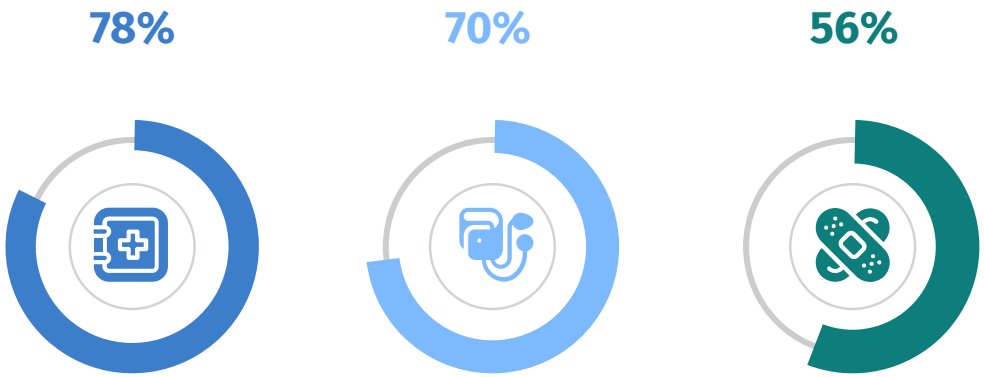
Vital Pathways Hospital Database

Michael Colbert,
Andrew Coffman,
& Shrey Patel

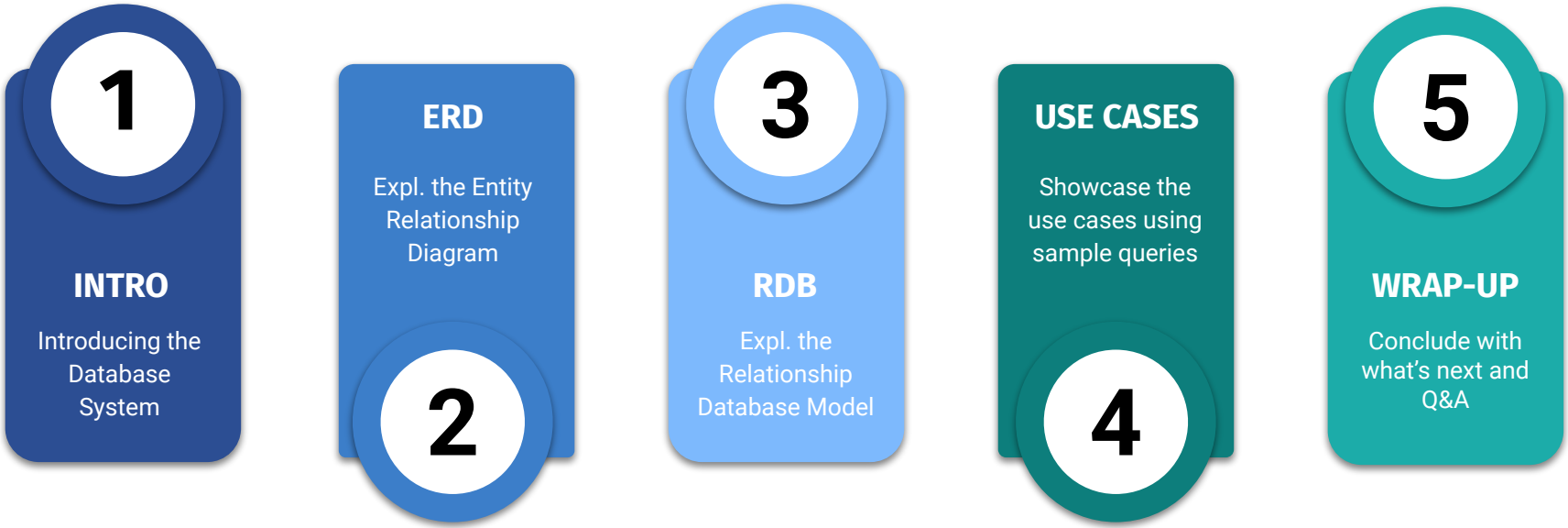
Team 3

Value of Hospital Management System



**According to a study done by Aykut Uslu & Jurgen Stausberg on the value of Electronic Medical Records for hospital care published between 2010 and 2019.

