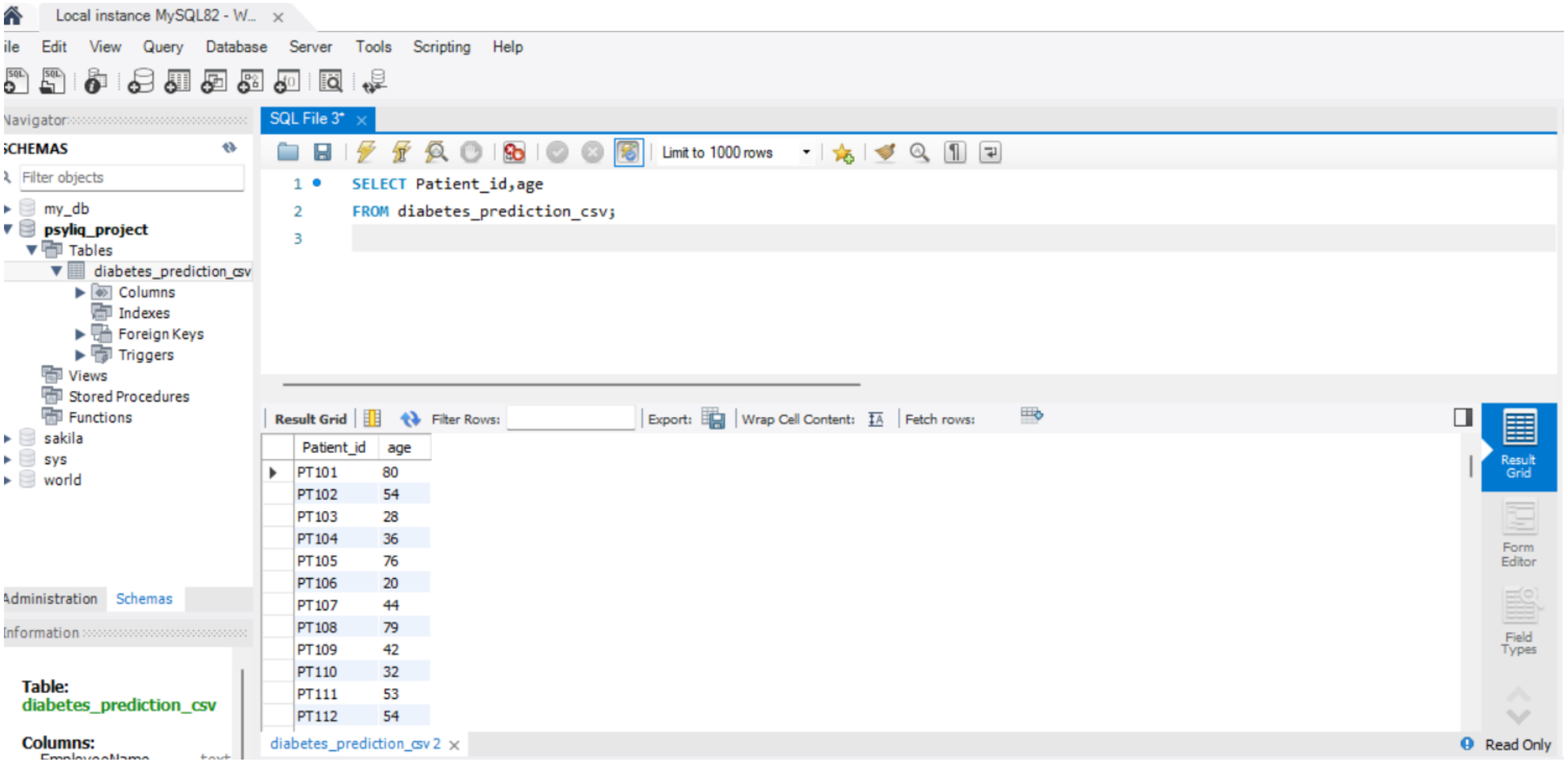
PSYLIQ

DIABETES PREDICTION

ARFA AFSHEEN

Retrieve the Patient_id and ages of all patients.



```sql
SELECT Patient_id,age
FROM diabetes_prediction_csv;
```

