Database Management & Database Design

Final Project Report

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Section: 05

1. Topic

Pharmacy Management System

2. Problem Statement

The project aims to develop backend of the pharmacy retail chain for effective and efficient management of drugs, inventory, sale and customer base. It makes the life easier for a salesperson/pharmacist to dispense the correct drug efficiently by reducing the effort in manually order/invoice filing, keeping track of expiration dates of drugs and handling the re-order of drugs once those are nearing out of stock situation.

A pharmacy management system helps improving the patient care by providing a broad view about the patient's current condition, currently used drug details and allergies which can occurs due to usage of alternative drugs or different doses. The scope of the project is to design the backend database to keep track of all the activities aforementioned in a pharmacy retail chain using MySQL.

The Database created will store the pharmacy customer base with the proper history of every purchase. It will store the different attributes of customer like address, the order details, inventory detail, drug details etc.

The database will also have some other procedural routines to help out keeping track of total inventory and refill details of patient. To do all such operation we have the following in place

- Stored Procedures
- Triggers
- Access Control
- Views

Database Development Tool: MySQL Workbench

3. Tables Involved in the Project

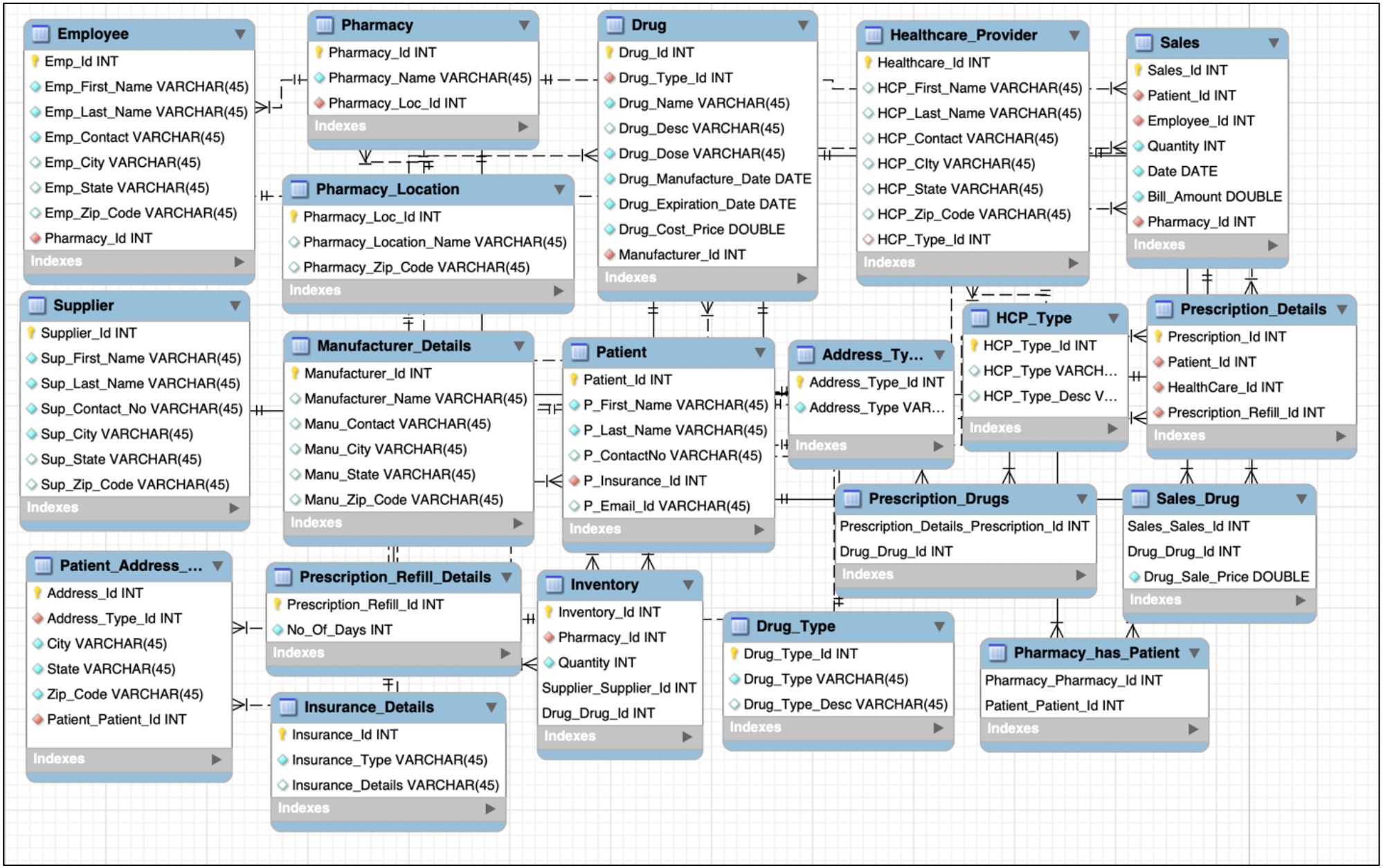
Below is the list of tables which have been created as a part of the complete Project

- Patient (Patient_Id (PK), P_First_Name, P_Last_Name, P_ContactNo, P_Insurance_Id, P_Email_Id)
- Patient_Address_Details (Address_Id (PK) , Address_Type_Id(FK), City, State, Zip_Code)
- Address_Type (Address_Type_Id (PK) , Address_Type_Desc)
- Prescription (Prescription_Id (PK) , Patient_Id(FK) , Healthcare_Provider_Id(FK), Prescription_Refill_Id(FK))
- Presfcription_Refill_Details (Prescription_Refill_Id (PK), No_Of_Days)
- Insurance_Details (Insurance_Id (PK), Insurance_Type, Insurance_Description)
- Pharmacy (Pharmacy_Id(PK), Pharmacy_Name, Pharmacy_Loc_Id(FK))
- Pharmacy_Location(Pharmacy_Loc_Id(PK), Pharmacy_Loc_Name, Pharmacy_Zip_Code)
- Employee (Employee_Id(PK), Employee_Fname, Employee_Lname, Employee_Contact, Employee_City, Employee_State, Pharmacy_Id(FK))
- Inventory (Inventory_Id(PK), Pharmacy_Id(FK), QuantitY, Drug_Drug_Id (FK), Supplier_ID(FK)
- Supplier(Supplier_ID(PK), Sup_First_Name, Sup_Last_Name, Sup_Contact_No, Sup_City, Sup_State, Sup_Zip_Code)
- Drug (Drug_Id(PK), Drug_Type_Id(FK), Drug_Name, Drug Desc, Drug Dose, Drug_Man_Date, Drug_Exp_Date, Drug_Cost_Price, Manufacturer_Id(FK))
- Drug_Type (Drug_Type_Id(PK), Drug_Type, Drug_Type_Description)
- Manufacture_Details (Manufacturer_Id(PK), Manufacturer_Name, Manufacturer_Contact, Manufacturer_City, Manufacturer_State, Manufacturer_Zip_Code)
- Healthcare Provider (Healthcare_provider_id(PK), HCP_TYPE_ID(FK), HCP_FName, HCP_Lname, HCP_Contact, HCP_City, HCP_State, HCP_Zip_code)
- HCP_TYPE (HCP_TYPE_ID(PK), HCP_TYPE, HCP_TYPE_desc)
- Prescription_Drug(Prescription_Id(PK), Drug_Id(PK))
- Sales (Sales_Id(PK), Patient_Id(FK), Employee_Id(FK), Sale_Date, Bill_Amount, Pharmacy_Id(FK), Prescription_Id(FK))
- Sales_Drug (Sales_Id(PK), Drug_Id(PK), Drug_Sale_Price, Drug_Quantity)
- Pharmacy_Patient_History(Pharmacy_Id(PK), Patient_Id(PK), Sale_Id(PK), Sale_Date)

4. Relationships Details

- A patient can have multiple drug prescriptions.
- A patient can purchase drug from more than 1 pharmacy.
- A pharmacy has multiple employees.
- A prescription can have more than one drug.
- A Supplier can supply more than one drug to Pharmacy.
- A prescription is meant to be for only one Patient.
- A manufacturer can produce more than one drugs.
- A drug can be there in multiple prescriptions
- A prescription has only one healthcare provider.