Agenda


1
INTRO
Introducing the Database System
ERD
Expl. the Entity Relationship Diagram
2
3
RDB
Expl. the Relationship Database Model
USE CASES
Showcase the use cases using sample queries
4
5
WRAP-UP
Conclude with what's next and Q&A

INTRO

Vital Pathways Hospital DBMS

Our System:

- A database designed to manage hospital operations efficiently
- Focuses on patient care, staff coordination, and billing accuracy

Purpose:

- Enhance patient care quality
- Improve hospital workflow and data integrity
- Support decision-making with reliable data

Key Functions:

- Tracks patient info, appts, & treatments.
- Manages doctor, nurse, and dept. Assignments.
- Links treatments to invoices for streamlined billing.

Benefits:

- Reduces administrative workload
- Ensures compliance with medical data standards
- Provides scalable solutions for hospital growth

Who can benefit from this system and why its valuable

Type of Organizations

- Hospitals of any size, from small clinics to large medical centers
- Specialized healthcare providers (e.g., cardiology, nephrology, urology, physical therapy centers)
- Multi-department medical institutions with integrated services

Why is it valuable?

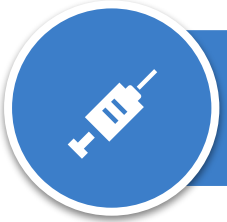
- Provides a centralized system for efficient hospital operations
- Reduces errors in patient care and billing.
- Supports compliance with healthcare regulations and standards.

INTRO

Database Usages

Appointment Management
Schedule, track, and assign staff to patient appointments

Staff Coordination
Manage assignments for nurses and doctors for smooth workflows



Find Specialists
Find doctors to treat the patient based on their department

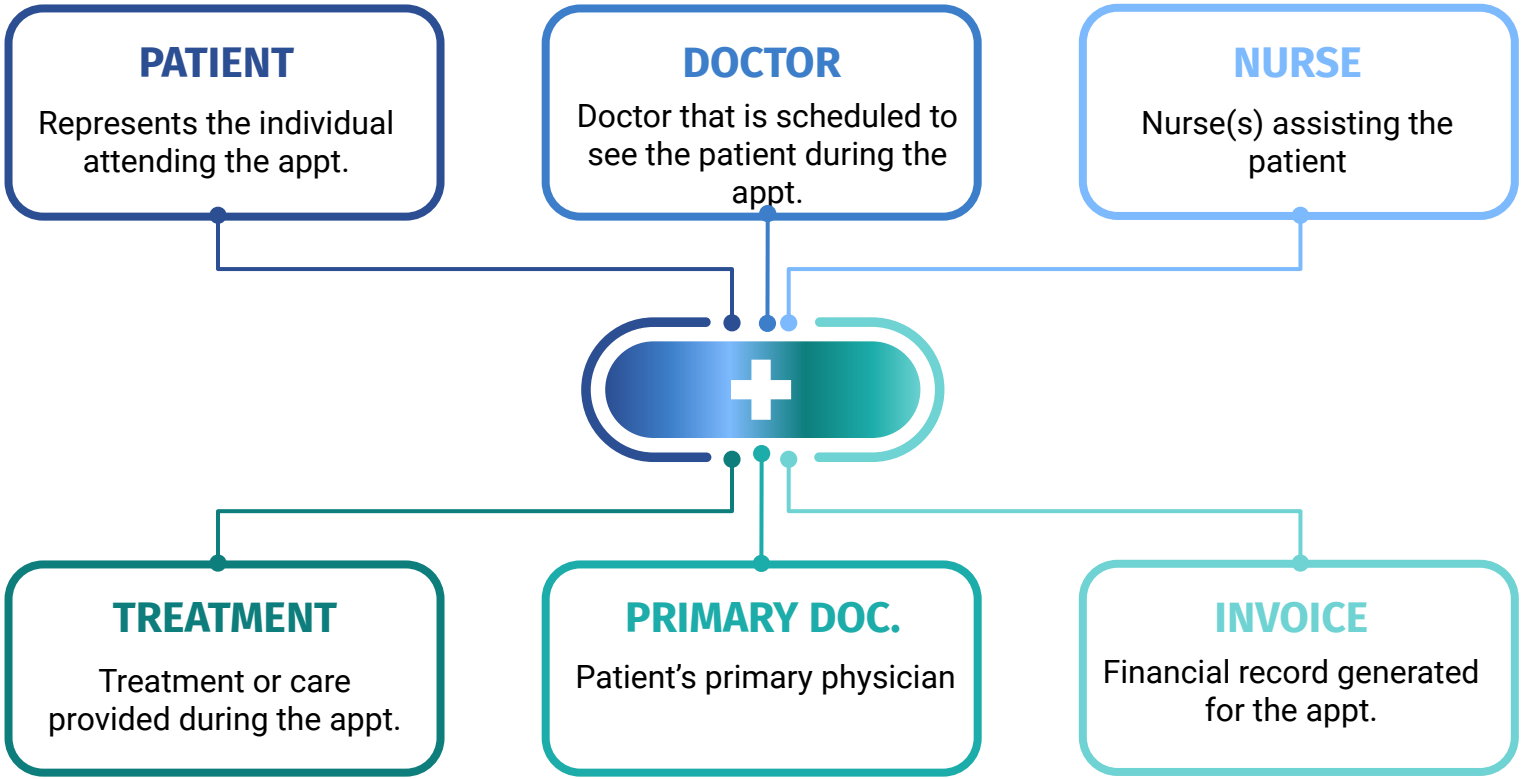
Patient History
Maintain detailed records of treatments, diagnoses, and history