Patient_id	age
PT101	80
PT102	54
PT103	28
PT104	36
PT105	76
PT106	20
PT107	44
PT108	79
PT109	42
PT110	32
PT111	53
PT112	54

Table:
diabetes_prediction_csv

Columns:

Select all female patients who are older than 40

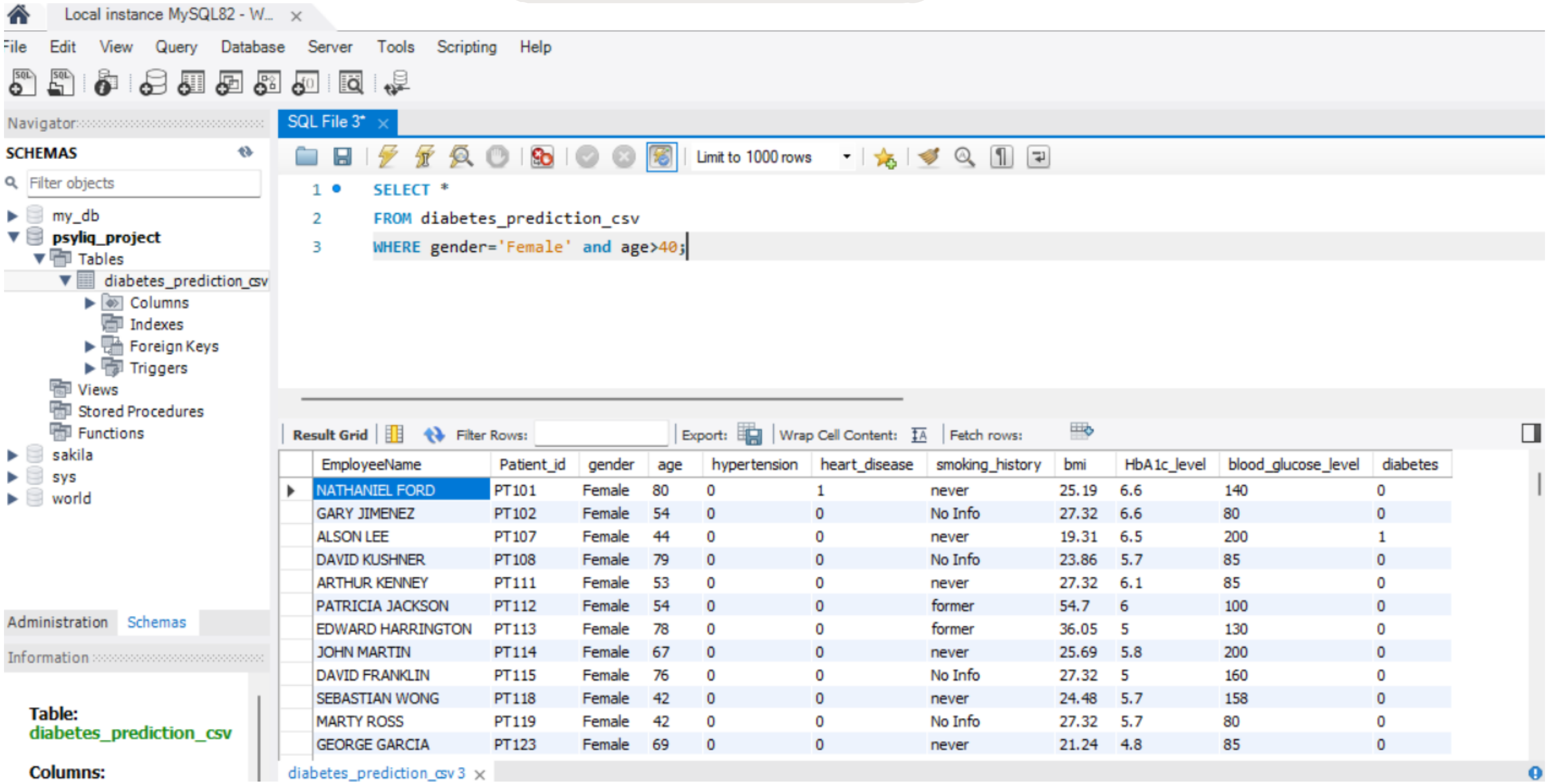


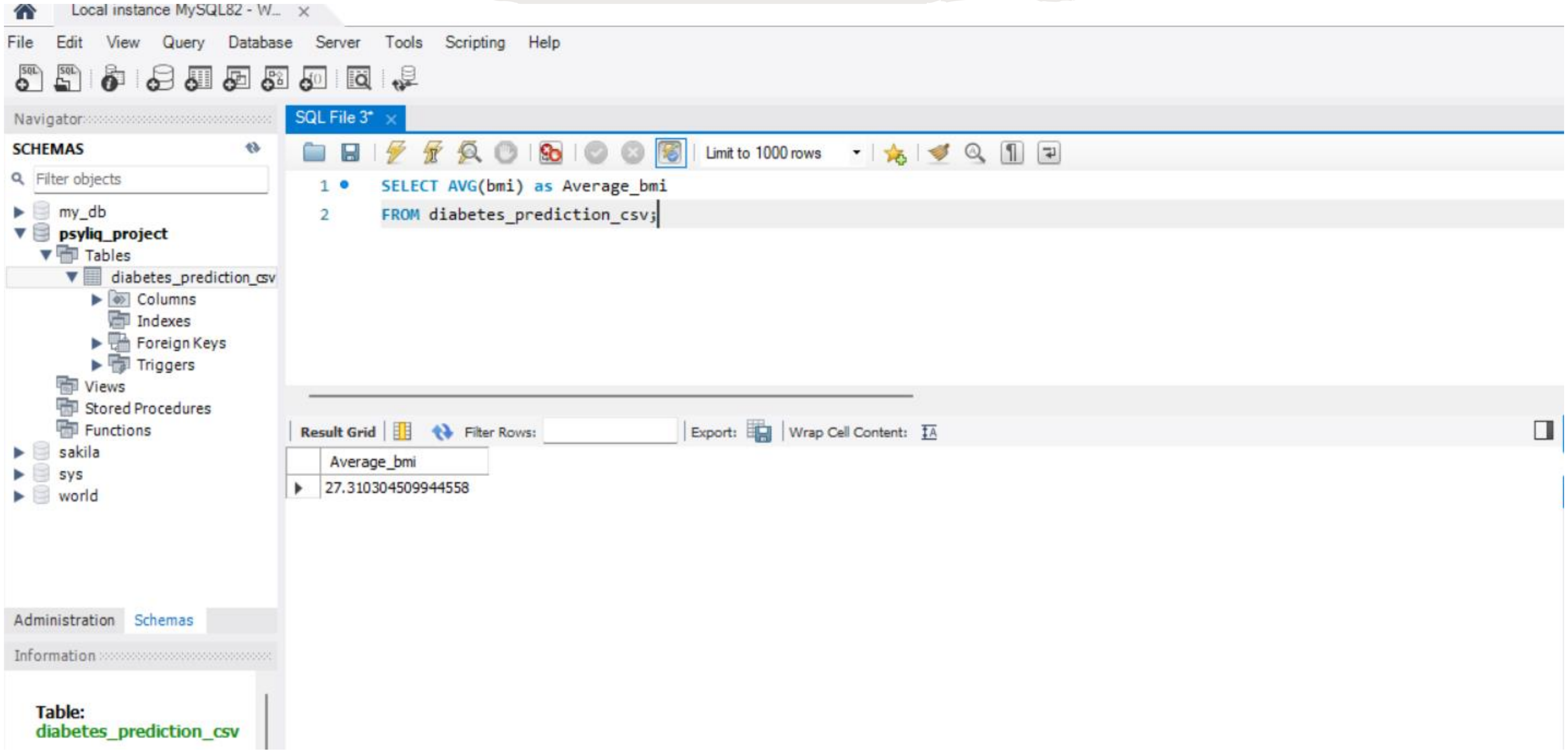
Table: diabetes_prediction_csv

Columns:

```sql
SELECT *
FROM diabetes_prediction_csv
WHERE gender='Female' and age>40;