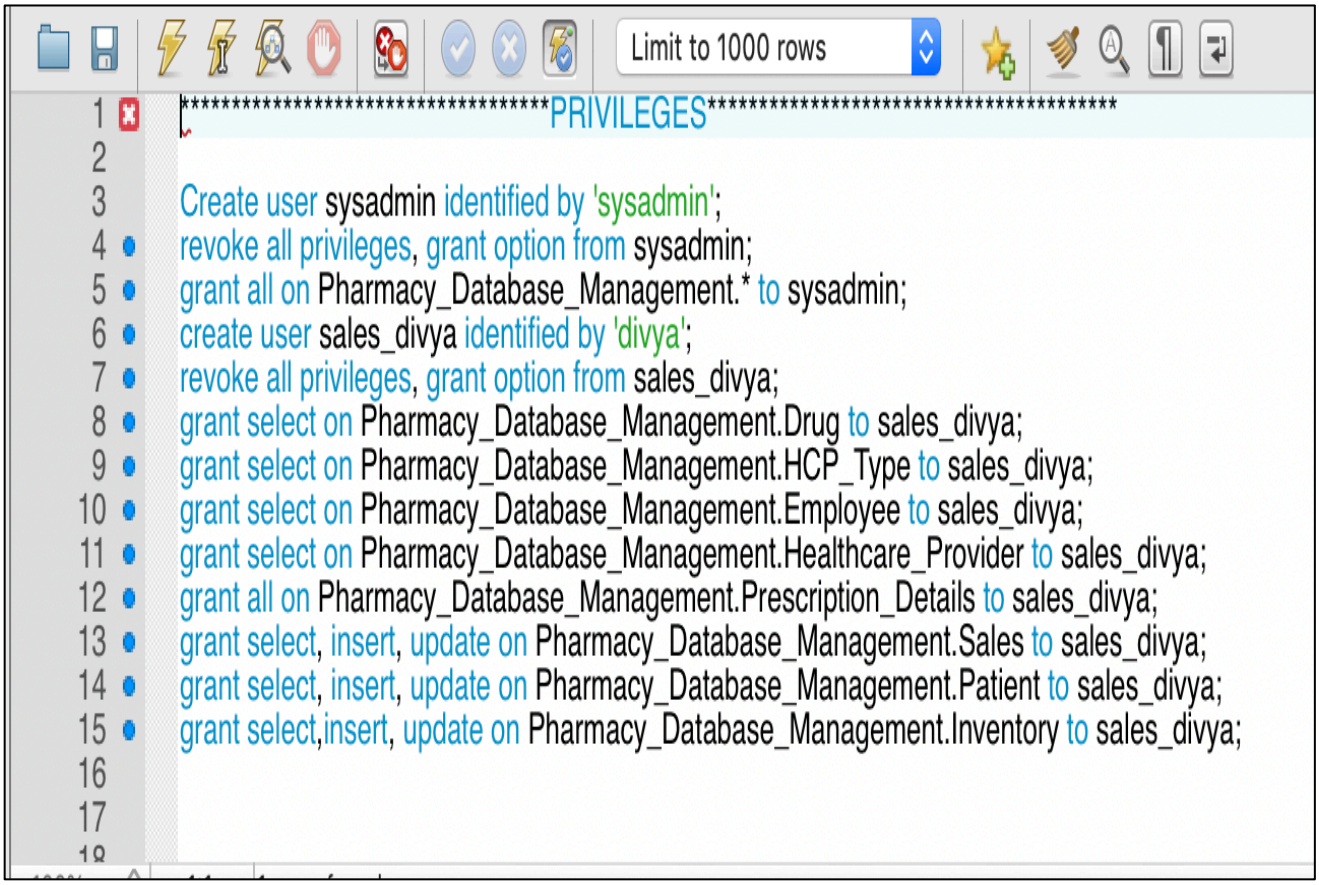
5. Entity Relationship Diagram



6. Privileges

1. A Sales person has limited access to the Pharmacy Database.
2. Sales person can select on Drug, Healthcare Provider details, Employee details tables.
3. A sales person has insert, update and select on inventory, sales , Prescription_Details, and patient tables.
4. A salesperson can't access insurance details of a patient.
5. A systemadmin has access to the complete database;

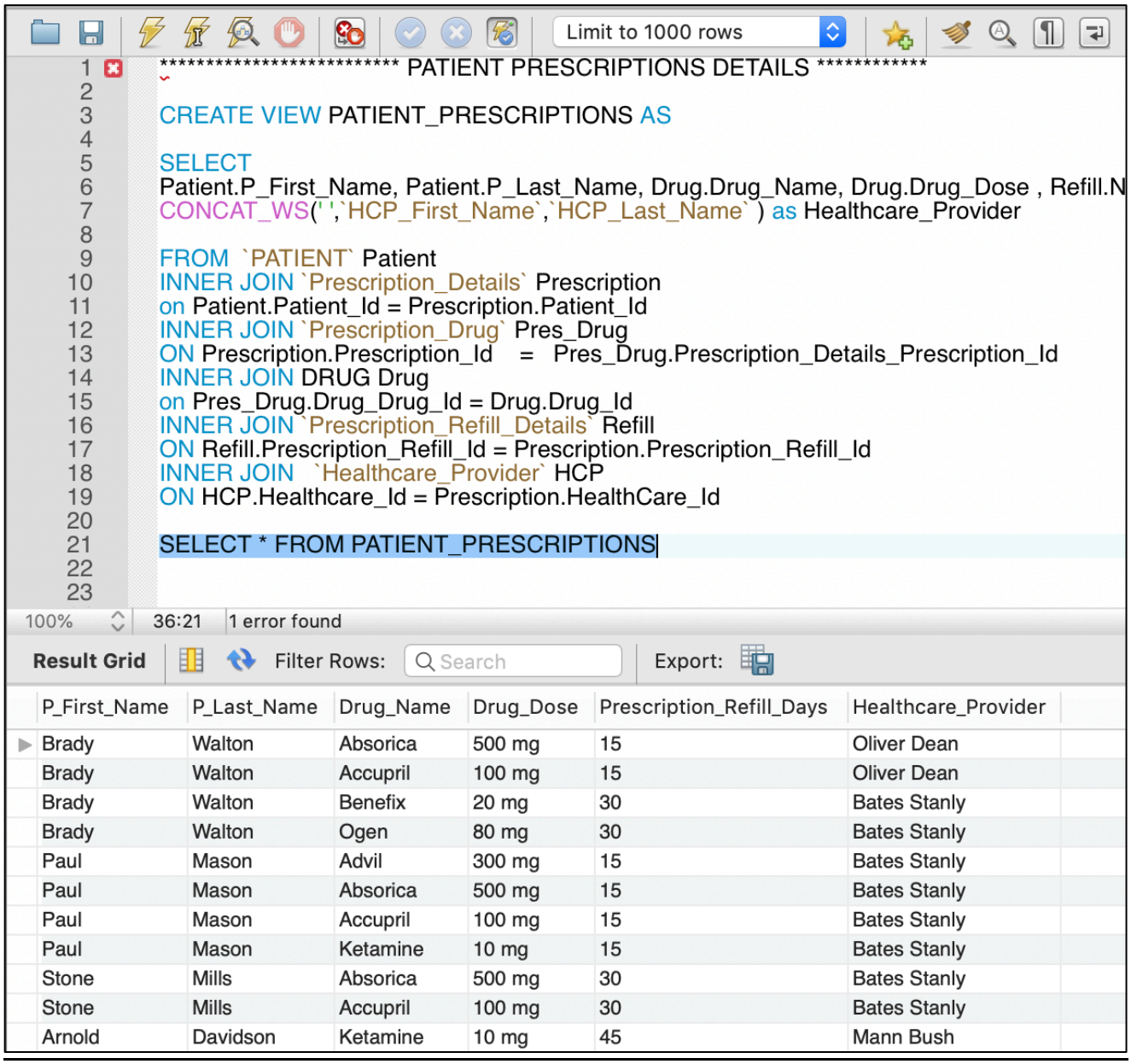
PFB the details of the access provided to systemadmin and salesperson.