Data Reporting & Analysis
Generate Insights for decision making busiest depts., cost analysis)

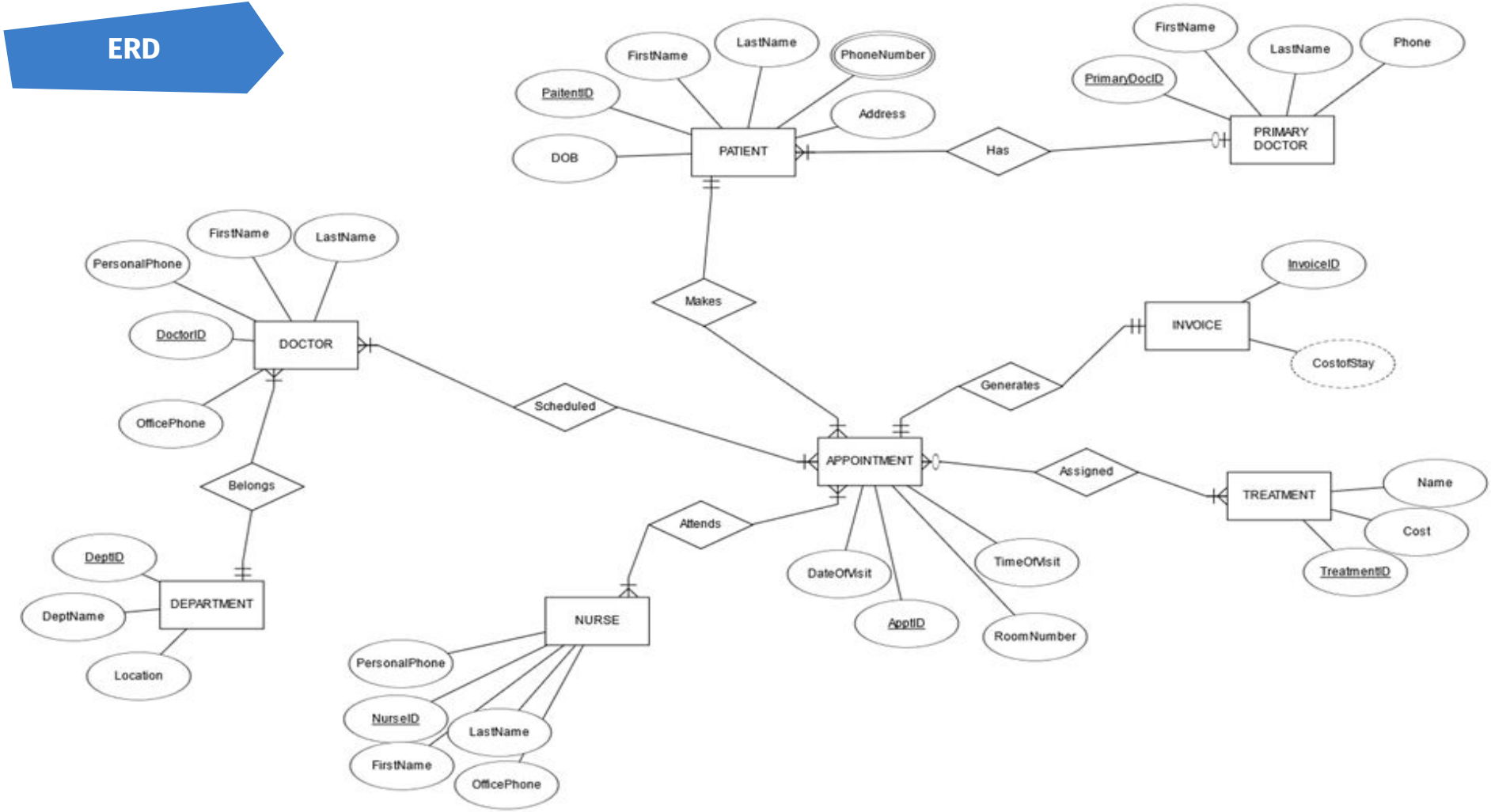
Billing & Invoicing
Automatically calculate treatment costs & generate invoices for patients