```

EmployeeName	Patient_id	gender	age	hypertension	heart_disease	smoking_history	bmi	HbA1c_level	blood_glucose_level	diabetes
NATHANIEL FORD	PT101	Female	80	0	1	never	25.19	6.6	140	0
GARY JIMENEZ	PT102	Female	54	0	0	No Info	27.32	6.6	80	0
ALSON LEE	PT107	Female	44	0	0	never	19.31	6.5	200	1
DAVID KUSHNER	PT108	Female	79	0	0	No Info	23.86	5.7	85	0
ARTHUR KENNEY	PT111	Female	53	0	0	never	27.32	6.1	85	0
PATRICIA JACKSON	PT112	Female	54	0	0	former	54.7	6	100	0
EDWARD HARRINGTON	PT113	Female	78	0	0	former	36.05	5	130	0
JOHN MARTIN	PT114	Female	67	0	0	never	25.69	5.8	200	0
DAVID FRANKLIN	PT115	Female	76	0	0	No Info	27.32	5	160	0
SEBASTIAN WONG	PT118	Female	42	0	0	never	24.48	5.7	158	0
MARTY ROSS	PT119	Female	42	0	0	No Info	27.32	5.7	80	0
GEORGE GARCIA	PT123	Female	69	0	0	never	21.24	4.8	85	0

