messages	Support for low-literacy users	High
Share via WhatsApp	Easy record sharing with family	Low
Appointment Requests	Patients can request bookings	Medium
Symptom Checker	When to seek care guidance	High

### Medium-Term (6-12 months)

- **Telemedicine Integration:** Video consultations with health workers
- **Community Features:** Mother support groups, Q&A; forums
- **Wearable Integration:** Sync data from fitness trackers
- **Medication Reminders:** Track prescriptions and dosages
- **Emergency SOS:** One-tap emergency contact alert
- **Family Sharing:** Allow partners/family to view child records

### Long-Term (12+ months)

- **AI Health Assistant:** Chatbot for common health questions
- **Predictive Analytics:** Risk assessment for complications
- **Mental Health Support:** Postpartum depression screening and resources
- **Nutrition Planning:** Personalized meal plans and recipes
- **Gamification:** Rewards for attending appointments, completing health tasks
- **Integration with NHIF:** Insurance claim tracking

### Research & Innovation

Future versions could explore cutting-edge technologies such as:

- Machine learning for early detection of growth abnormalities
- Natural language processing for voice-based data entry (for low-literacy users)
- Blockchain for secure, portable health records across facilities
- IoT integration with home health monitoring devices

# Appendix: Technical Specifications

## Minimum Device Requirements

Platform	OS Version	RAM	Storage
Android	Android 6.0 (API 23)+	2 GB	100 MB
iOS	iOS 12.0+	2 GB	100 MB
Web	Modern browsers (Chrome 90+, Safari 14+)	N/A	N/A

## Performance Targets

Metric	Target	Measurement
App Launch Time	< 3 seconds	Cold start on mid-range device
Screen Transition	< 200ms	Navigation between tabs
Data Sync Time	< 30 seconds	100 records, good network
Offline Data Load	< 1 second	Load from Hive database
Memory Usage	< 150 MB	Average during normal use
App Size	< 50 MB	APK/IPA download size

## Dependencies (Key Packages)

Package	Version	Purpose
flutter_riverpod	^2.4.0	State management
hive	^2.2.3	Local database
hive_flutter	^1.1.0	Hive Flutter integration
supabase_flutter	^2.0.0	Backend & auth
go_router	^12.0.0	Navigation
flutter_local_notifications	^16.0.0	Local notifications
intl	^0.18.1	Internationalization
shared_preferences	^2.2.2	Settings storage

## Contact & Support

For questions about this design plan or implementation support:

- **Project:** MCH Kenya Digital Health System
- **Component:** Patient Mobile Application
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