HOPE ALIVE CLINICS

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## HOSPITAL PATIENT MANAGEMENT SYSTEM

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FOR END OF MODULE PRESENTATION

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# INTRODUCTION

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## BACKGROUND

- In response to the high infant and child mortality rate caused by short illnesses in Dille Village, Borno State, the Hope Alive Foundation, an international NGO, established a children's hospital known as Hope Alive Clinic.
- The foundation initially planned to offer completely free healthcare, but to ensure sustainability, patients now pay only 20% of consultation fees, while all prescribed drugs remain completely free.
- However, the hospital faced serious record management challenges. Patient records, doctor appointments, and prescriptions were stored manually on paper. As a result, records were often lost, prescriptions mismatched, and appointments double-booked. This inefficiency raised serious concerns about the quality of service delivery.
- The hospital director, Dr. Yusuf, highlighted the urgent need for an electronic system to store, update, and retrieve records reliably. I have been tasked with designing and implementing the database system that will serve as the backbone of this solution.

# PATIENT JOURNEY EXAMPLE (CASE SCENARIO)

- Registration: Patient details are recorded along with guardian details (e.g., Maryam + her father, Mr. Hassan).
- Guardian Reusability: A single guardian (Mr. Hassan) can be linked to multiple patients (e.g., Maryam and her brother Zubair).
- Appointment: After registration, the patient books an appointment with a doctor.
- Consultation & Prescription: Upon payment confirmation, the doctor examines the patient and prescribes medication (which may be none or multiple drugs).
- Repeat Visits: Patient data is stored; on future visits, only a new appointment record is created, ensuring complete medical history is maintained for better treatment.
- Doctors & Departments: Each doctor belongs to one of 10 hospital departments, and their specialization must align with their department.

HOSPITAL PROCESS WORKFLOW FLOWCHART

# PROPOSED DATABASE STRUCTURE

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**The Hope Alive Children Clinics Database manages patient care, appointments, and medical records through five entities: Patients, Appointments, Doctors, Departments, and Prescriptions. These entities work together to track patient details, doctor assignments, departmental roles, and prescriptions for efficient healthcare management.**

# PROPOSED DATABASE STRUCTURE

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# DATABASE TABLES CREATION AND DATA INPUT

# DATABASE CONSTRAINTS & RULES:

- Primary Keys: Every table (patient_id, appointment_id, doctor_id, department_id, prescription_id) has a unique identifier.

- Foreign Keys:
  - patient_id in Appointments → references Patients.
  - doctor_id in Appointments → references Doctors.
  - department_id in Doctors → references Departments.
  - appointment_id in Prescriptions → references Appointments.

- NOT NULL: Critical fields like patient details, guardian phone, appointment date, doctor assignment, department name, and drug name must always be entered.

- Data Types & Length Rules: Controlled formats for phone numbers, emails, and text fields (e.g., VARCHAR(11) for phone).

- Check/Enum Rules: Appointment status restricted to values like Scheduled, Completed, etc.

- Trigger Rule: Patient age is auto-calculated from date of birth using a trigger, ensuring accuracy.

employees | HA_CLINICS_DB | Janada_EOM* | Janada_EOM_Part2

Limit to 1000 rows

```sql
-- Create Patients Table
CREATE TABLE patients (
    patient_id VARCHAR(10) PRIMARY KEY,
    first_name VARCHAR(50) NOT NULL,
    last_name VARCHAR(50) NOT NULL,
    dob DATE NOT NULL,
    gender VARCHAR(10) NOT NULL CHECK (gender IN ('Male', 'Female')),
    guardian_name VARCHAR(100) NOT NULL,
    guardian_relationship VARCHAR(50) NOT NULL,
    guardian_phone VARCHAR(15) NOT NULL,
    guardian_address VARCHAR(150)
);

-- Change delimiter to allow trigger body
DELIMITER //

-- Trigger for INSERT
CREATE TRIGGER check_child_age_insert
```

