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Project Report: Pharmacy Inventory System

Introduction

The Pharmacy Inventory System is designed to manage and track medicines, suppliers, purchases, prescriptions, sales, and inventory in a pharmacy. This system ensures efficient stock management, reduces manual errors, and provides meaningful reports for decision-making.

System Overview

The system includes the following functionalities:

- Medicine Management: Add, update, and delete medicines.
- Supplier Management: Track suppliers and their details.
- Purchase Management: Record medicine purchases from suppliers.
- Prescription Management: Manage prescriptions issued to patients.
- Sales Management: Track medicine sales to patients.
- Inventory Management: Monitor current stock levels of medicines.
- Reporting: Generate reports for stock levels, sales, prescriptions, and more.

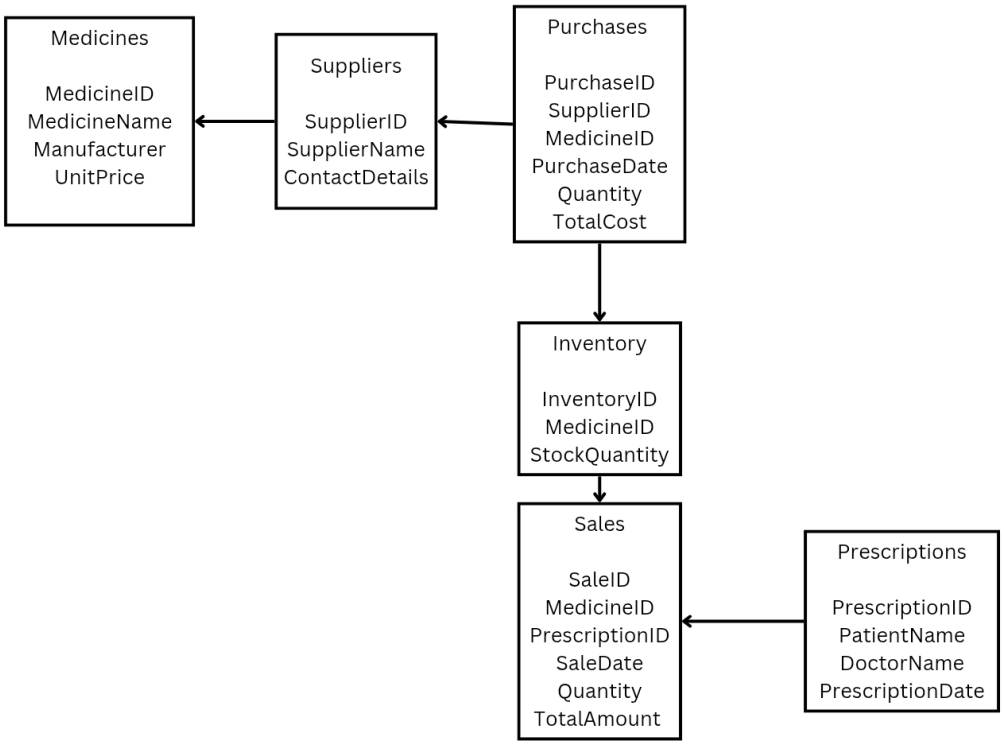
Database Design

3.1 Tables and Relationships

The database consists of the following tables:

1. Medicines: Stores details about medicines.
2. Suppliers: Tracks suppliers of medicines.
3. Purchases: Records medicine purchases from suppliers.

4. Prescriptions: Manages prescriptions issued to patients.
5. Sales: Tracks medicine sales to patients.
6. Inventory: Tracks current stock levels of medicines.



3.2 Normalization

The database is normalized up to the Third Normal Form (3NF) to eliminate redundancy and ensure data integrity.

Normalization Steps

First Normal Form (1NF):

Each table has a primary key.

All attributes are atomic (no repeating groups or arrays).

Second Normal Form (2NF):

Remove partial dependencies.

All non-key attributes are fully dependent on the primary key.

Third Normal Form (3NF):

Remove transitive dependencies.

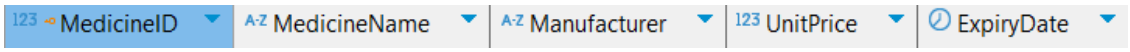
Non-key attributes are not dependent on other non-key attributes.

Example of Normalization

In the Purchases table, TotalCost is derived from Quantity and UnitPrice (no transitive dependencies).

In the Sales table, TotalAmount is derived from Quantity and UnitPrice.

Medicines Table

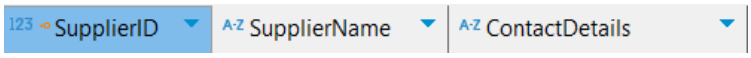


First Normal Form (1NF): All fields contain atomic values, with each record having MedicineID as their primary key.

Second Normal Form (2NF): All non-key attributes are fully dependent on the primary key MedicineID.

Third Normal Form (3NF): There are no transitive dependencies in this table, as all attributes directly depend on MedicineID.

Suppliers Table

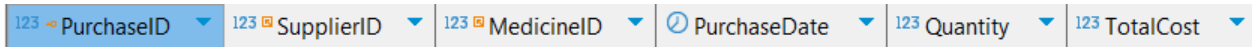


First Normal Form (1NF): All columns contain atomic values, with each row having a unique SupplierID.

Second Normal Form (2NF): All non-key attributes (SupplierName and ContactDetails) depend fully on the primary key SupplierID.

Third Normal Form (3NF): No transitive dependencies since SupplierName and ContactDetails depend directly on SupplierID.

Purchases Table



First Normal Form (1NF): Each row is uniquely identified by PurchaseID.

Second Normal Form (2NF): All non-key attributes (SupplierName and ContactDetails) depend fully on the primary key SupplierID.

Third Normal Form (3NF): No transitive dependencies.

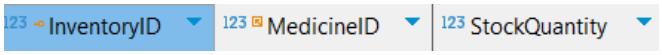
Prescriptions Table

First Normal Form (1NF): All columns contain atomic values, and each row has a unique PrescriptionID.
Second Normal Form (2NF): The non-key attributes (PatientName, DoctorName, PrescriptionDate) depend fully on the primary key PrescriptionID.
Third Normal Form (3NF): No transitive dependencies.

Sales Table

First Normal Form (1NF): All columns contain atomic values, with each row having a unique SaleID.
Second Normal Form (2NF): All non-key attributes (SaleDate, Quantity, TotalAmount) depend fully on the primary key SaleID.
Third Normal Form (3NF): No transitive dependencies exist.

Inventory Table



First Normal Form (1NF): The table is in 1NF because all fields contain atomic values, and each record has a unique InventoryID.
Second Normal Form (2NF): All non-key attributes depend fully on the primary key InventoryID. The StockQuantity is dependent on the MedicineID, which is part of the table's foreign key.
Third Normal Form (3NF): There are no transitive dependencies, as StockQuantity depends directly on MedicineID.

Database Implementation

4.1 SQL Script

The SQL script for creating tables, inserting data, and defining relationships is provided below:

-- **Create Medicines Table**
CREATE TABLE Medicines (

```
    MedicineID INT PRIMARY KEY,
    MedicineName VARCHAR(100),
    Manufacturer VARCHAR(100),
    UnitPrice DECIMAL(10, 2),
    ExpiryDate DATE
);

-- Create Suppliers Table
CREATE TABLE Suppliers (
    SupplierID INT PRIMARY KEY,
    SupplierName VARCHAR(100),
    ContactDetails VARCHAR(100)
);

-- Create Purchases Table
CREATE TABLE Purchases (
    PurchaseID INT PRIMARY KEY,
    SupplierID INT,
    MedicineID INT,
    PurchaseDate DATE,
    Quantity INT,
    TotalCost DECIMAL(10, 2),
    FOREIGN KEY (SupplierID) REFERENCES Suppliers(SupplierID),
    FOREIGN KEY (MedicineID) REFERENCES Medicines(MedicineID)
);

-- Create Prescriptions Table
CREATE TABLE Prescriptions (
    PrescriptionID INT PRIMARY KEY,
    PatientName VARCHAR(100),
    DoctorName VARCHAR(100),
    PrescriptionDate DATE
);
```

```
-- Create Sales Table
CREATE TABLE Sales (
    SaleID INT PRIMARY KEY,
    MedicineID INT,
    PrescriptionID INT,
    SaleDate DATE,
    Quantity INT,
    TotalAmount DECIMAL(10, 2),
    FOREIGN KEY (MedicineID) REFERENCES Medicines(MedicineID),
    FOREIGN KEY (PrescriptionID) REFERENCES Prescriptions(PrescriptionID)
);

-- Create Inventory Table
CREATE TABLE Inventory (
    InventoryID INT PRIMARY KEY,
    MedicineID INT,
    StockQuantity INT,
    FOREIGN KEY (MedicineID) REFERENCES Medicines(MedicineID)
);
```

4.2 Sample Data

Realistic dummy data has been inserted into the tables to simulate actual pharmacy operations. Refer to the SQL script provided earlier for the complete dataset.

