**1. SDG 3: Good Health and Well-being – Focus on High Maternal Mortality Rates in Rural Areas**

**Problem Definition:** Maternal mortality remains a significant issue in rural areas due to inadequate access to healthcare services, poor medical infrastructure, lack of skilled health personnel, and delays in receiving care during emergencies. Addressing this problem requires a data-driven approach to identify high-risk regions, analyze the factors contributing to maternal deaths, and develop strategies to improve maternal health outcomes.

**Proposed Solution:** Develop a database system to track maternal health data, analyze risk factors, and identify high-risk areas that need targeted interventions. The data can help policymakers and health organizations allocate resources effectively.

**Database Design:**

* **Entities:**
  + **Patients**: Stores data on pregnant women.
  + **Health Centers**: Information about clinics and hospitals.
  + **Medical Records**: Details of each patient's visits, diagnoses, and outcomes.
  + **Personnel**: Information on healthcare providers.
* **Sample ERD Design:**
  + **Patients** (PatientID, Name, Age, Address, Region, PregnancyStage, RiskFactors)
  + **Health Centers** (CenterID, Name, Location, Type, Capacity)
  + **Medical Records** (RecordID, PatientID, CenterID, VisitDate, Diagnosis, Outcome)
  + **Personnel** (PersonnelID, Name, Position, CenterID)

**Sample SQL Schema and Data Insertion:**

sql

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CREATE TABLE Patients (

PatientID INT PRIMARY KEY,

Name VARCHAR(100),

Age INT,

Address VARCHAR(255),

Region VARCHAR(50),

PregnancyStage VARCHAR(50),

RiskFactors VARCHAR(255)

);

CREATE TABLE HealthCenters (

CenterID INT PRIMARY KEY,

Name VARCHAR(100),

Location VARCHAR(100),

Type VARCHAR(50), -- e.g., Clinic, Hospital

Capacity INT

);

CREATE TABLE MedicalRecords (

RecordID INT PRIMARY KEY,

PatientID INT,

CenterID INT,

VisitDate DATE,

Diagnosis VARCHAR(255),

Outcome VARCHAR(255), -- e.g., Safe Delivery, Maternal Death

FOREIGN KEY (PatientID) REFERENCES Patients(PatientID),

FOREIGN KEY (CenterID) REFERENCES HealthCenters(CenterID)

);

CREATE TABLE Personnel (

PersonnelID INT PRIMARY KEY,

Name VARCHAR(100),

Position VARCHAR(50), -- e.g., Doctor, Nurse, Midwife

CenterID INT,

FOREIGN KEY (CenterID) REFERENCES HealthCenters(CenterID)

);

**Data Analysis with SQL Queries:**

* Identify regions with the highest maternal mortality rates:

sql

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SELECT Region, COUNT(\*) AS MortalityCount

FROM MedicalRecords

JOIN Patients ON MedicalRecords.PatientID = Patients.PatientID

WHERE Outcome = 'Maternal Death'

GROUP BY Region

ORDER BY MortalityCount DESC;

**2. SDG 7: Affordable and Clean Energy – Address Low Access to Renewable Energy in Remote Areas**

**Problem Definition:** Remote and rural areas often suffer from limited access to affordable and clean energy sources, relying on fossil fuels that are expensive and environmentally harmful. Expanding access to renewable energy can significantly improve living standards, reduce environmental impact, and support sustainable development.

**Proposed Solution:** Create a database system to track renewable energy projects, identify areas with low access to clean energy, and analyze the factors hindering access. The system can assist stakeholders in planning and implementing renewable energy solutions in underserved areas.

**Database Design:**

* **Entities:**
  + **Regions**: Stores data on geographical locations.
  + **Energy Projects**: Information on renewable energy projects.
  + **Households**: Details of energy access and usage in each household.
  + **Energy Providers**: Data on companies providing renewable energy solutions.
* **Sample ERD Design:**
  + **Regions** (RegionID, Name, Population, RenewableEnergyAccessRate)
  + **EnergyProjects** (ProjectID, Name, Type, RegionID, Status, Capacity)
  + **Households** (HouseholdID, RegionID, EnergySource, MonthlyCost, EnergyUsage)
  + **EnergyProviders** (ProviderID, Name, Type, Contact)

**Sample SQL Schema and Data Insertion:**

sql

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CREATE TABLE Regions (

RegionID INT PRIMARY KEY,

Name VARCHAR(100),

Population INT,

RenewableEnergyAccessRate DECIMAL(5,2)

);

CREATE TABLE EnergyProjects (

ProjectID INT PRIMARY KEY,

Name VARCHAR(100),

Type VARCHAR(50), -- e.g., Solar, Wind

RegionID INT,

Status VARCHAR(50), -- e.g., Active, Planned

Capacity DECIMAL(10,2),

FOREIGN KEY (RegionID) REFERENCES Regions(RegionID)

);

CREATE TABLE Households (

HouseholdID INT PRIMARY KEY,

RegionID INT,

EnergySource VARCHAR(50), -- e.g., Solar, Diesel, None

MonthlyCost DECIMAL(10,2),

EnergyUsage DECIMAL(10,2), -- in kWh

FOREIGN KEY (RegionID) REFERENCES Regions(RegionID)

);

CREATE TABLE EnergyProviders (

ProviderID INT PRIMARY KEY,

Name VARCHAR(100),

Type VARCHAR(50), -- e.g., Solar Provider, Wind Farm Operator

Contact VARCHAR(100)

);

**Data Analysis with SQL Queries:**

* Find regions with the lowest access to renewable energy:

sql

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SELECT Name, RenewableEnergyAccessRate

FROM Regions

WHERE RenewableEnergyAccessRate < 20

ORDER BY RenewableEnergyAccessRate ASC;