7. Views

- **Patient_Prescriptions:** A view where all the drug prescription details can be seen for patient.

  SQL Query: Select * from Patient_Prescriptions.



```
********************** PATIENT PRESCRIPTIONS DETAILS ************

CREATE VIEW PATIENT_PRESCRIPTIONS AS

SELECT
Patient.P_First_Name, Patient.P_Last_Name, Drug.Drug_Name, Drug.Drug_Dose , Refill.N
CONCAT_WS(' ',`HCP_First_Name`,`HCP_Last_Name`) as Healthcare_Provider

FROM  `PATIENT` Patient
INNER JOIN `Prescription_Details` Prescription
on Patient.Patient_Id = Prescription.Patient_Id
INNER JOIN `Prescription_Drug` Pres_Drug
ON Prescription.Prescription_Id    =   Pres_Drug.Prescription_Details_Prescription_Id
INNER JOIN DRUG Drug
on Pres_Drug.Drug_Drug_Id = Drug.Drug_Id
INNER JOIN `Prescription_Refill_Details` Refill
ON Refill.Prescription_Refill_Id = Prescription.Prescription_Refill_Id
INNER JOIN   `Healthcare_Provider` HCP
ON HCP.Healthcare_Id = Prescription.HealthCare_Id

SELECT * FROM PATIENT_PRESCRIPTIONS
```

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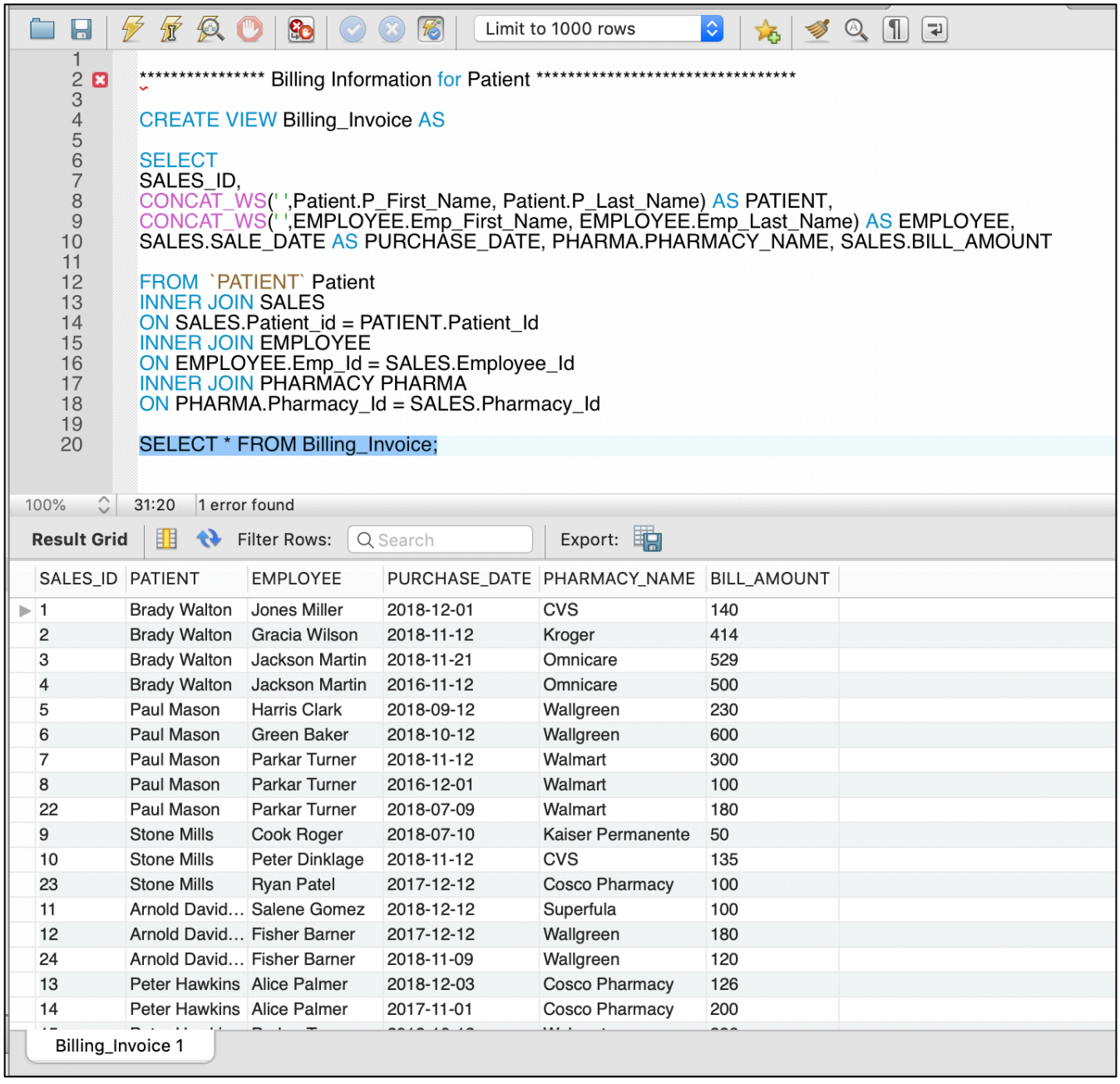
Result Grid Filter Rows: Search Export:

P_First_Name	P_Last_Name	Drug_Name	Drug_Dose	Prescription_Refill_Days	Healthcare_Provider
Brady	Walton	Absorica	500 mg	15	Oliver Dean
Brady	Walton	Accupril	100 mg	15	Oliver Dean
Brady	Walton	Benefix	20 mg	30	Bates Stanly
Brady	Walton	Ogen	80 mg	30	Bates Stanly
Paul	Mason	Advil	300 mg	15	Bates Stanly
Paul	Mason	Absorica	500 mg	15	Bates Stanly
Paul	Mason	Accupril	100 mg	15	Bates Stanly
Paul	Mason	Ketamine	10 mg	15	Bates Stanly
Stone	Mills	Absorica	500 mg	30	Bates Stanly
Stone	Mills	Accupril	100 mg	30	Bates Stanly
Arnold	Davidson	Ketamine	10 mg	45	Mann Bush

- **Billing_Invoice :** Billing information for patients with sales_Id

  SQL : SELECT * FROM Billing_Invoice;



```
1
2  ********** Billing Information for Patient **********
3
4  CREATE VIEW Billing_Invoice AS
5
6  SELECT
7  SALES_ID,
8  CONCAT_WS(' ',Patient.P_First_Name, Patient.P_Last_Name) AS PATIENT,
9  CONCAT_WS(' ',EMPLOYEE.Emp_First_Name, EMPLOYEE.Emp_Last_Name) AS EMPLOYEE,
10 SALES.SALE_DATE AS PURCHASE_DATE, PHARMA.PHARMACY_NAME, SALES.BILL_AMOUNT
11
12 FROM  `PATIENT` Patient
13 INNER JOIN SALES
14 ON SALES.Patient_id = PATIENT.Patient_Id
15 INNER JOIN EMPLOYEE
16 ON EMPLOYEE.Emp_Id = SALES.Employee_Id
17 INNER JOIN PHARMACY PHARMA
18 ON PHARMA.Pharmacy_Id = SALES.Pharmacy_Id
19
20 SELECT * FROM Billing_Invoice;
```