MEDICINES TABLE

*<localhost> Script-2

```
show TABLES;

select * from MEDICINES;
```

medicines 1

select * from MEDICINES Enter a SQL expression to filter results (use Ctrl+Space)

Grid

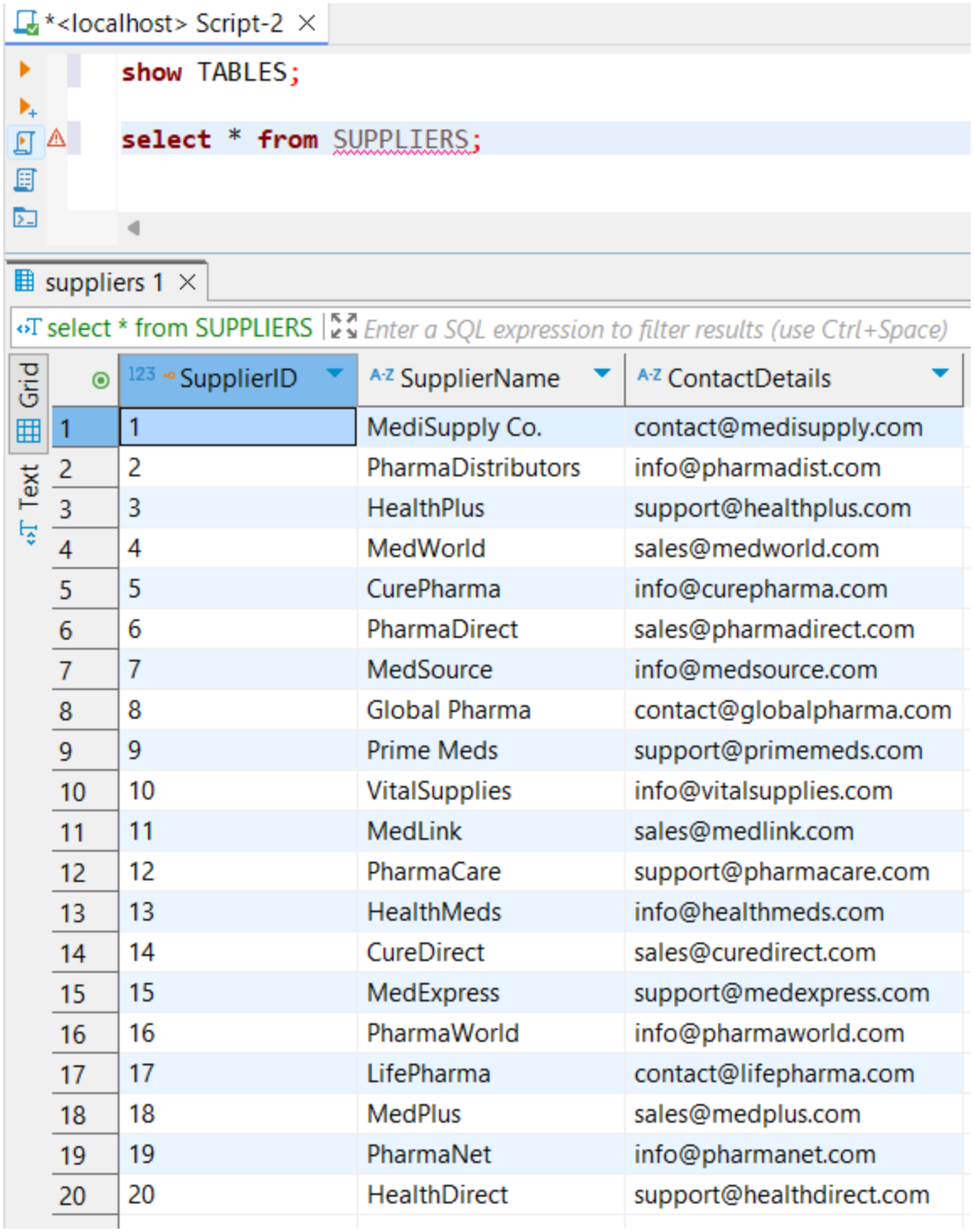
Text

	MedicineID	MedicineName	Manufacturer	UnitPrice	ExpiryDate
1	1	Paracetamol	ABC Pharma	5	2025-12-31
2	2	Amoxicillin	XYZ Pharma	10	2024-06-30
3	3	Ibuprofen	MedHealth	7.5	2024-09-15
4	4	Cetirizine	PharmaCare	3	2025-03-20
5	5	Omeprazole	Global Meds	8	2024-11-30
6	6	Metformin	HealthPlus	4.5	2025-07-25
7	7	Losartan	MedWorld	9	2024-08-10
8	8	Atorvastatin	CurePharma	6.5	2025-01-15
9	9	Levothyroxine	ABC Pharma	5.5	2024-12-20
10	10	Albuterol	XYZ Pharma	12	2025-05-30
11	11	Metronidazole	MedHealth	3.5	2024-10-05
12	12	Azithromycin	PharmaCare	11	2025-02-28
13	13	Ciprofloxacin	Global Meds	8.5	2024-07-15
14	14	Prednisone	HealthPlus	6	2025-04-10
15	15	Gabapentin	MedWorld	7	2024-11-25
16	16	Tramadol	CurePharma	9.5	2025-03-05
17	17	Hydrochlorothiazide	ABC Pharma	4	2024-09-30
18	18	Sertraline	XYZ Pharma	10.5	2025-06-15
19	19	Lisinopril	MedHealth	5	2024-12-10
20	20	Pantoprazole	PharmaCare	7.5	2025-01-20

INSERT INTO Medicines (MedicineID, MedicineName, Manufacturer, UnitPrice, ExpiryDate)
VALUES
(1, 'Paracetamol', 'ABC Pharma', 5.00, '2025-12-31'),
(2, 'Amoxicillin', 'XYZ Pharma', 10.00, '2024-06-30'),
(3, 'Ibuprofen', 'MedHealth', 7.50, '2024-09-15'),
(4, 'Cetirizine', 'PharmaCare', 3.00, '2025-03-20'),
(5, 'Omeprazole', 'Global Meds', 8.00, '2024-11-30'),
(6, 'Metformin', 'HealthPlus', 4.50, '2025-07-25'),
(7, 'Losartan', 'MedWorld', 9.00, '2024-08-10'),
(8, 'Atorvastatin', 'CurePharma', 6.50, '2025-01-15'),

(9, 'Levothyroxine', 'ABC Pharma', 5.50, '2024-12-20'),
(10, 'Albuterol', 'XYZ Pharma', 12.00, '2025-05-30'),
(11, 'Metronidazole', 'MedHealth', 3.50, '2024-10-05'),
(12, 'Azithromycin', 'PharmaCare', 11.00, '2025-02-28'),
(13, 'Ciprofloxacin', 'Global Meds', 8.50, '2024-07-15'),
(14, 'Prednisone', 'HealthPlus', 6.00, '2025-04-10'),
(15, 'Gabapentin', 'MedWorld', 7.00, '2024-11-25'),
(16, 'Tramadol', 'CurePharma', 9.50, '2025-03-05'),
(17, 'Hydrochlorothiazide', 'ABC Pharma', 4.00, '2024-09-30'),
(18, 'Sertraline', 'XYZ Pharma', 10.50, '2025-06-15'),
(19, 'Lisinopril', 'MedHealth', 5.00, '2024-12-10'),
(20, 'Pantoprazole', 'PharmaCare', 7.50, '2025-01-20');

SUPPLIERS TABLE



INSERT INTO Suppliers (SupplierID, SupplierName, ContactDetails)

