

# Code4Cure: Empowering Smart, Secure, and Instant Telehealth

**Team Name:** Code4Cure

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## Introduction

In the wake of the COVID-19 pandemic, the need for accessible, affordable, and high-quality healthcare has become more critical than ever. **Code4Cure** is a comprehensive telehealth solution designed to meet this growing demand. It enables patients to consult with healthcare professionals securely and conveniently through a web-based platform, regardless of their geographical location.

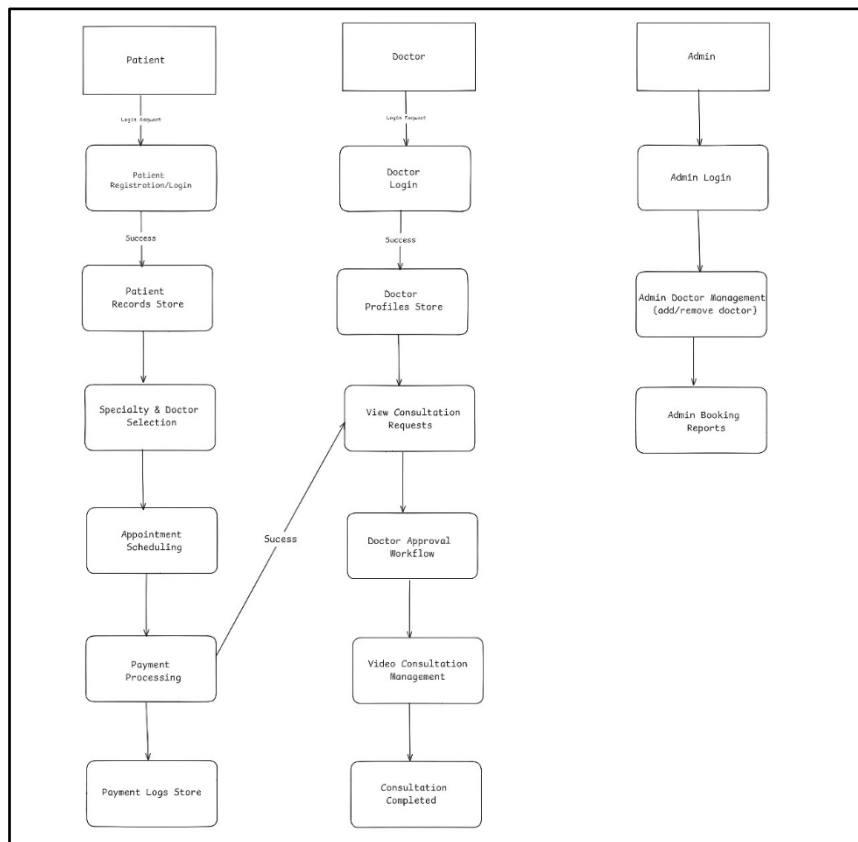
## Problem Statement

The post-pandemic healthcare environment presents unique challenges that require innovative digital solutions:

1. Ensuring **immediate access** to medical consultation with an experience that closely mimics **in-person visits**.
2. Facilitating **structured** and **user-friendly** collection of **patient details** and **specialty preferences**.
3. Securing **pre-consultation payment processing** to streamline **appointment scheduling**.
4. Maintaining strict **confidentiality** and **safety** of consultation data and **Protected Health Information (PHI)**.
5. Supporting **in-app communication** features during **live video consultations**.
6. Assisting diverse users through **real-time transcription** to bridge **dialect** and **accent gaps**.

# Our Solution: Code4Cure

## System Flow Diagram



- **Patient journey:** From registration to video consultation.
- **Doctor journey:** From login to consultation approval and management.
- **Admin role:** In managing doctors and viewing booking reports.

## 1. Instant Access to Medical Consultations

- Integrated **Daily.co SDK** using DailyIframe for seamless video conferencing.
- Employed Daily's prebuilt UI to simplify implementation while maintaining user experience.
- Included intuitive call controls such as leave buttons and live captions.

**Test Case:** Initiate a video call between a doctor and a patient using separate devices. Confirm video/audio quality and connection stability.

## 2. Structured Patient Registration & Specialty Selection

- Patient onboarding captures essential information: name, email, password, DOB, gender, phone number, and address.
- Doctor specialties are assigned by the admin during registration to ensure reliable doctor-patient matching.

**Test Case:** Register a new patient and verify the accuracy of stored data and form validations.

### 3. Secure Payment Integration

- Incorporated **Razorpay** to facilitate mandatory payment before consultations.
- Access to the meeting link is conditional upon successful transaction completion.
- Backend validation ensures that only paid appointments can access the video session.

**Test Case:** Attempt to join a call without completing payment — verify that the “Join Call” button remains disabled and backend blocks unauthorized access.

### 4. Data Privacy & PHI Security

- Utilized **JWT authentication** and **bcrypt encryption** to secure sessions and credentials.
- Implemented backend authorization to allow access only to the assigned doctor and patient.
- Employed **Daily.co meeting tokens** to enforce role-based access control at the video conferencing level.

**Test Case:** Attempt to join a session with an invalid or mismatched token — system should reject access.

### 5. Integrated In-Call Chat

- Enabled **Daily.co’s built-in chat** functionality for real-time messaging during consultations.

**Test Case:** Send and receive messages mid-session from both participants and verify successful communication.

### 6. Live Transcription Support

- Activated **Daily.co live captions** to enhance accessibility, especially for users with different linguistic backgrounds.
- Transcription improves comprehension across accents and dialects.

**Test Case:** Speak during a consultation and confirm accurate and timely transcription appears on-screen.

## Tech Stack

- **Frontend:** React.js, Tailwind CSS
- **Backend:** Node.js, Express.js
- **Database:** MongoDB
- **Video & Chat:** Daily.co SDK (Iframe + Prebuilt UI + Captions)
- **Transcription:** Daily Live Captions
- **Payments:** Razorpay
- **Security:** JWT, bcrypt, Daily.co Meeting Tokens
- **Deployment:** Vercel, Render

## Future Enhancements

1. **Doctor Rating System:** Allow patients to rate and review doctors after each session to build trust and promote quality care.
2. **Digital Prescription Generator:** Enable doctors to issue digitally signed prescriptions that patients can securely download after consultations.
3. **Security & Reliability Enhancements:** Integrate **Cloudflare** for CDN, DDoS protection, and SSL; add **CAPTCHA** to block bots during login and registration.

## Conclusion

**Code4Cure** delivers a robust, secure, and user-friendly telehealth platform tailored for today's digital healthcare needs. By prioritizing privacy, accessibility, and real-time communication, it not only bridges the gap between doctors and patients but also lays a scalable foundation for the future of virtual healthcare.