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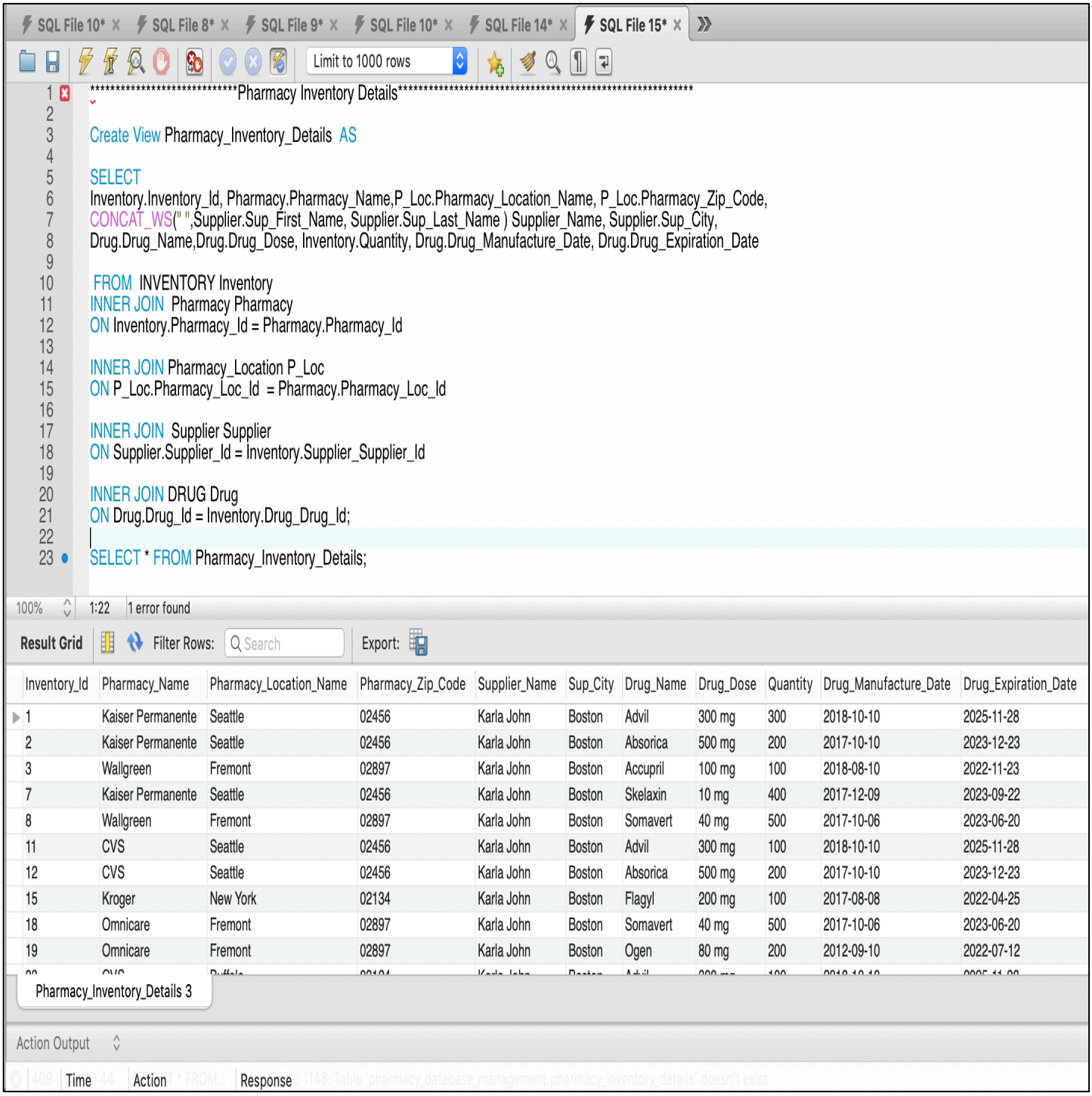
Result Grid | Filter Rows: Search | Export:

SALES_ID	PATIENT	EMPLOYEE	PURCHASE_DATE	PHARMACY_NAME	BILL_AMOUNT
1	Brady Walton	Jones Miller	2018-12-01	CVS	140
2	Brady Walton	Gracia Wilson	2018-11-12	Kroger	414
3	Brady Walton	Jackson Martin	2018-11-21	Omnicare	529
4	Brady Walton	Jackson Martin	2016-11-12	Omnicare	500
5	Paul Mason	Harris Clark	2018-09-12	Wallgreen	230
6	Paul Mason	Green Baker	2018-10-12	Wallgreen	600
7	Paul Mason	Parkar Turner	2018-11-12	Walmart	300
8	Paul Mason	Parkar Turner	2016-12-01	Walmart	100
22	Paul Mason	Parkar Turner	2018-07-09	Walmart	180
9	Stone Mills	Cook Roger	2018-07-10	Kaiser Permanente	50
10	Stone Mills	Peter Dinklage	2018-11-12	CVS	135
23	Stone Mills	Ryan Patel	2017-12-12	Cosco Pharmacy	100
11	Arnold David…	Salene Gomez	2018-12-12	Superfula	100
12	Arnold David…	Fisher Barner	2017-12-12	Wallgreen	180
24	Arnold David…	Fisher Barner	2018-11-09	Wallgreen	120
13	Peter Hawkins	Alice Palmer	2018-12-03	Cosco Pharmacy	126
14	Peter Hawkins	Alice Palmer	2017-11-01	Cosco Pharmacy	200

Billing_Invoice 1

- **Pharmcy_Inventory_Details:** View to show all the drugs and quantity available for a pharmacy.

  SQL Query: SELECT * FROM Pharmacy_Inventory_Details;



```
**********Pharmacy Inventory Details**********

Create View Pharmacy_Inventory_Details  AS

SELECT
Inventory.Inventory_Id, Pharmacy.Pharmacy_Name,P_Loc.Pharmacy_Location_Name, P_Loc.Pharmacy_Zip_Code,
CONCAT_WS(" ",Supplier.Sup_First_Name, Supplier.Sup_Last_Name ) Supplier_Name, Supplier.Sup_City,
Drug.Drug_Name,Drug.Drug_Dose, Inventory.Quantity, Drug.Drug_Manufacture_Date, Drug.Drug_Expiration_Date

 FROM  INVENTORY Inventory
INNER JOIN  Pharmacy Pharmacy
ON Inventory.Pharmacy_Id = Pharmacy.Pharmacy_Id

INNER JOIN Pharmacy_Location P_Loc
ON P_Loc.Pharmacy_Loc_Id  = Pharmacy.Pharmacy_Loc_Id

INNER JOIN  Supplier Supplier
ON Supplier.Supplier_Id = Inventory.Supplier_Supplier_Id

INNER JOIN DRUG Drug
ON Drug.Drug_Id = Inventory.Drug_Drug_Id;

SELECT * FROM Pharmacy_Inventory_Details;
```

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Result Grid | Filter Rows: Search | Export:

Inventory_Id	Pharmacy_Name	Pharmacy_Location_Name	Pharmacy_Zip_Code	Supplier_Name	Sup_City	Drug_Name	Drug_Dose	Quantity	Drug_Manufacture_Date	Drug_Expiration_Date
1	Kaiser Permanente	Seattle	02456	Karla John	Boston	Advil	300 mg	300	2018-10-10	2025-11-28
2	Kaiser Permanente	Seattle	02456	Karla John	Boston	Absorica	500 mg	200	2017-10-10	2023-12-23
3	Wallgreen	Fremont	02897	Karla John	Boston	Accupril	100 mg	100	2018-08-10	2022-11-23
7	Kaiser Permanente	Seattle	02456	Karla John	Boston	Skelaxin	10 mg	400	2017-12-09	2023-09-22
8	Wallgreen	Fremont	02897	Karla John	Boston	Somavert	40 mg	500	2017-10-06	2023-06-20
11	CVS	Seattle	02456	Karla John	Boston	Advil	300 mg	100	2018-10-10	2025-11-28
12	CVS	Seattle	02456	Karla John	Boston	Absorica	500 mg	200	2017-10-10	2023-12-23
15	Kroger	New York	02134	Karla John	Boston	Flagyl	200 mg	100	2017-08-08	2022-04-25
18	Omnicare	Fremont	02897	Karla John	Boston	Somavert	40 mg	500	2017-10-06	2023-06-20
19	Omnicare	Fremont	02897	Karla John	Boston	Ogen	80 mg	200	2012-09-10	2022-07-12