Calculate the average BMI of patients

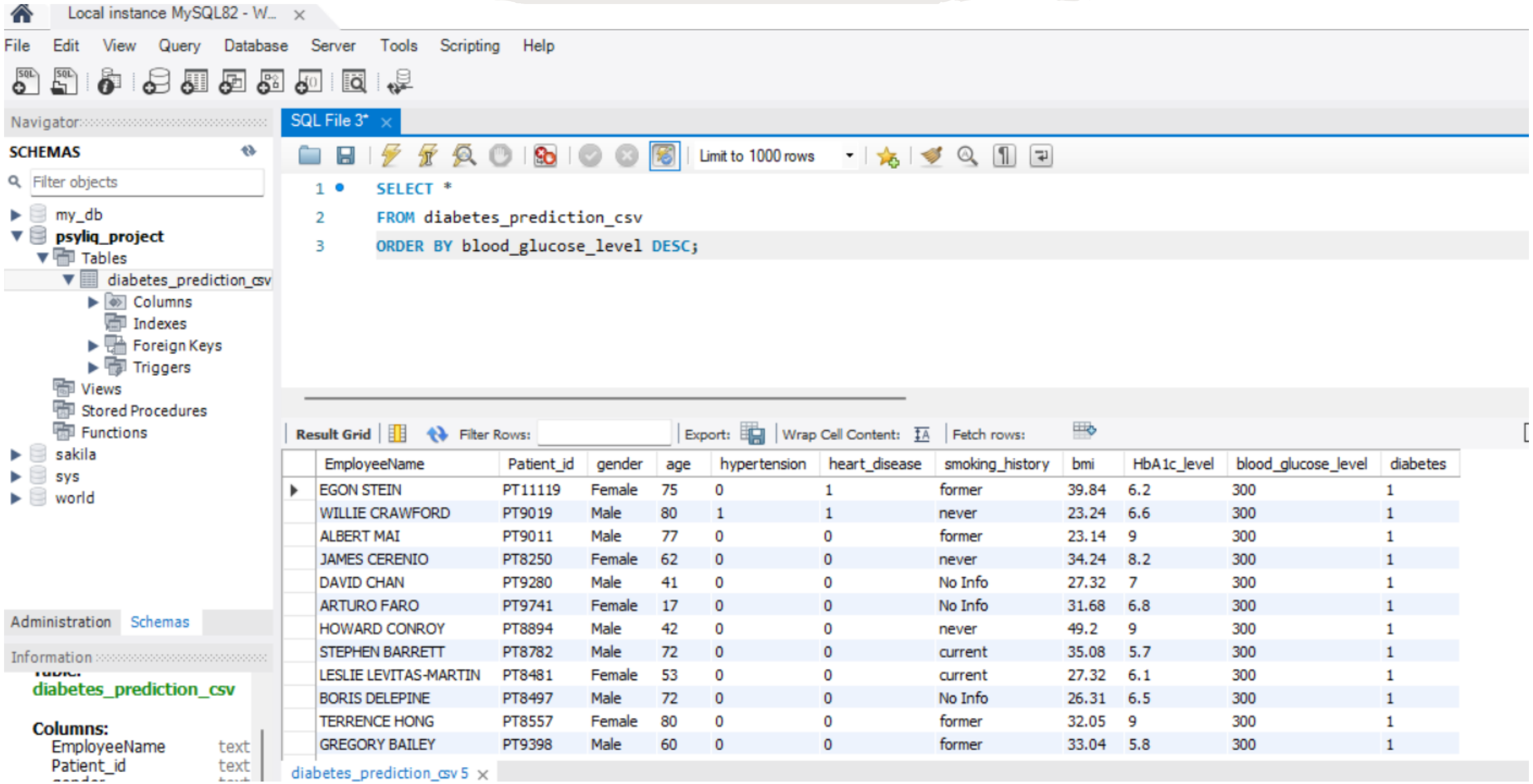


```sql
SELECT AVG(bmi) as Average_bmi
FROM diabetes_prediction_csv;
```

```
Average_bmi
27.310304509944558
```