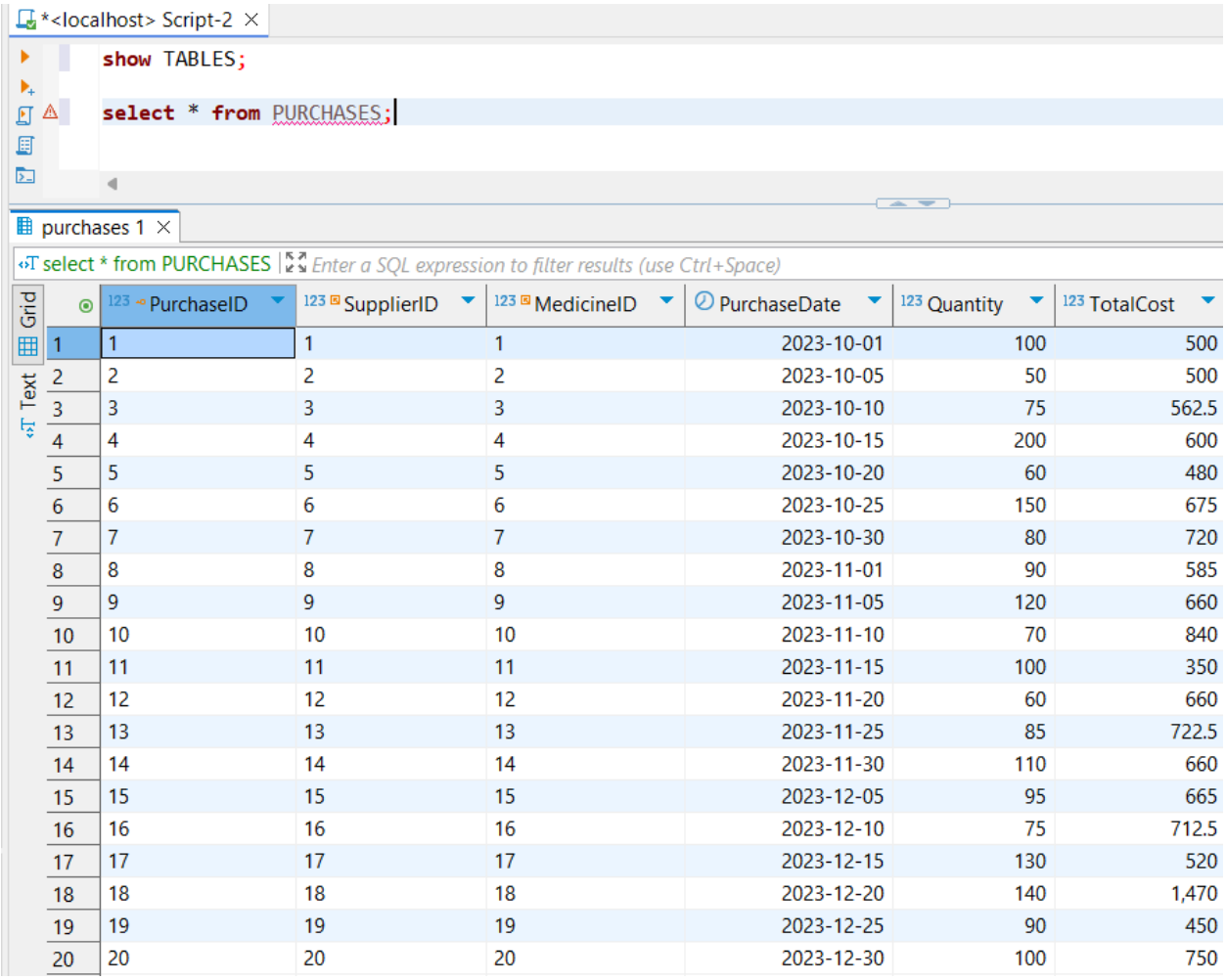
VALUES

(1, 'MediSupply Co.', 'contact@medisupply.com'),

(2, 'PharmaDistributors', 'info@pharmadist.com'),

(3, 'HealthPlus', 'support@healthplus.com'),
(4, 'MedWorld', 'sales@medworld.com'),
(5, 'CurePharma', 'info@curepharma.com'),
(6, 'PharmaDirect', 'sales@pharmadirect.com'),
(7, 'MedSource', 'info@medsource.com'),
(8, 'Global Pharma', 'contact@globalpharma.com'),
(9, 'Prime Meds', 'support@primemeds.com'),
(10, 'VitalSupplies', 'info@vitalsupplies.com'),
(11, 'MedLink', 'sales@medlink.com'),
(12, 'PharmaCare', 'support@pharmacare.com'),
(13, 'HealthMeds', 'info@healthmeds.com'),
(14, 'CureDirect', 'sales@curedirect.com'),
(15, 'MedExpress', 'support@medexpress.com'),
(16, 'PharmaWorld', 'info@pharmaworld.com'),
(17, 'LifePharma', 'contact@lifepharma.com'),
(18, 'MedPlus', 'sales@medplus.com'),
(19, 'PharmaNet', 'info@pharmanet.com'),
(20, 'HealthDirect', 'support@healthdirect.com');

PURCHASES TABLE



	PurchaseID	SupplierID	MedicineID	PurchaseDate	Quantity	TotalCost
1	1	1	1	2023-10-01	100	500
2	2	2	2	2023-10-05	50	500
3	3	3	3	2023-10-10	75	562.5
4	4	4	4	2023-10-15	200	600
5	5	5	5	2023-10-20	60	480
6	6	6	6	2023-10-25	150	675
7	7	7	7	2023-10-30	80	720
8	8	8	8	2023-11-01	90	585
9	9	9	9	2023-11-05	120	660
10	10	10	10	2023-11-10	70	840
11	11	11	11	2023-11-15	100	350
12	12	12	12	2023-11-20	60	660
13	13	13	13	2023-11-25	85	722.5
14	14	14	14	2023-11-30	110	660
15	15	15	15	2023-12-05	95	665
16	16	16	16	2023-12-10	75	712.5
17	17	17	17	2023-12-15	130	520
18	18	18	18	2023-12-20	140	1,470
19	19	19	19	2023-12-25	90	450
20	20	20	20	2023-12-30	100	750

INSERT INTO Purchases (PurchaseID, SupplierID, MedicineID, PurchaseDate, Quantity, TotalCost)

VALUES

(1, 1, 1, '2023-10-01', 100, 500.00),

(2, 2, 2, '2023-10-05', 50, 500.00),

(3, 3, 3, '2023-10-10', 75, 562.50),

(4, 4, 4, '2023-10-15', 200, 600.00),

(5, 5, 5, '2023-10-20', 60, 480.00),

(6, 6, 6, '2023-10-25', 150, 675.00),

(7, 7, 7, '2023-10-30', 80, 720.00),

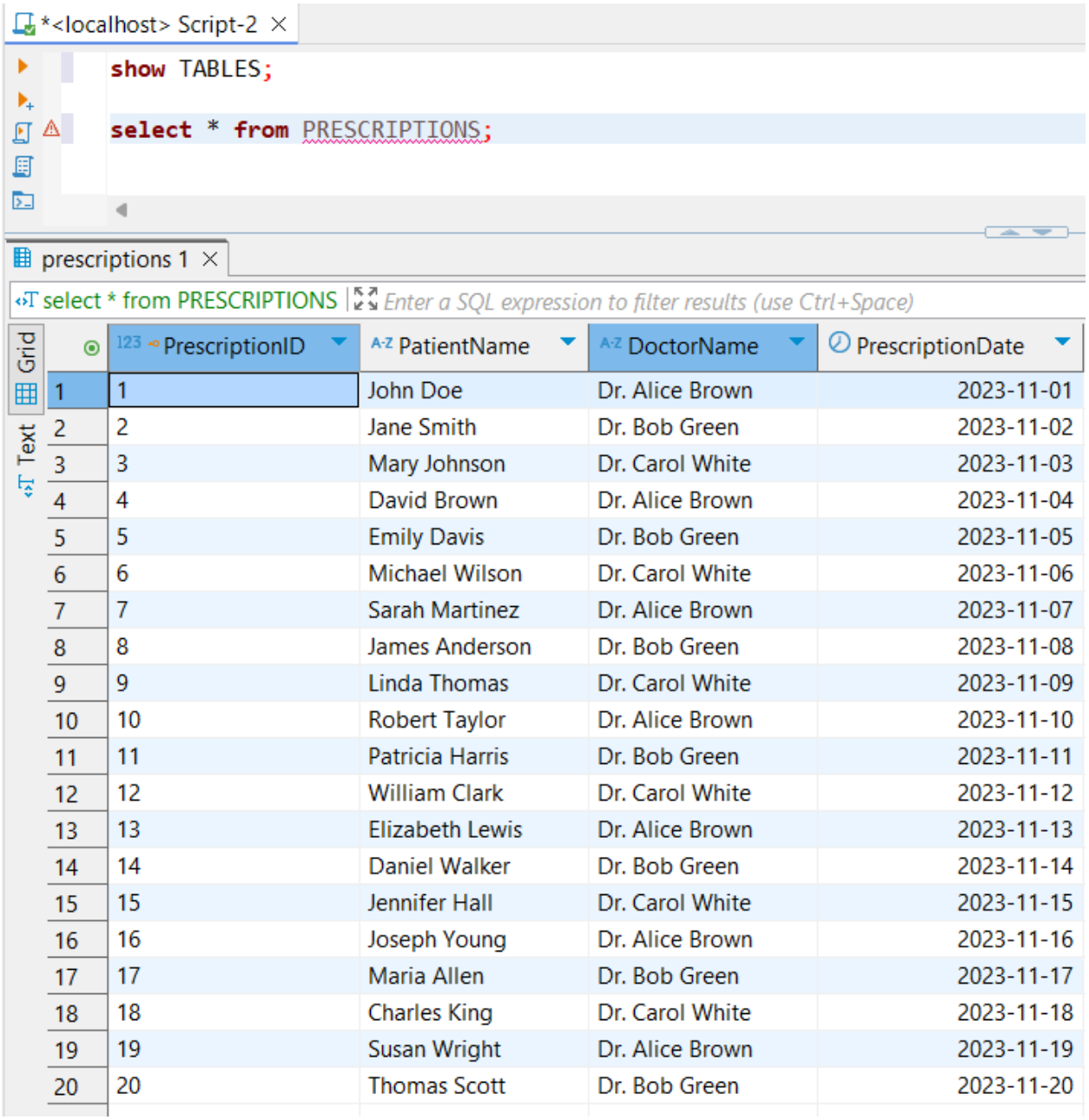
(8, 8, 8, '2023-11-01', 90, 585.00),

(9, 9, 9, '2023-11-05', 120, 660.00),

(10, 10, 10, '2023-11-10', 70, 840.00),

(11, 11, 11, '2023-11-15', 100, 350.00),
(12, 12, 12, '2023-11-20', 60, 660.00),
(13, 13, 13, '2023-11-25', 85, 722.50),
(14, 14, 14, '2023-11-30', 110, 660.00),
(15, 15, 15, '2023-12-05', 95, 665.00),
(16, 16, 16, '2023-12-10', 75, 712.50),
(17, 17, 17, '2023-12-15', 130, 520.00),
(18, 18, 18, '2023-12-20', 140, 1470.00),
(19, 19, 19, '2023-12-25', 90, 450.00),
(20, 20, 20, '2023-12-30', 100, 750.00);