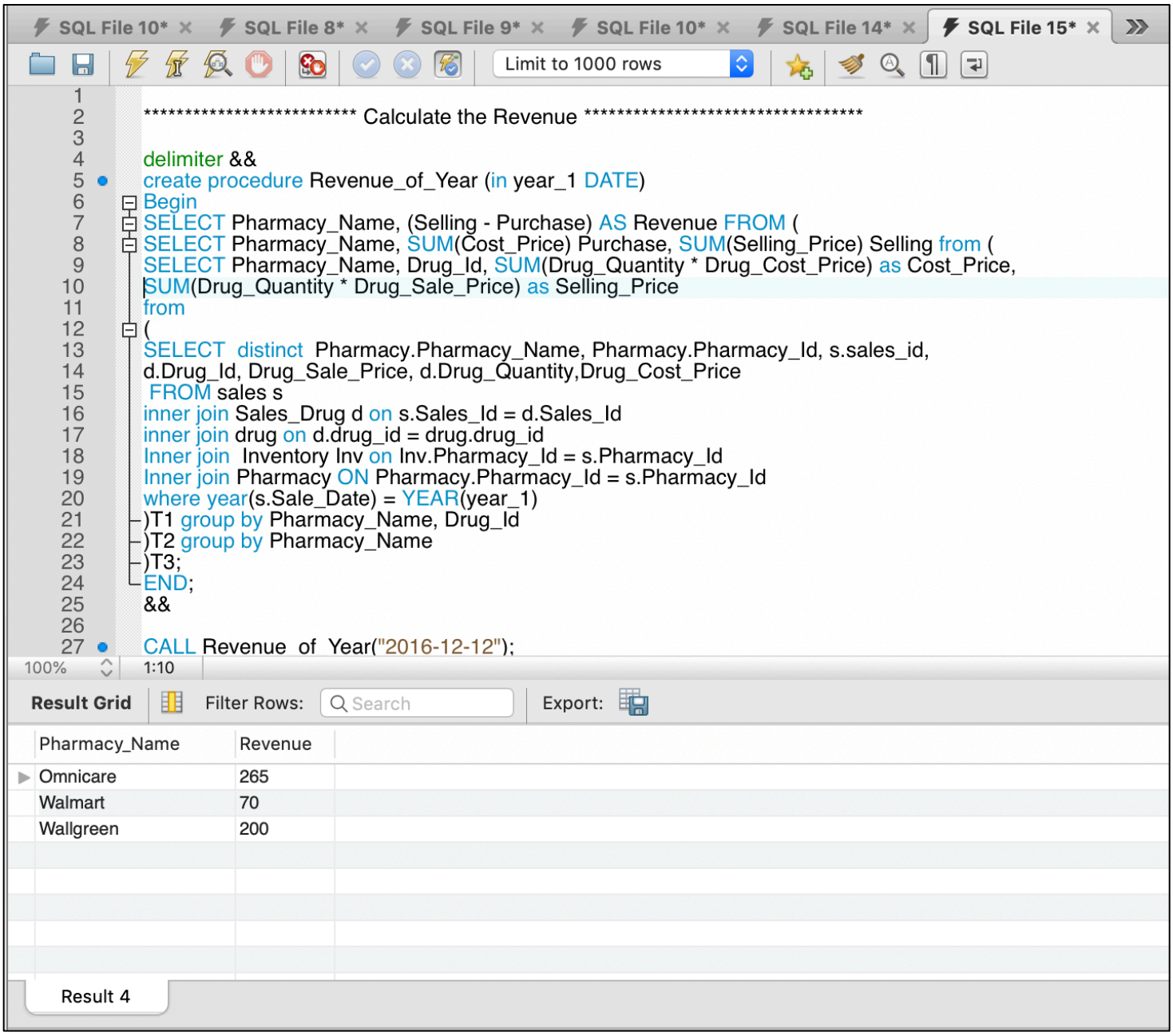
Pharmacy_Inventory_Details 3

Action Output

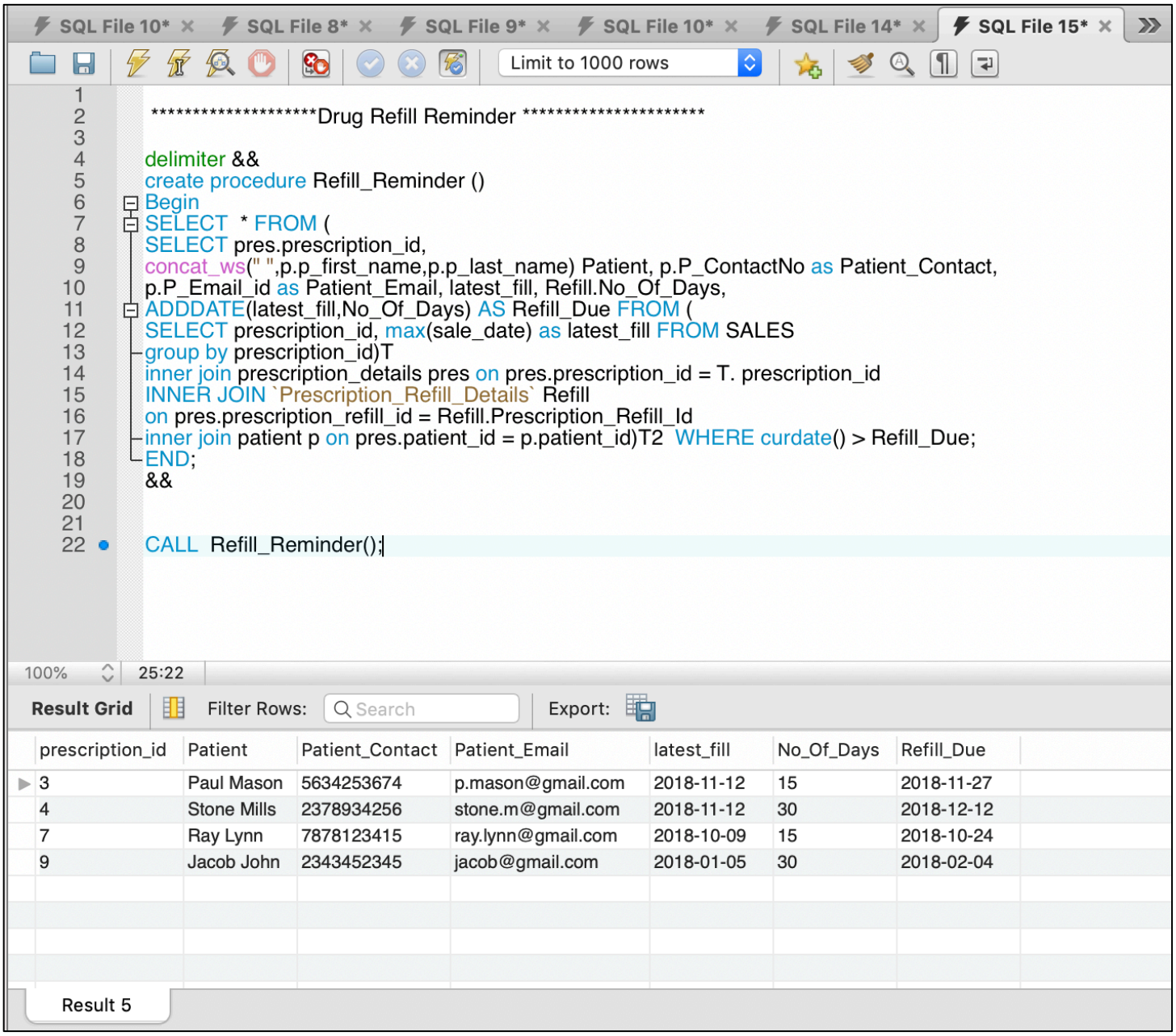
Time | Action | Response

8. Procedures

- **Revenue_of_Year :** This procedure return the revenue for different pharmacy in year. We are passing year as the input parameter to this procedure.