ERD

ERD High Level Overview

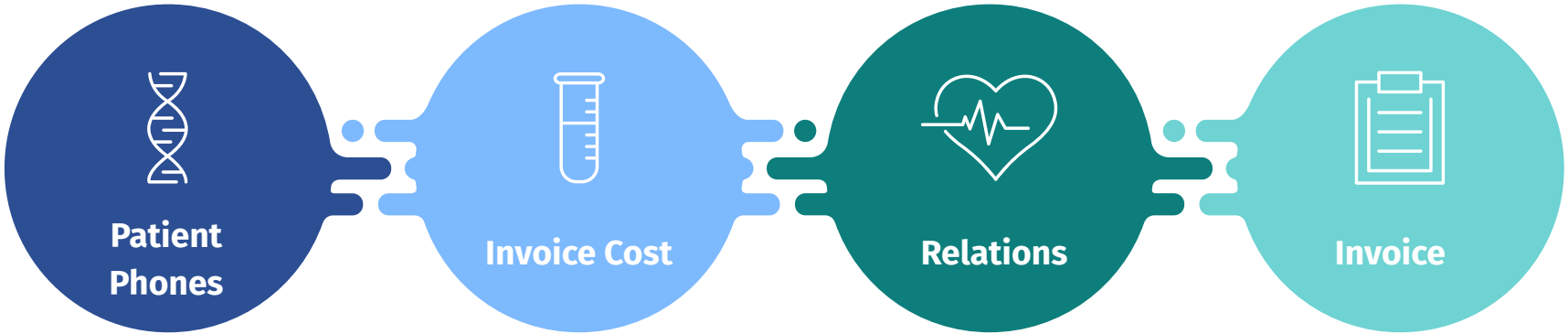


ERD


PATIENT
PaitentID
FirstName
LastName
PhoneNumber
Address
DOB
Has
PRIMARY DOCTOR
PrimaryDocID
FirstName
LastName
Phone
Makes
DOCTOR
DoctorID
FirstName
LastName
PersonalPhone
OfficePhone
Belongs
Scheduled
APPOINTMENT
Generates
INVOICE
InvoiceID
CostofStay
Assigned
TREATMENT
TreatmentID
Name
Cost
Attends
NURSE
NurseID
FirstName
LastName
PersonalPhone
OfficePhone
DEPARTMENT
DeptID
DeptName
Location
DateOfVisit
TimeOfVisit
ApptID
RoomNumber