PRESCRIPTIONS TABLE



INSERT INTO Prescriptions (PrescriptionID, PatientName, DoctorName, PrescriptionDate)
VALUES

(1, 'John Doe', 'Dr. Alice Brown', '2023-11-01'),

(2, 'Jane Smith', 'Dr. Bob Green', '2023-11-02'),

(3, 'Mary Johnson', 'Dr. Carol White', '2023-11-03'),

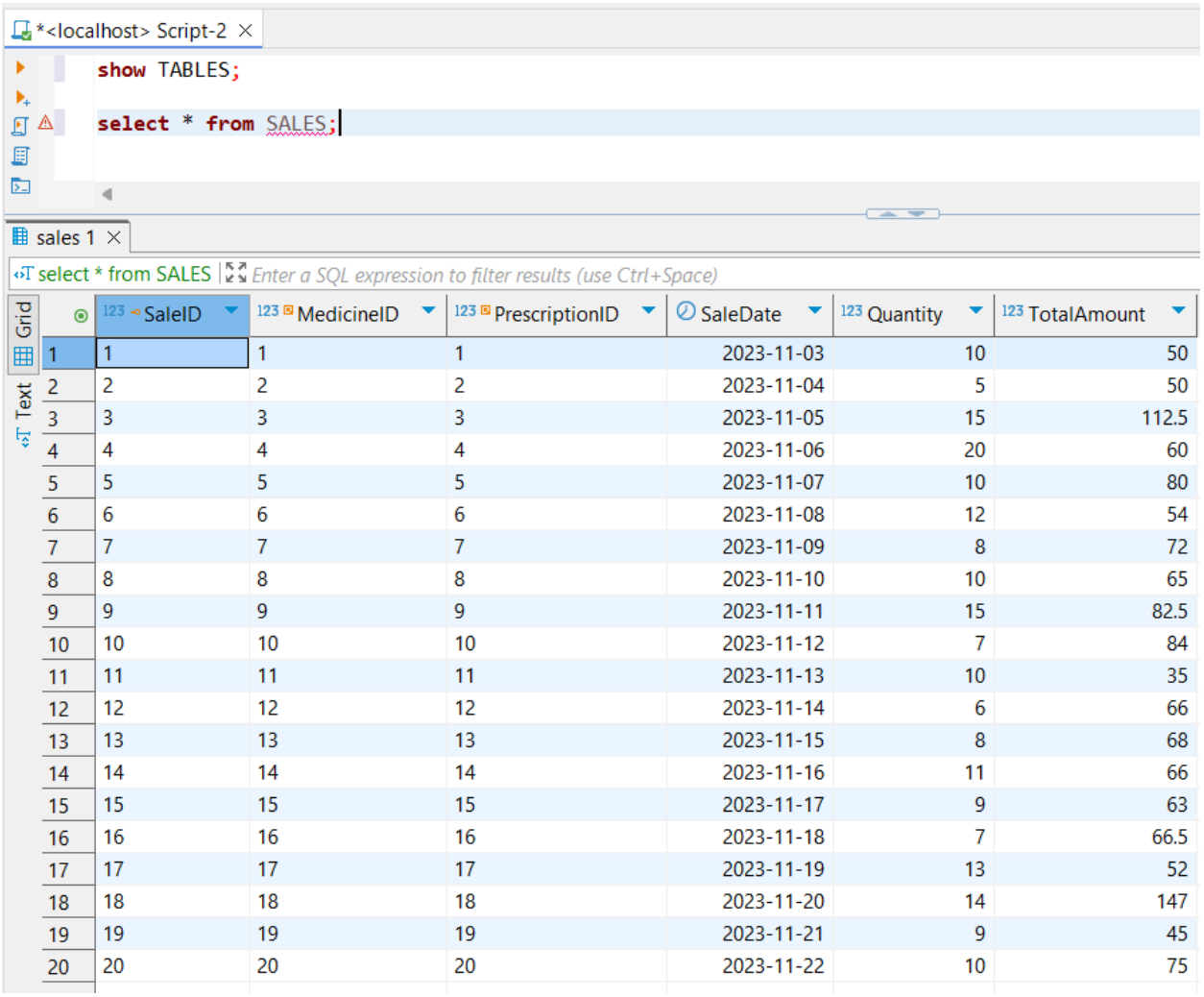
(4, 'David Brown', 'Dr. Alice Brown', '2023-11-04'),

(5, 'Emily Davis', 'Dr. Bob Green', '2023-11-05'),

(6, 'Michael Wilson', 'Dr. Carol White', '2023-11-06'),

(7, 'Sarah Martinez', 'Dr. Alice Brown', '2023-11-07'),
(8, 'James Anderson', 'Dr. Bob Green', '2023-11-08'),
(9, 'Linda Thomas', 'Dr. Carol White', '2023-11-09'),
(10, 'Robert Taylor', 'Dr. Alice Brown', '2023-11-10'),
(11, 'Patricia Harris', 'Dr. Bob Green', '2023-11-11'),
(12, 'William Clark', 'Dr. Carol White', '2023-11-12'),
(13, 'Elizabeth Lewis', 'Dr. Alice Brown', '2023-11-13'),
(14, 'Daniel Walker', 'Dr. Bob Green', '2023-11-14'),
(15, 'Jennifer Hall', 'Dr. Carol White', '2023-11-15'),
(16, 'Joseph Young', 'Dr. Alice Brown', '2023-11-16'),
(17, 'Maria Allen', 'Dr. Bob Green', '2023-11-17'),
(18, 'Charles King', 'Dr. Carol White', '2023-11-18'),
(19, 'Susan Wright', 'Dr. Alice Brown', '2023-11-19'),
(20, 'Thomas Scott', 'Dr. Bob Green', '2023-11-20');