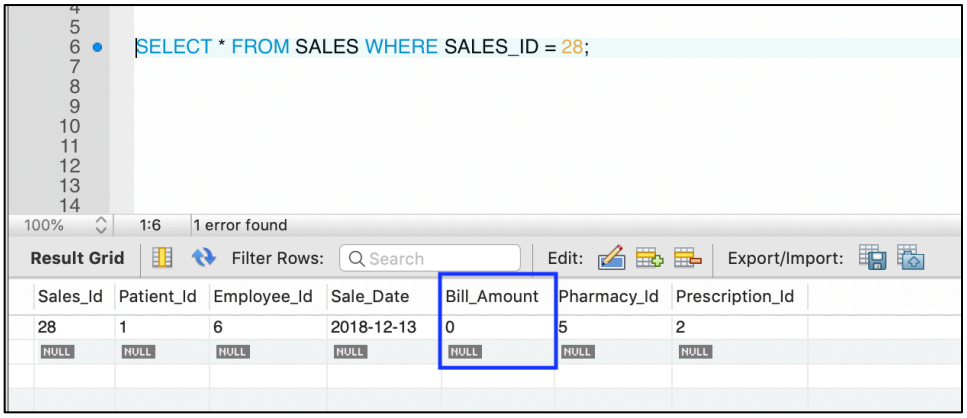
- **Refill_Reminder :** Generate the patient report for whom the refill is due according to their prescription information.



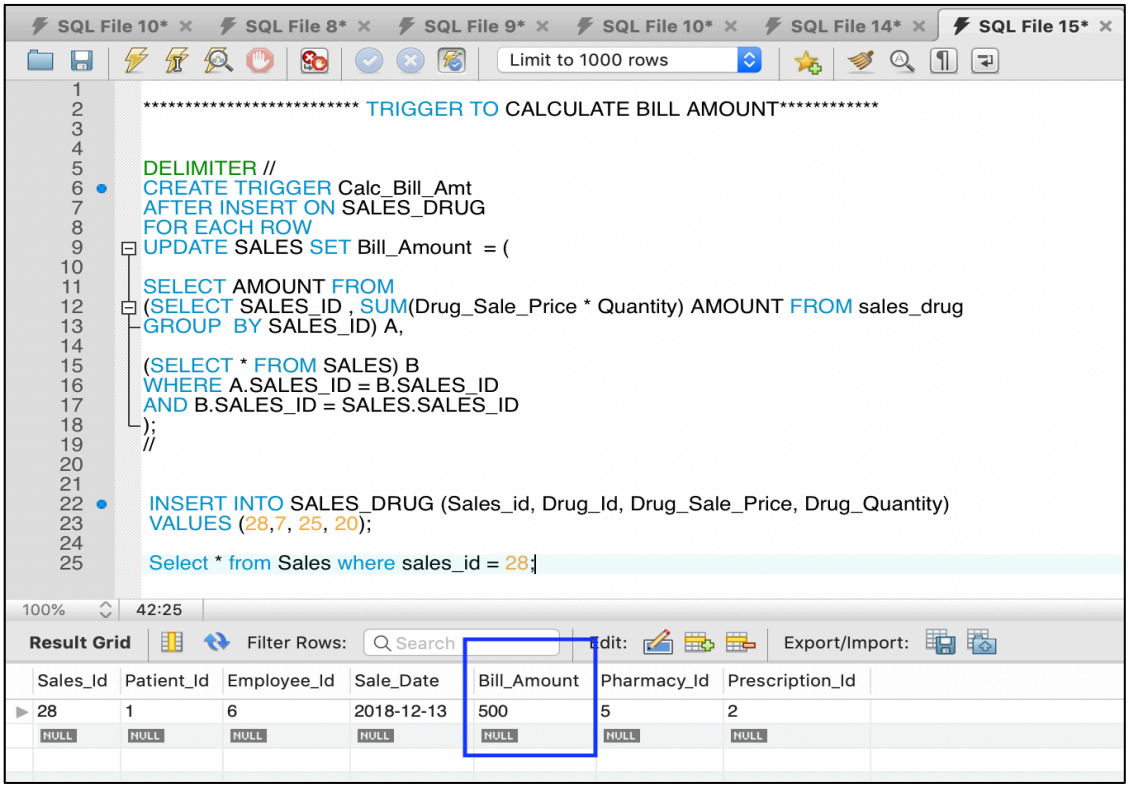
9. Triggers

- **Calc_Bill_Amt :** Calculate the total bill amount for each purchase based on the quantity sold * selling price of drug and update in table SALES for each sale.

  ➢ Before inserting into **Sales_Drug** table, the Bill amount is not populated.

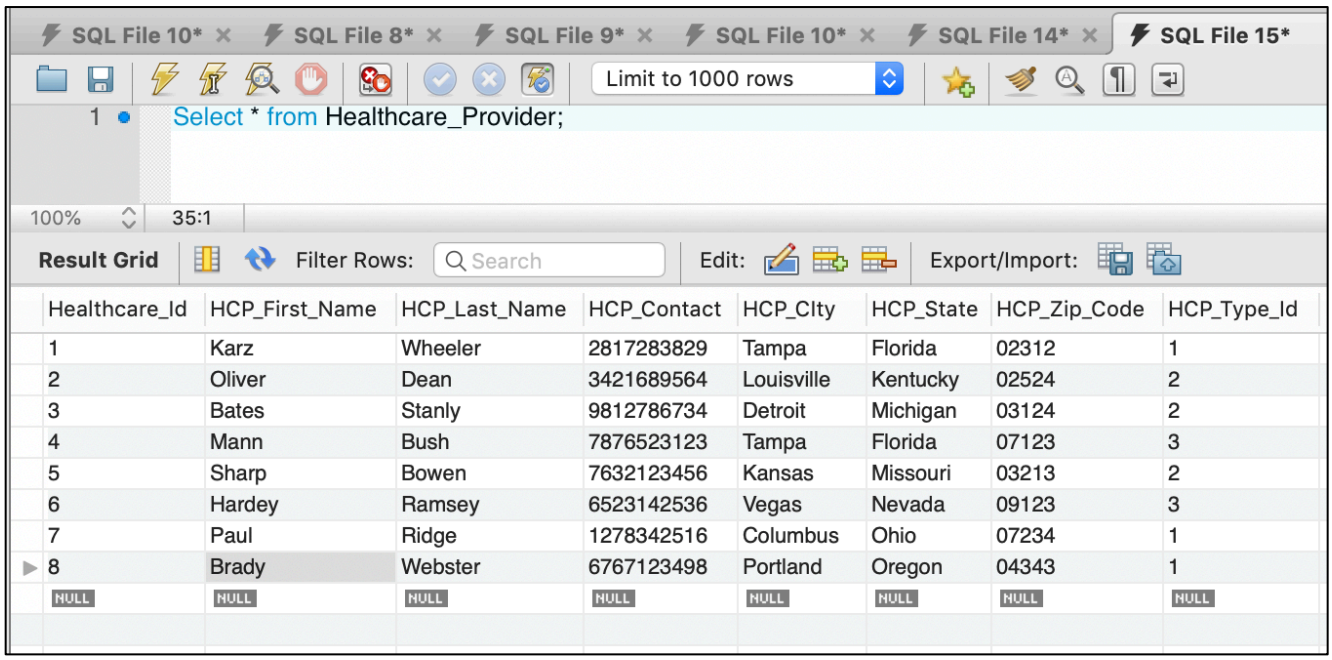


  ➢ After inserting into **Sales_Drug** table, the Bill amount is populated due to trigger.