RDB

RDB Changes



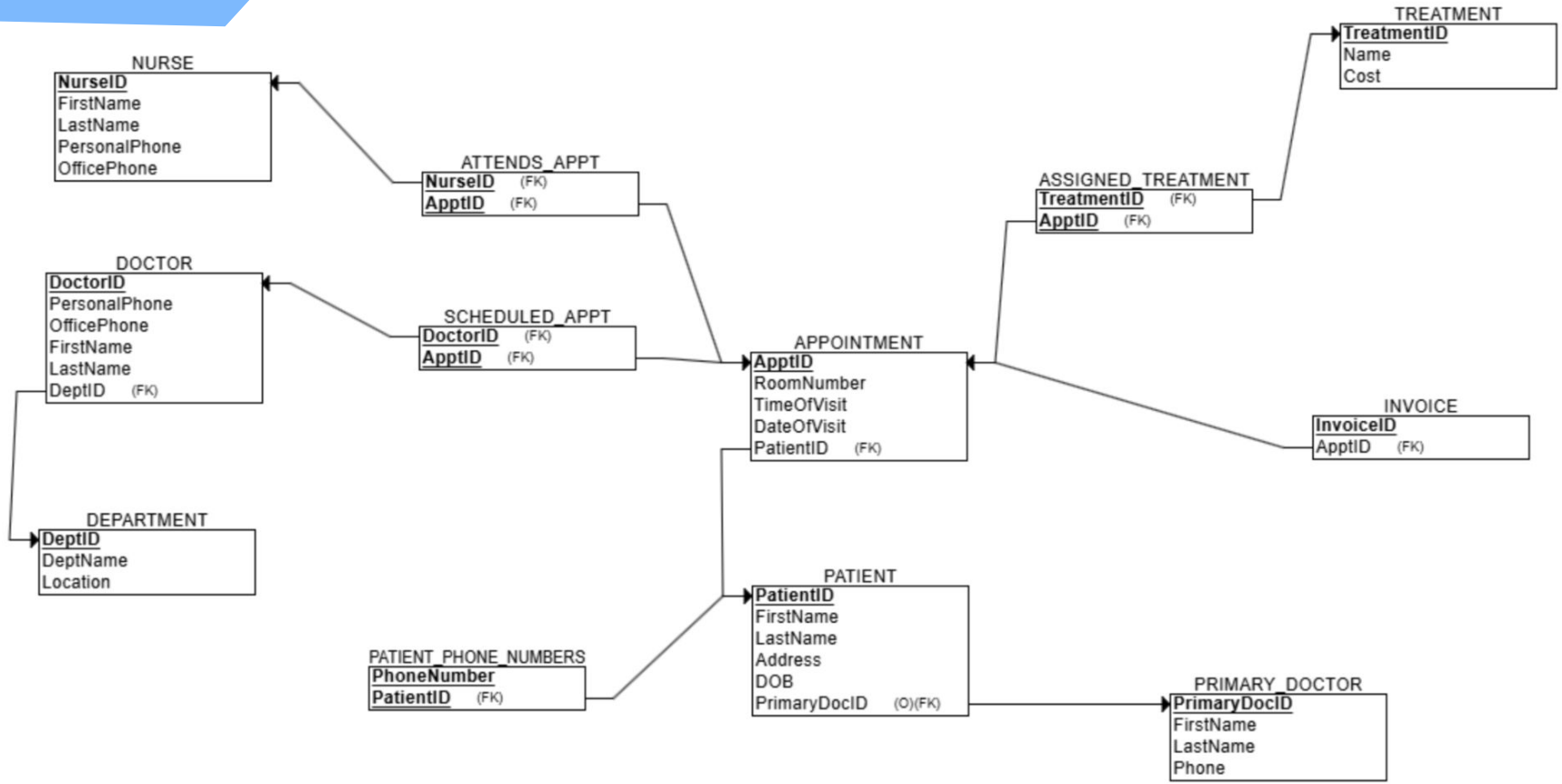
Multivalued Attribute
Phone Number and
Patient ID are the FK