SALES TABLE

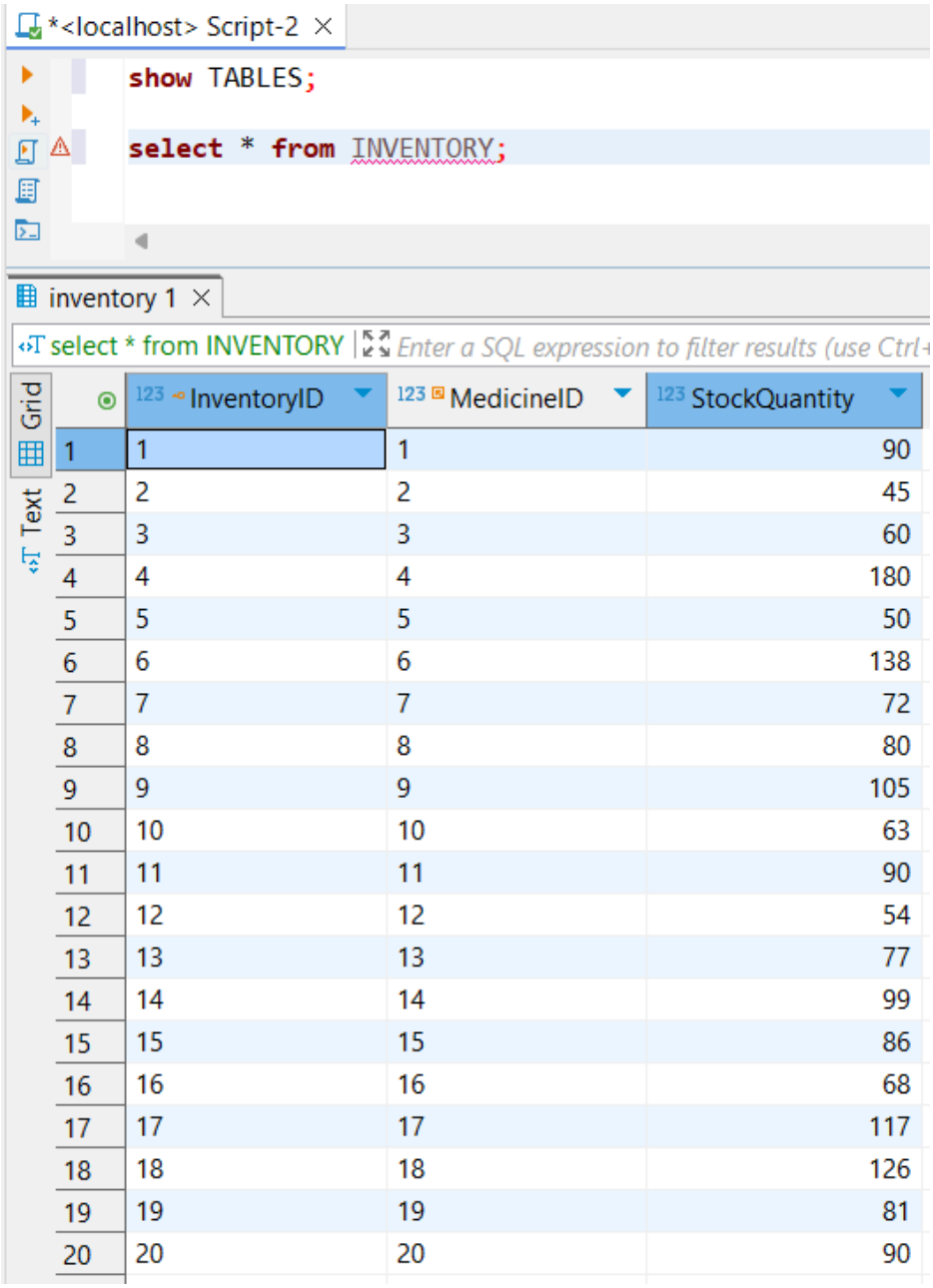


SaleID	MedicineID	PrescriptionID	SaleDate	Quantity	TotalAmount
1	1	1	2023-11-03	10	50
2	2	2	2023-11-04	5	50
3	3	3	2023-11-05	15	112.5
4	4	4	2023-11-06	20	60
5	5	5	2023-11-07	10	80
6	6	6	2023-11-08	12	54
7	7	7	2023-11-09	8	72
8	8	8	2023-11-10	10	65
9	9	9	2023-11-11	15	82.5
10	10	10	2023-11-12	7	84
11	11	11	2023-11-13	10	35
12	12	12	2023-11-14	6	66
13	13	13	2023-11-15	8	68
14	14	14	2023-11-16	11	66
15	15	15	2023-11-17	9	63
16	16	16	2023-11-18	7	66.5
17	17	17	2023-11-19	13	52
18	18	18	2023-11-20	14	147
19	19	19	2023-11-21	9	45
20	20	20	2023-11-22	10	75

INSERT INTO Sales (SaleID, MedicineID, PrescriptionID, SaleDate, Quantity, TotalAmount)
VALUES
(1, 1, 1, '2023-11-03', 10, 50.00),
(2, 2, 2, '2023-11-04', 5, 50.00),
(3, 3, 3, '2023-11-05', 15, 112.50),
(4, 4, 4, '2023-11-06', 20, 60.00),
(5, 5, 5, '2023-11-07', 10, 80.00),
(6, 6, 6, '2023-11-08', 12, 54.00),
(7, 7, 7, '2023-11-09', 8, 72.00),
(8, 8, 8, '2023-11-10', 10, 65.00),
(9, 9, 9, '2023-11-11', 15, 82.50),
(10, 10, 10, '2023-11-12', 7, 84.00),

(11, 11, 11, '2023-11-13', 10, 35.00),
(12, 12, 12, '2023-11-14', 6, 66.00),
(13, 13, 13, '2023-11-15', 8, 68.00),
(14, 14, 14, '2023-11-16', 11, 66.00),
(15, 15, 15, '2023-11-17', 9, 63.00),
(16, 16, 16, '2023-11-18', 7, 66.50),
(17, 17, 17, '2023-11-19', 13, 52.00),
(18, 18, 18, '2023-11-20', 14, 147.00),
(19, 19, 19, '2023-11-21', 9, 45.00),
(20, 20, 20, '2023-11-22', 10, 75.00);

INVENTORY TABLE



	InventoryID	MedicineID	StockQuantity
1	1	1	90
2	2	2	45
3	3	3	60
4	4	4	180
5	5	5	50
6	6	6	138
7	7	7	72
8	8	8	80
9	9	9	105
10	10	10	63
11	11	11	90
12	12	12	54
13	13	13	77
14	14	14	99
15	15	15	86
16	16	16	68
17	17	17	117
18	18	18	126
19	19	19	81
20	20	20	90

INSERT INTO Inventory (InventoryID, MedicineID, StockQuantity)

VALUES

(1, 1, 90),

(2, 2, 45),

(3, 3, 60),

(4, 4, 180),

(5, 5, 50),

(6, 6, 138),
(7, 7, 72),
(8, 8, 80),
(9, 9, 105),
(10, 10, 63),
(11, 11, 90),
(12, 12, 54),
(13, 13, 77),
(14, 14, 99),
(15, 15, 86),
(16, 16, 68),
(17, 17, 117),
(18, 18, 126),
(19, 19, 81),
(20, 20, 90);

SQL Queries and Reports

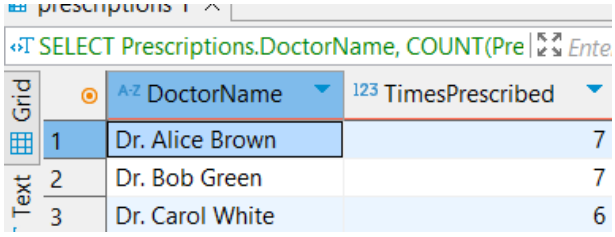
5.1 Queries

Medicine Stock Report

MedicineName	StockQuantity
Amoxicillin	45

```
SELECT
    Medicines.MedicineName,
    Inventory.StockQuantity
FROM Inventory
JOIN Medicines ON Inventory.MedicineID = Medicines.MedicineID
WHERE Inventory.StockQuantity < 50;
```

Prescription Report




```
SELECT
    Prescriptions.DoctorName,
    COUNT(Prescriptions.PrescriptionID) AS TimesPrescribed
FROM Prescriptions
GROUP BY Prescriptions.DoctorName;
```

Sales Summary Report

MedicineName	TotalQuantitySold	TotalRevenue
Albuterol	7	84
Amoxicillin	5	50
Atorvastatin	10	65
Azithromycin	6	66
Cetirizine	20	60
Ciprofloxacin	8	68
Gabapentin	9	63
Hydrochlorothiazide	13	52
Ibuprofen	15	112.5
Levothyroxine	15	82.5
Lisinopril	9	45
Losartan	8	72
Metformin	12	54
Metronidazole	10	35
Omeprazole	10	80
Pantoprazole	10	75
Paracetamol	10	50
Prednisone	11	66
Sertraline	14	147
Tramadol	7	66.5

```
SELECT
    Medicines.MedicineName,
    SUM(Sales.Quantity) AS TotalQuantitySold,
    SUM(Sales.TotalAmount) AS TotalRevenue
FROM Sales
JOIN Medicines ON Sales.MedicineID = Medicines.MedicineID
GROUP BY Medicines.MedicineName;
```

Expired Medicines Report

MedicineName	ExpiryDate
Amoxicillin	2024-06-30
Ibuprofen	2024-09-15
Omeprazole	2024-11-30
Losartan	2024-08-10
Atorvastatin	2025-01-15
Levothyroxine	2024-12-20
Metronidazole	2024-10-05
Azithromycin	2025-02-28
Ciprofloxacin	2024-07-15
Gabapentin	2024-11-25
Hydrochlorothiazide	2024-09-30
Lisinopril	2024-12-10
Pantoprazole	2025-01-20

```
SELECT
    MedicineName,
    ExpiryDate
FROM Medicines
WHERE ExpiryDate < CURDATE();
```

Supplier Purchase Report

	SupplierName	TotalPurchases
1	CureDirect	660
2	CurePharma	480
3	Global Pharma	585
4	HealthDirect	750
5	HealthMeds	722.5
6	HealthPlus	562.5
7	LifePharma	520
8	MedExpress	665
9	MediSupply Co.	500
10	MedLink	350
11	MedPlus	1,470
12	MedSource	720
13	MedWorld	600
14	PharmaCare	660
15	PharmaDirect	675
16	PharmaDistributors	500
17	PharmaNet	450
18	PharmaWorld	712.5
19	Prime Meds	660
20	VitalSupplies	840

```
SELECT
   Suppliers.SupplierName,
   SUM(Purchases.TotalCost) AS TotalPurchases
FROM Purchases
JOIN Suppliers ON Purchases.SupplierID = Suppliers.SupplierID
GROUP BY Suppliers.SupplierName;
```

Database Design

Entities and Relationships
Medicines – Stores details about medicines.
Suppliers – Tracks suppliers of medicines.
Purchases – Records medicine purchases from suppliers.
Prescriptions – Manages prescriptions issued to patients.
Sales – Tracks medicine sales to patients.
Inventory – Tracks current stock levels of medicines.