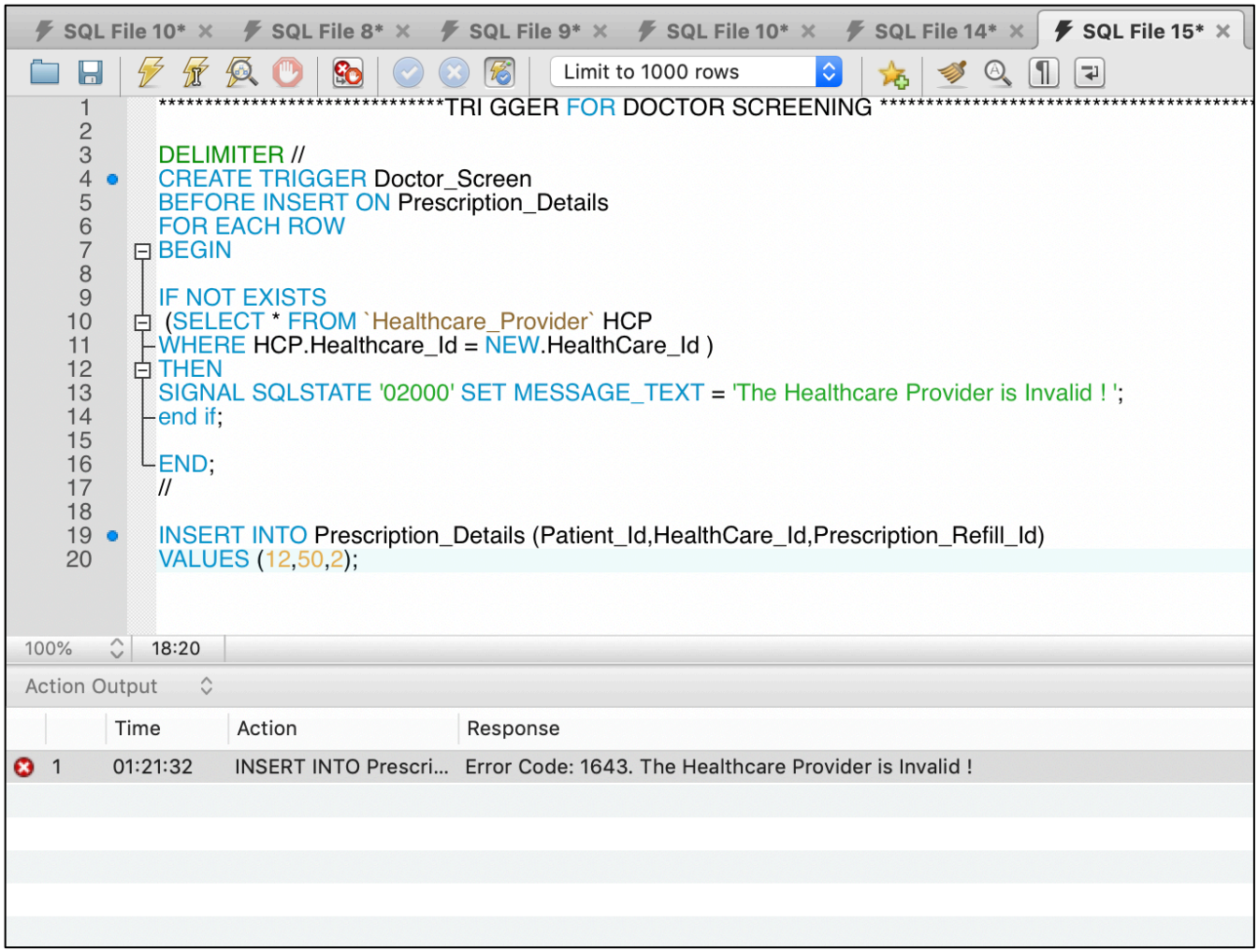
- **Doctor_Screen:** Whenever a record is inserted into Prescription_details table, the healthcare provider information is checked. If the Healthcare provider exist in the system, the prescription is added and drug is dispensed and if the Healthcare provider doesn't exist, an error message is thrown and record is discarded.

  Valid Healthcare Provider List in System:

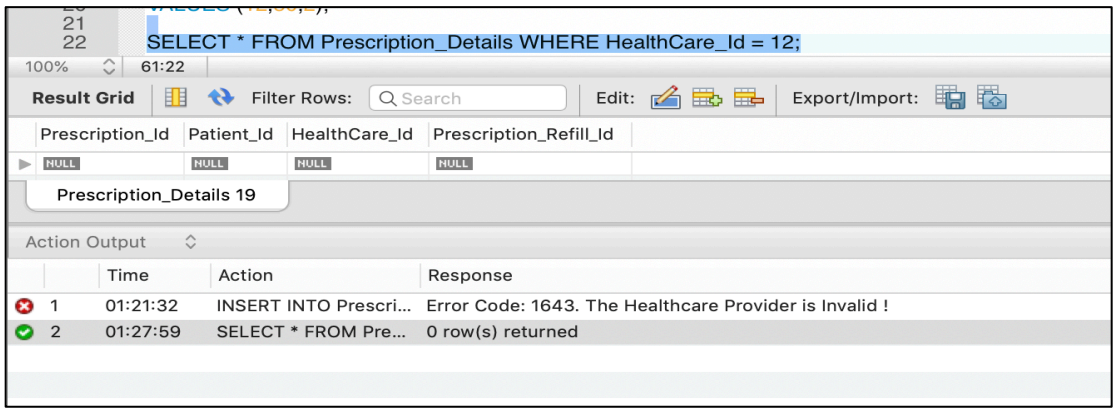


Healthcare_Id	HCP_First_Name	HCP_Last_Name	HCP_Contact	HCP_CIty	HCP_State	HCP_Zip_Code	HCP_Type_Id
1	Karz	Wheeler	2817283829	Tampa	Florida	02312	1
2	Oliver	Dean	3421689564	Louisville	Kentucky	02524	2
3	Bates	Stanly	9812786734	Detroit	Michigan	03124	2
4	Mann	Bush	7876523123	Tampa	Florida	07123	3
5	Sharp	Bowen	7632123456	Kansas	Missouri	03213	2
6	Hardey	Ramsey	6523142536	Vegas	Nevada	09123	3
7	Paul	Ridge	1278342516	Columbus	Ohio	07234	1
8	Brady	Webster	6767123498	Portland	Oregon	04343	1
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Adding a prescription where the Healthcare provider is Invalid.
Healthcare_Provider_Id = 12