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Limit to 1000 rows

```sql
INSERT INTO patients
(patient_id, first_name, last_name, dob, gender, guardian_name, guardian_relationship, guardian_phone, guardian_address)
VALUES
('P001', 'Hannah', 'Ali', '2025-09-22', 'Female', 'Peter Yohanna', 'Grandfather', '08014443184', 'Brooksstad, Borno State'),
('P002', 'Sarah', 'Lawal', '2023-08-12', 'Female', 'Linda Hassan', 'Uncle', '08024221074', 'North Stevenbury, Borno State'),
('P003', 'Mohammed', 'Saleh', '2023-04-03', 'Male', 'Karen Ali', 'Uncle', '08026198168', 'Phillipschester, Borno State'),
('P004', 'Bala', 'Mohammed', '2025-05-19', 'Male', 'Brandon Gambo', 'Sister', '08089514048', 'Higginsshire, Borno State'),
('P005', 'Bala', 'Ibrahim', '2025-05-04', 'Male', 'Tyler Saleh', 'Father', '08058370286', 'Romeromouth, Borno State'),
('P006', 'Maryam', 'Yohanna', '2021-11-16', 'Female', 'Jessica Suleiman', 'Mother', '08094751230', 'Lake Ashley, Borno State'),
```

# THIS IS A CHILDREN'S HOSPITAL SO PATIENTS MUST BE < 18 YEARS OLD

employees | HA_CLINICS_DB | Janada_EOM* | Janada_EOM_Part2

Limit to 1000 rows

```mysql

-- Trigger for INSERT
CREATE TRIGGER check_child_age_insert
BEFORE INSERT ON patients
FOR EACH ROW
BEGIN
    IF TIMESTAMPDIFF(YEAR, NEW.dob, CURDATE()) >= 18 THEN
        SIGNAL SQLSTATE '45000'
        SET MESSAGE_TEXT = 'Patient must be under 18 years old (INSERT blocked).';
    END IF;
END;
//

-- Trigger for UPDATE
CREATE TRIGGER check_child_age_update
BEFORE UPDATE ON patients
FOR EACH ROW
BEGIN
    IF TIMESTAMPDIFF(YEAR, NEW.dob, CURDATE()) >= 18 THEN
        SIGNAL SQLSTATE '45000'
        SET MESSAGE_TEXT = 'Patient must be under 18 years old (UPDATE blocked).';
    END IF;
END;
```

Output

```mysql

-- Reset delimiter back to ;
DELIMITER ;


CREATE TABLE departments (
    department_id VARCHAR(10) PRIMARY KEY,
    department_name VARCHAR(100) UNIQUE NOT NULL
);

CREATE TABLE doctors (
    doctor_id VARCHAR(10) PRIMARY KEY,
    first_name VARCHAR(50) NOT NULL,
    last_name VARCHAR(50) NOT NULL,
    specialization VARCHAR(100) NOT NULL,
    department_id VARCHAR(10) NOT NULL,
    FOREIGN KEY (department_id) REFERENCES departments(department_id)
        ON DELETE RESTRICT ON UPDATE CASCADE
);

CREATE TABLE appointments (
    appointment_id VARCHAR(10) PRIMARY KEY,
    patient_id VARCHAR(10) NOT NULL,
```

# WITH THIS NEW DATABASE MANAGEMENT SYSTEM, HOPE ALIVE CLINICS CAN NOW:

**They can now easily check when a patient with last name 'Danladi' and dob '2022-09-26' has his upcoming appointment**

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## CHALLENGES HOPE ALIVE CLINIC MIGHT FACE WITH A NEW DATABASE

- **System Downtime – Power outages or server failures (common in some areas due to insurgency) may disrupt access to records.**
- **Training & Adoption – Hospital staff used to manual records may resist change or struggle to use the new system.**
- **Data Security & Privacy – Protecting sensitive patient data from unauthorized access or breaches requires strong security measures.**
- **Scalability – As patient numbers grow, the system may need upgrades to handle higher volumes smoothly.**

## RECOMMENDATIONS

- Use backup power (generators/UPS) and regular database backups.
- Run onboarding workshops and create user-friendly manuals.
- Enforce role-based access and encrypt sensitive data.
- Build with modular, cloud-ready design for scalability.

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# CONCLUSION

With the new database system, Hope Alive Clinic now has an automated way to manage patient records, appointments, and prescriptions. Old records can be securely stored and updated, while new records are created seamlessly. This eliminates the risk of lost files, mismatched prescriptions, and double-booked appointments. The system ensures accurate, reliable, and efficient healthcare delivery, supporting the clinic's mission to provide sustainable, quality care for children in Dille Village and beyond.

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# THANK YOU