Tables and Attributes

Medicines
MedicineID (Primary Key)
MedicineName
Manufacturer
UnitPrice
ExpiryDate

Suppliers
SupplierID (Primary Key)
SupplierName
ContactDetails

Purchases
PurchaseID (Primary Key)

SupplierID (Foreign Key to Suppliers)
MedicineID (Foreign Key to Medicines)
PurchaseDate
Quantity
TotalCost

Prescriptions
PrescriptionID (Primary Key)
PatientName
DoctorName
PrescriptionDate

Sales

SaleID (Primary Key)
MedicineID (Foreign Key to Medicines)
PrescriptionID (Foreign Key to Prescriptions)
SaleDate
Quantity
TotalAmount

Inventory

InventoryID (Primary Key)
MedicineID (Foreign Key to Medicines)
StockQuantity

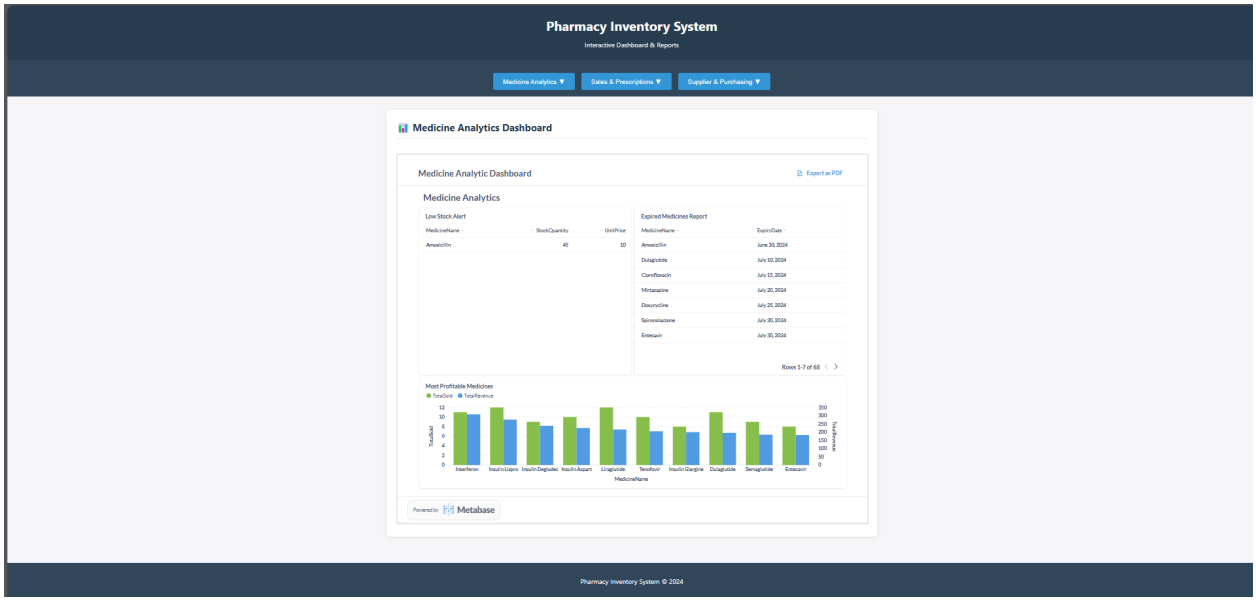
Conclusion

From the reports, we can see that some medicines have expired and need to be removed from the inventory to keep things safe. Some suppliers are getting more purchase orders, and the reports are able to show which medicines are being

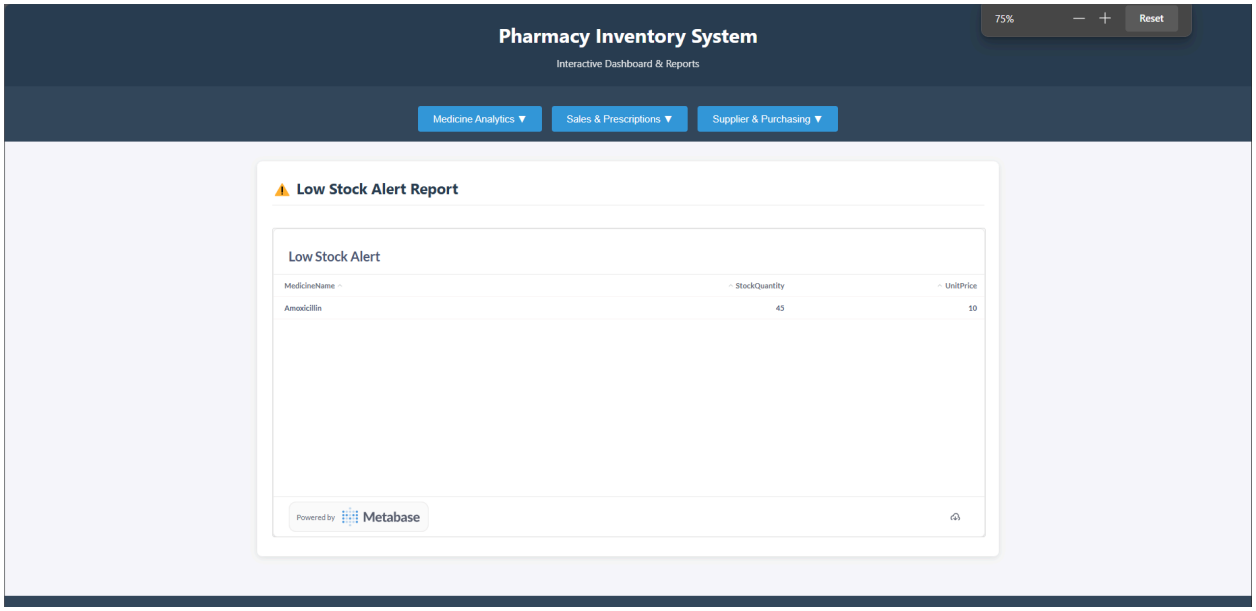
prescribed and sold the most, and which medicines are low in stock helping us keep the right medicines in stock. It's also helpful to see how often doctors prescribe medicines so we can better understand their needs. Overall, keeping an eye on inventory, checking suppliers, removing expired medicines, and understanding the pattern will help us make better decisions.