Calculated Attribute
Does not appear in
RDB

Attends, Scheduled,
Assigned Treatment
Many to Many

Invoice is proof of
concept for addition
of billing

RDB


NURSE
NurseID
FirstName
LastName
PersonalPhone
OfficePhone
ATTENDS_APPT
NurseID (FK)
ApptID (FK)
TREATMENT
TreatmentID
Name
Cost
ASSIGNED_TREATMENT
TreatmentID (FK)
ApptID (FK)
DOCTOR
DoctorID
PersonalPhone
OfficePhone
FirstName
LastName
DeptID (FK)
SCHEDULED_APPT
DoctorID (FK)
ApptID (FK)
APPOINTMENT
ApptID
RoomNumber
TimeOfVisit
DateOfVisit
PatientID (FK)
INVOICE
InvoiceID
ApptID (FK)
DEPARTMENT
DeptID
DeptName
Location
PATIENT
PatientID
FirstName
LastName
Address
DOB
PrimaryDocID (O)(FK)
PATIENT_PHONE_NUMBERS
PhoneNumber
PatientID (FK)
PRIMARY_DOCTOR
PrimaryDocID
FirstName
LastName
Phone

Use Cases

Index Creation

Treatment Cost

Treatment costs will be queried often for invoices, and stay static for long periods of time.

Appointment Room No.

The hospital will often query this information for doctors or nurses, and it will not change unless the patient moves.

Primary Doctor Phone

Only changes on update of primary doctor phone number. Will be queried when doctors need medical history.

Use Cases

Each Patients Cost of Stay with Invoice

```
SELECT
    i.invoiceid,
    p.firstname,
    p.lastname,
    SUM(t.cost) AS costofstay
FROM
        patient p
    JOIN appointment         a ON ( p.patientid = a.patientid )
    JOIN invoice_proj        i ON ( a.apptid = i.apptid )
    JOIN assigned_treatment at ON ( at.apptid = a.apptid )
    JOIN treatment           t ON ( t.treatmentid = at.treatmentid )
GROUP BY
    i.invoiceid,
    p.firstname,
    p.lastname;
```

	INVOICEID	FIRSTNAME	LASTNAME	COSTOFSTAY
1	1	John	Doe	1500
2	2	Jane	Smith	1000
3	3	Daniel	Gafford	150

Use Cases

All Scheduled Appointments

```
SELECT
    firstname,
    lastname,
    TO_CHAR(timeofvisit, 'HH24:MI:SS') AS timeofvisit,
    dateofvisit,
    roomnumber
FROM
        patient p
    JOIN appointment a ON ( p.patientid = a.patientid );
```

	FIRSTNAME	LASTNAME	TIMEOFVISIT	DATEOFVISIT	ROOMNUMBER
1	John	Doe	10:30:00	29-OCT-24	424
2	Jane	Smith	10:30:00	30-OCT-24	420
3	Daniel	Gafford	10:30:00	31-OCT-24	451

WRAP-UP

Whats next...

Increasing Patient Records

The sys. Is designed to handle a growing number of patient profiles as the hospital expands its services or adds new locations.

Integration with New Technologies

The database can scale to incorporate IoT devices like wearable health monitors for real-time data collections, and integration with telemedicine platforms

Expansion to Multiple Facilities

The sys. Supports scaling across multiple hospital branches, enabling centralized data management for appts., treatments, and billing across locations.

Advanced Analytics and AI Integration

The platform can integrate with machine learning models or data analytics tools to predict patient trends, optimize resource allocations, and enhance decision-making.

THANK YOU!

Any questions?