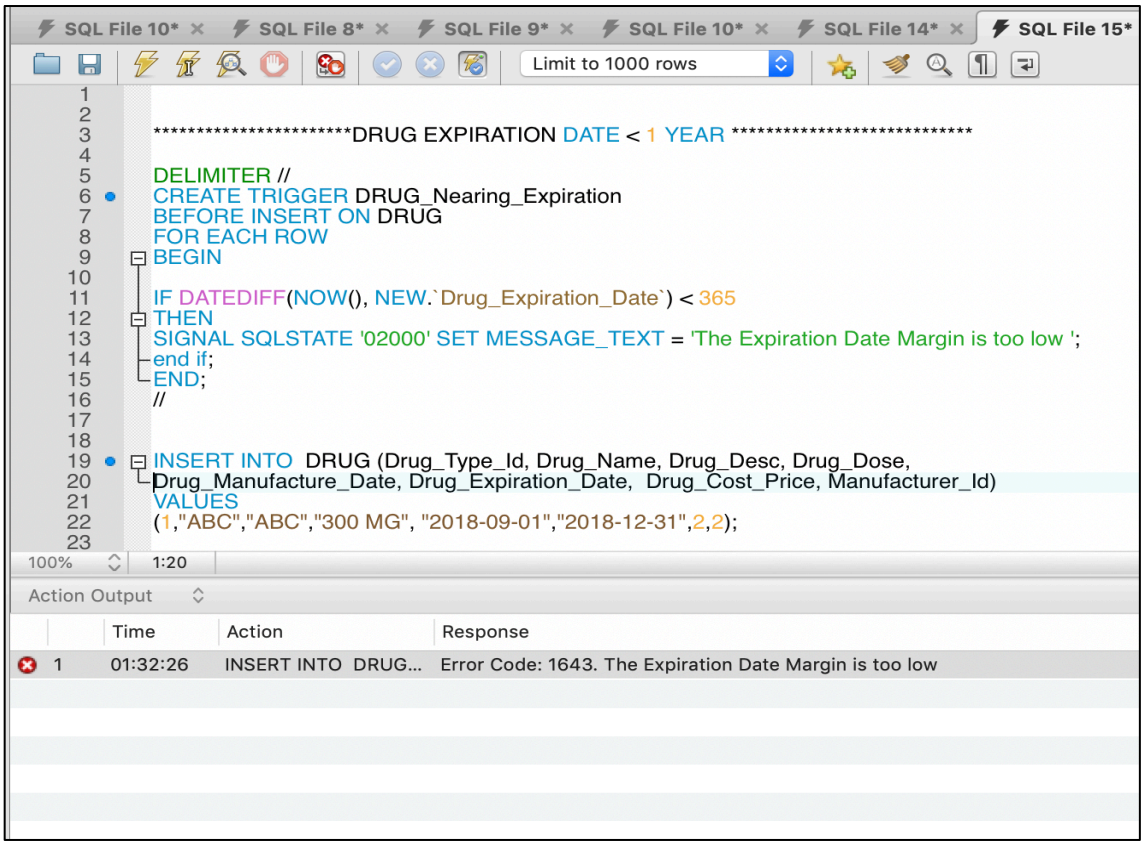


Check if the prescription is added with invalid Healthcare Provider Id = 12.

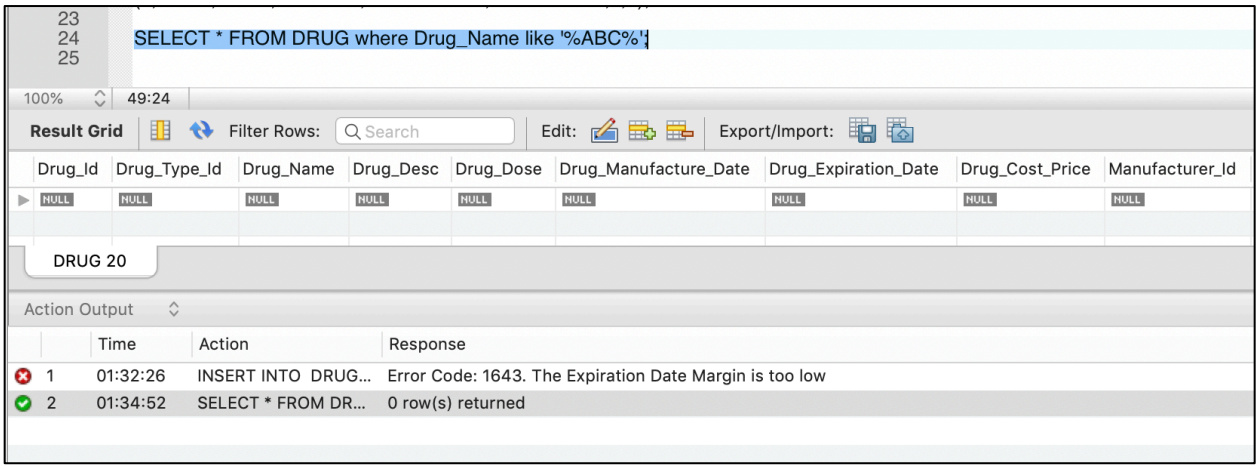


- **DRUG_Nearing_Expiration :** Whenever a drug is added to the drug table, its expiration date is checked. If the drug expiration date is less than a year from current date, the drug details are not entered and returned to supplier.

  Inserting a record into drug table where the expiration date of the drug is less a month from now.

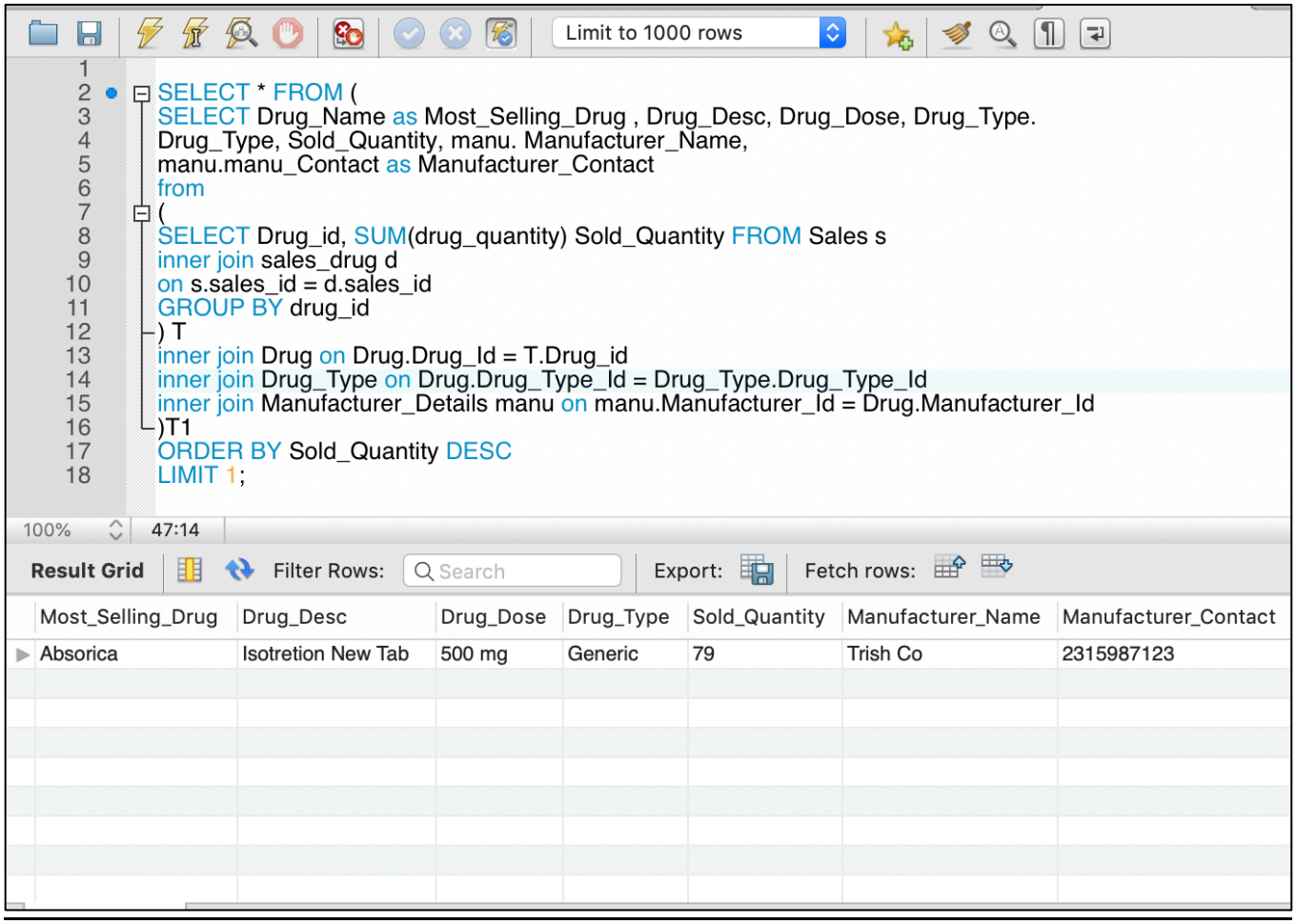


  Check if the drug is added to the drug table.



10. Data Analysis

Most Selling Drug: The most selling drug across all pharmacy based on the total quantity sold.



Most Successful Manufacturer: Based on the total sale of its drugs.