Metabase Dashboard and Reports

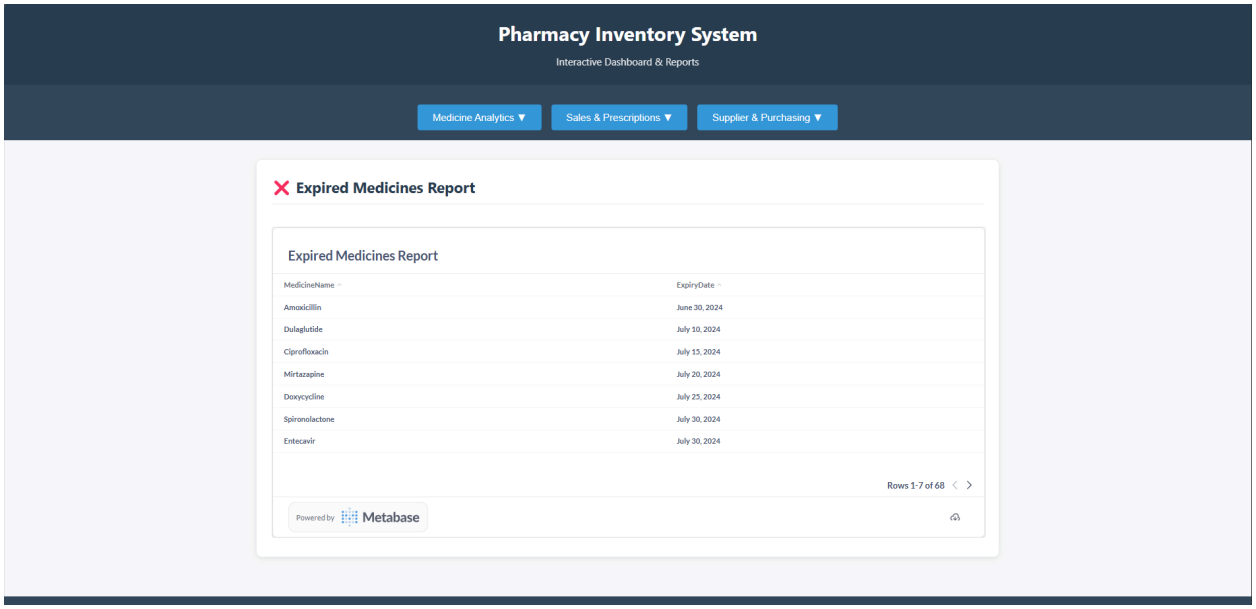
Medicine Analytics Dashboard



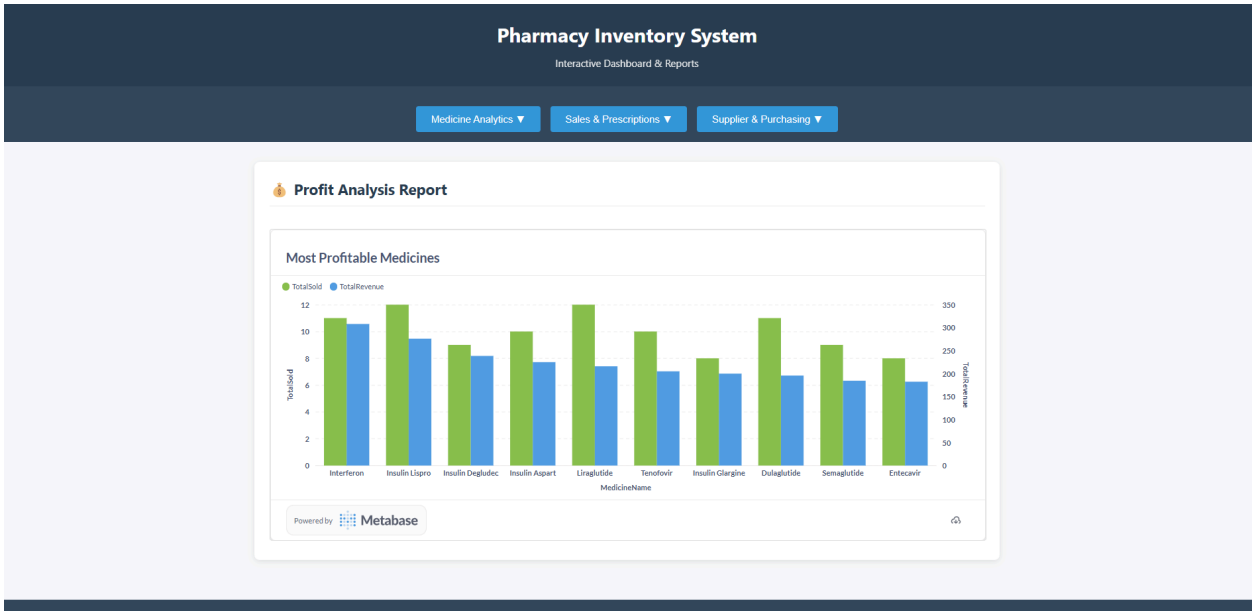
Low Stock Alert Report



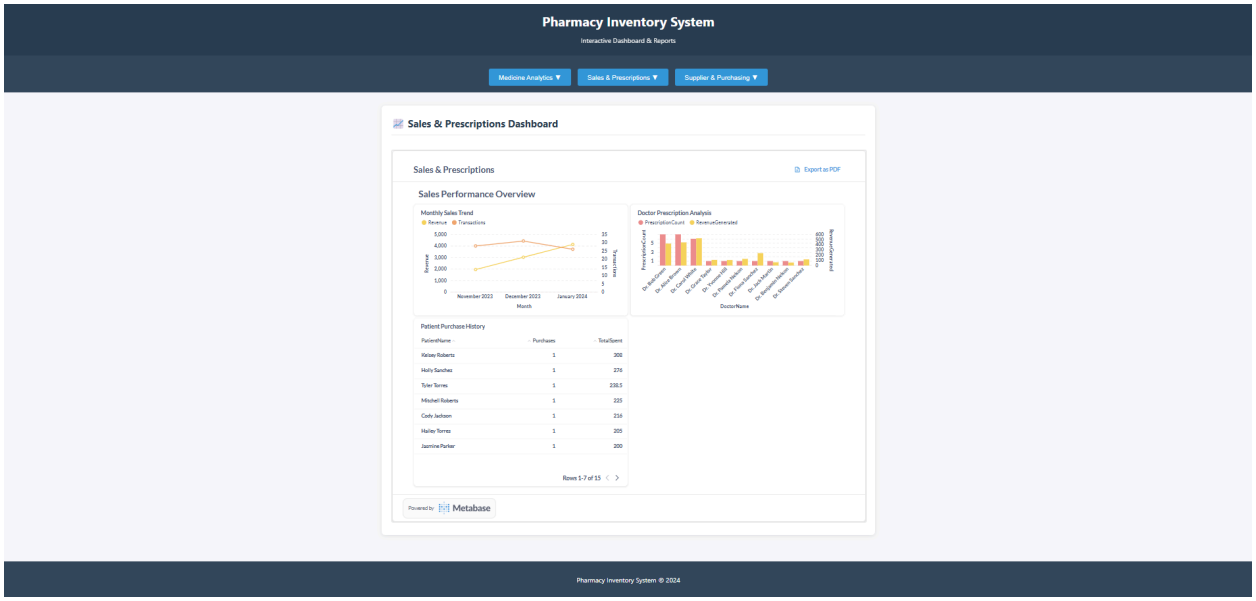
Expired Medicines Report



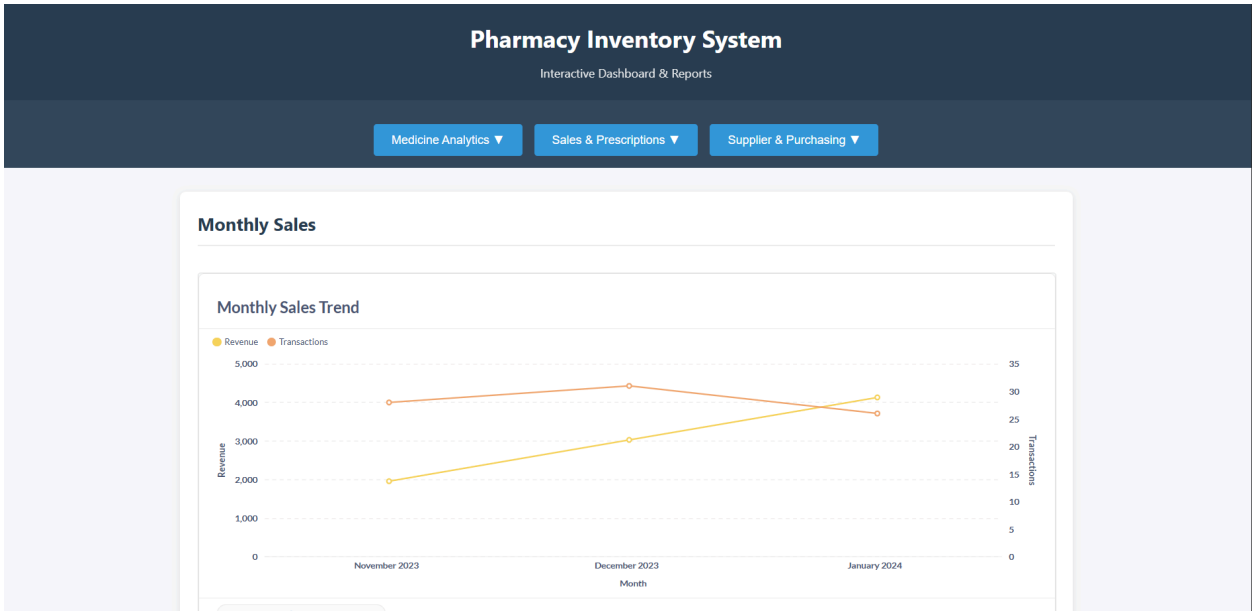
Profit Analysis Report



Sales & Prescription Dashboard

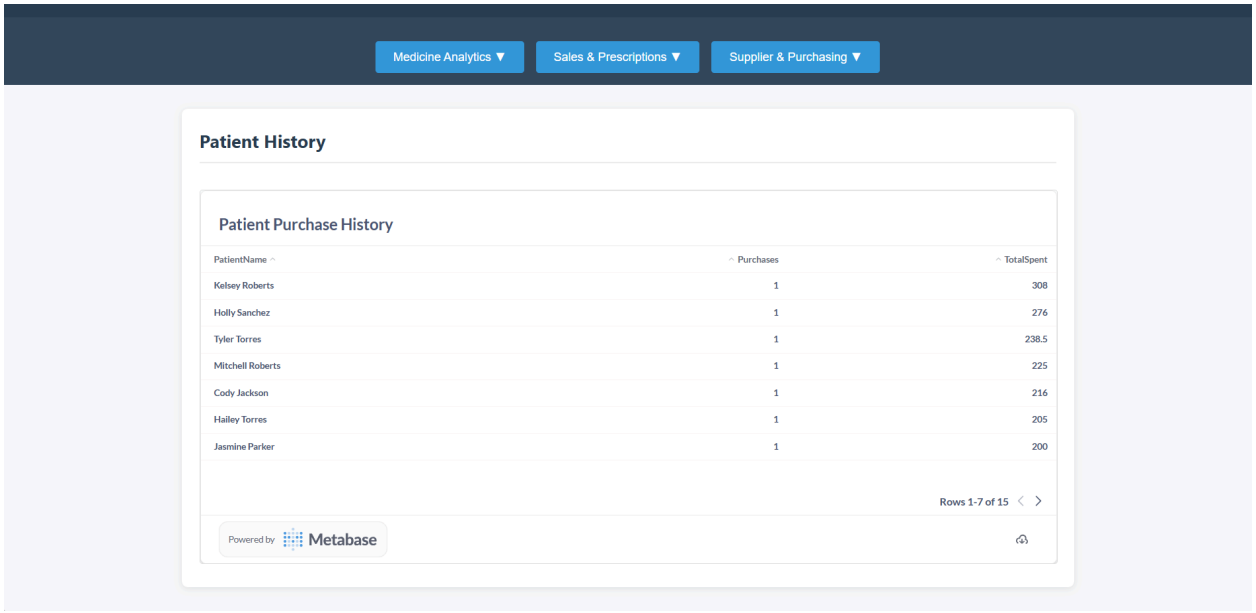


Monthly Sales Report

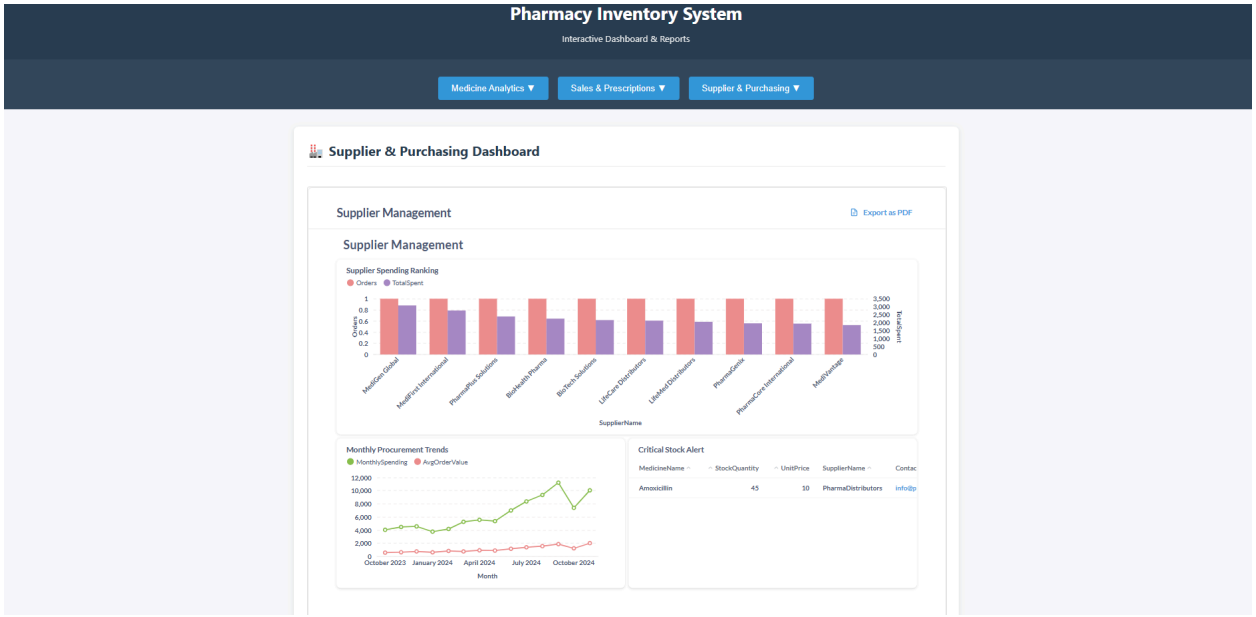


Doctor Prescriptions Report

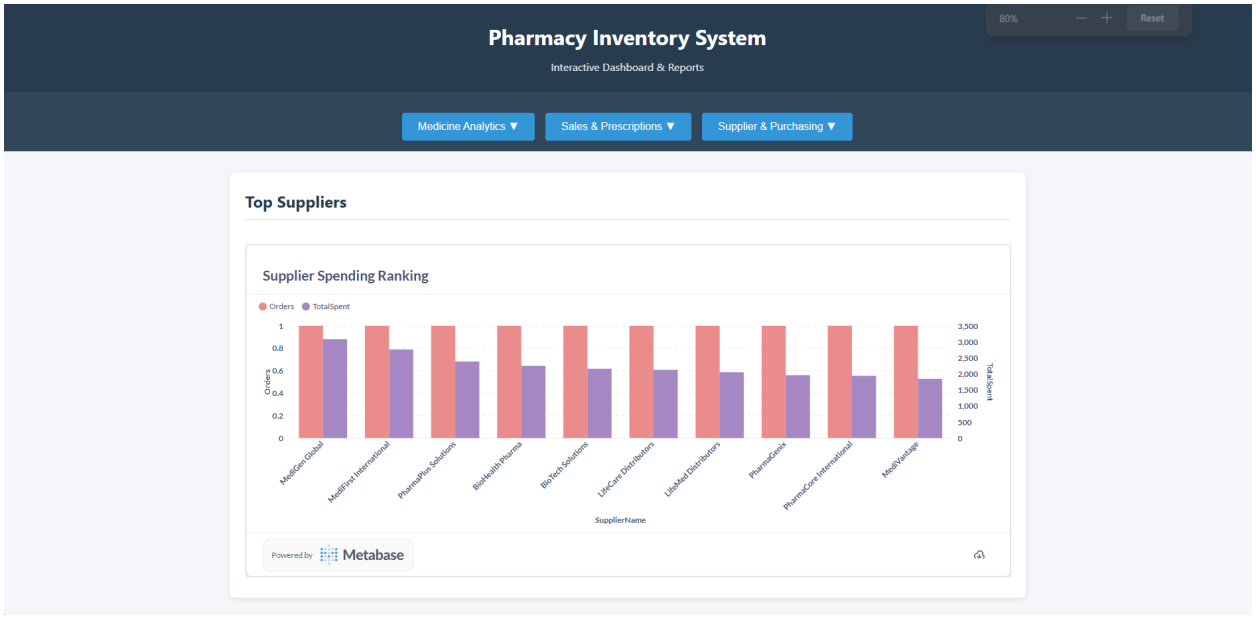
Patient History Report



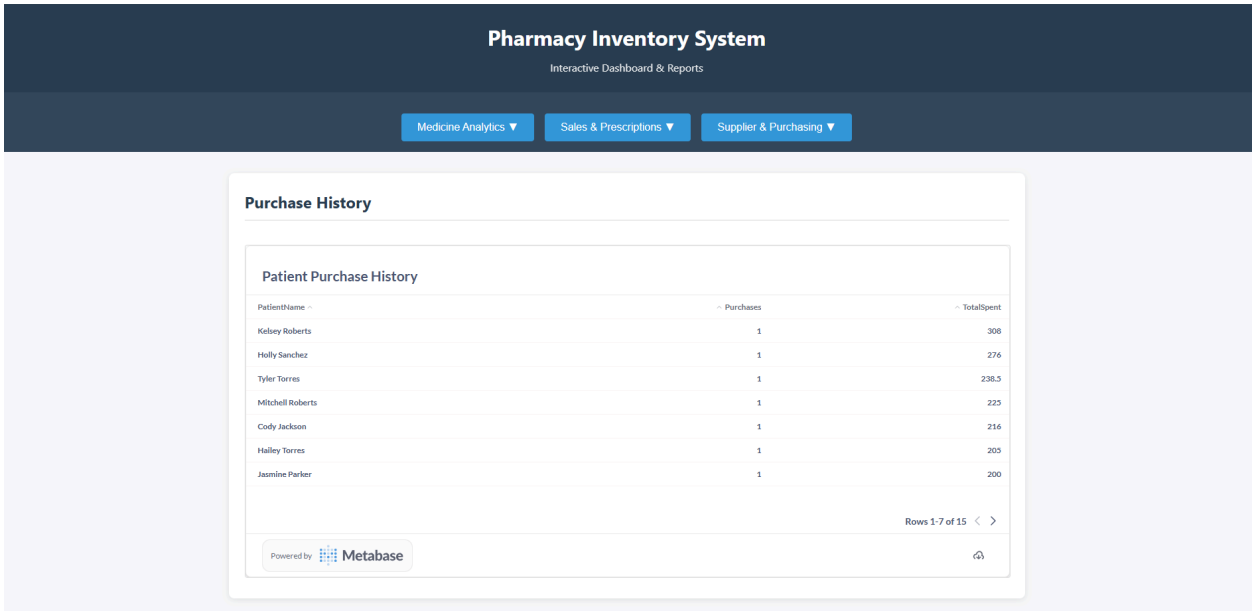
Suppliers & Purchasing Dashboard



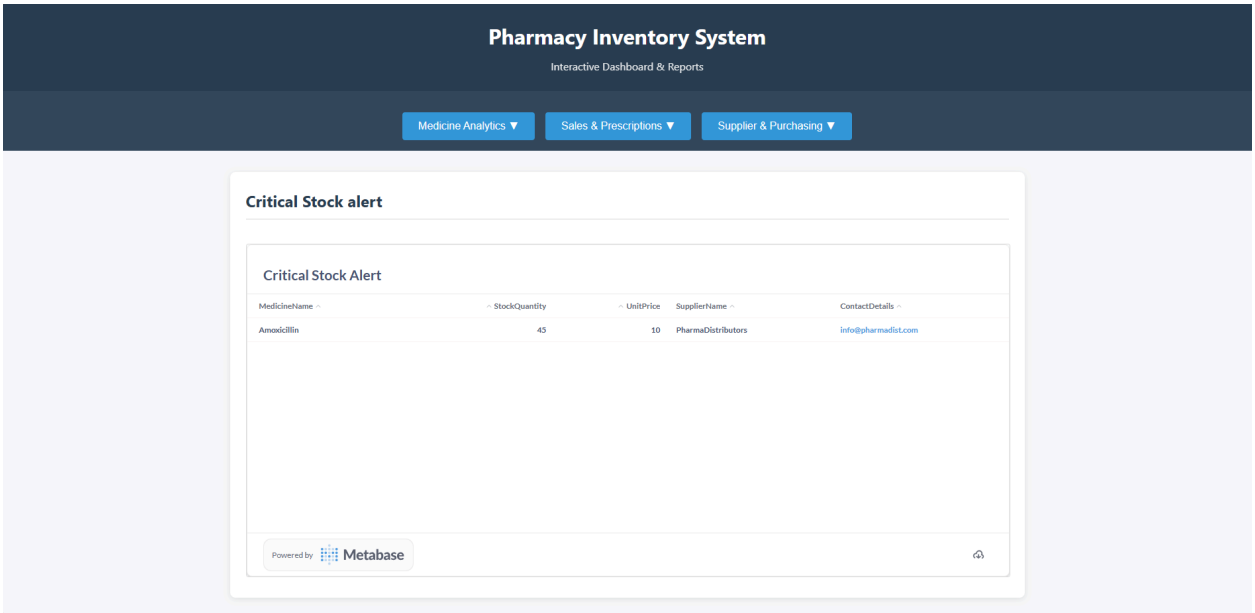
Top Suppliers Report



Purchase History Report



Critical Stock Alert



User Guide

To use the EMC001 Dashboard:

1. Launch the Web Application
    - Open xammp and start APACHE server
    - Open web app using localhost
2. Viewing Dashboards
    - To view dashboards just click the button on what dashboard you wanna see
3. Viewing specific Reports
    - To view specific reports just hover on the drop down on a dashboard and click on a specific report