Table:
diabetes_prediction_csv

List patients in descending order of blood glucose levels



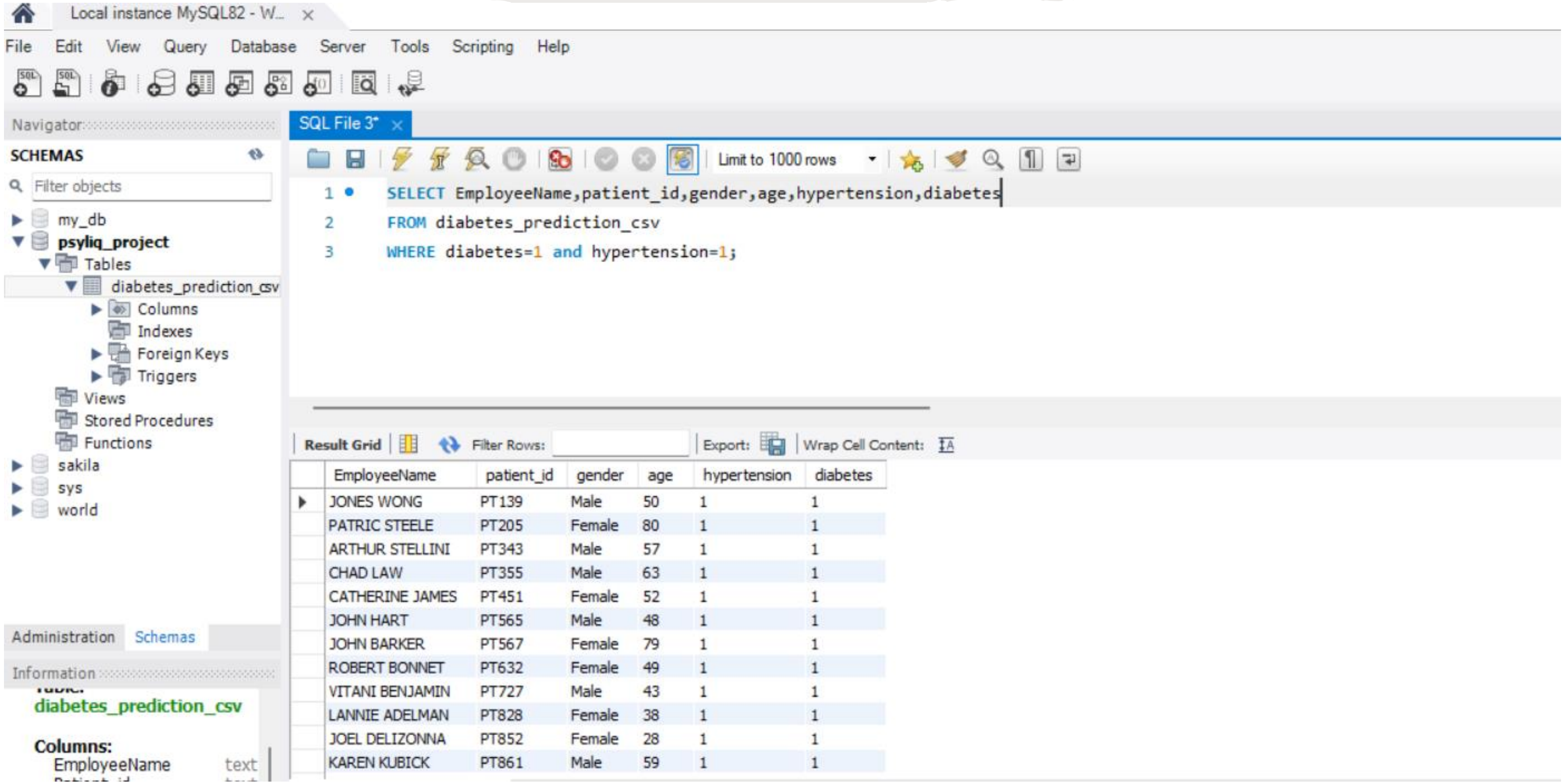
```
SELECT *
FROM diabetes_prediction_csv
ORDER BY blood_glucose_level DESC;
```

EmployeeName	Patient_id	gender	age	hypertension	heart_disease	smoking_history	bmi	HbA1c_level	blood_glucose_level	diabetes
EGON STEIN	PT11119	Female	75	0	1	former	39.84	6.2	300	1
WILLIE CRAWFORD	PT9019	Male	80	1	1	never	23.24	6.6	300	1
ALBERT MAI	PT9011	Male	77	0	0	former	23.14	9	300	1
JAMES CERENIO	PT8250	Female	62	0	0	never	34.24	8.2	300	1
DAVID CHAN	PT9280	Male	41	0	0	No Info	27.32	7	300	1
ARTURO FARO	PT9741	Female	17	0	0	No Info	31.68	6.8	300	1
HOWARD CONROY	PT8894	Male	42	0	0	never	49.2	9	300	1
STEPHEN BARRETT	PT8782	Male	72	0	0	current	35.08	5.7	300	1
LESLIE LEVITAS-MARTIN	PT8481	Female	53	0	0	current	27.32	6.1	300	1
BORIS DELEPINE	PT8497	Male	72	0	0	No Info	26.31	6.5	300	1
TERRENCE HONG	PT8557	Female	80	0	0	former	32.05	9	300	1
GREGORY BAILEY	PT9398	Male	60	0	0	former	33.04	5.8	300	1

Table:
diabetes_prediction_csv

Columns:
EmployeeName text
Patient_id text

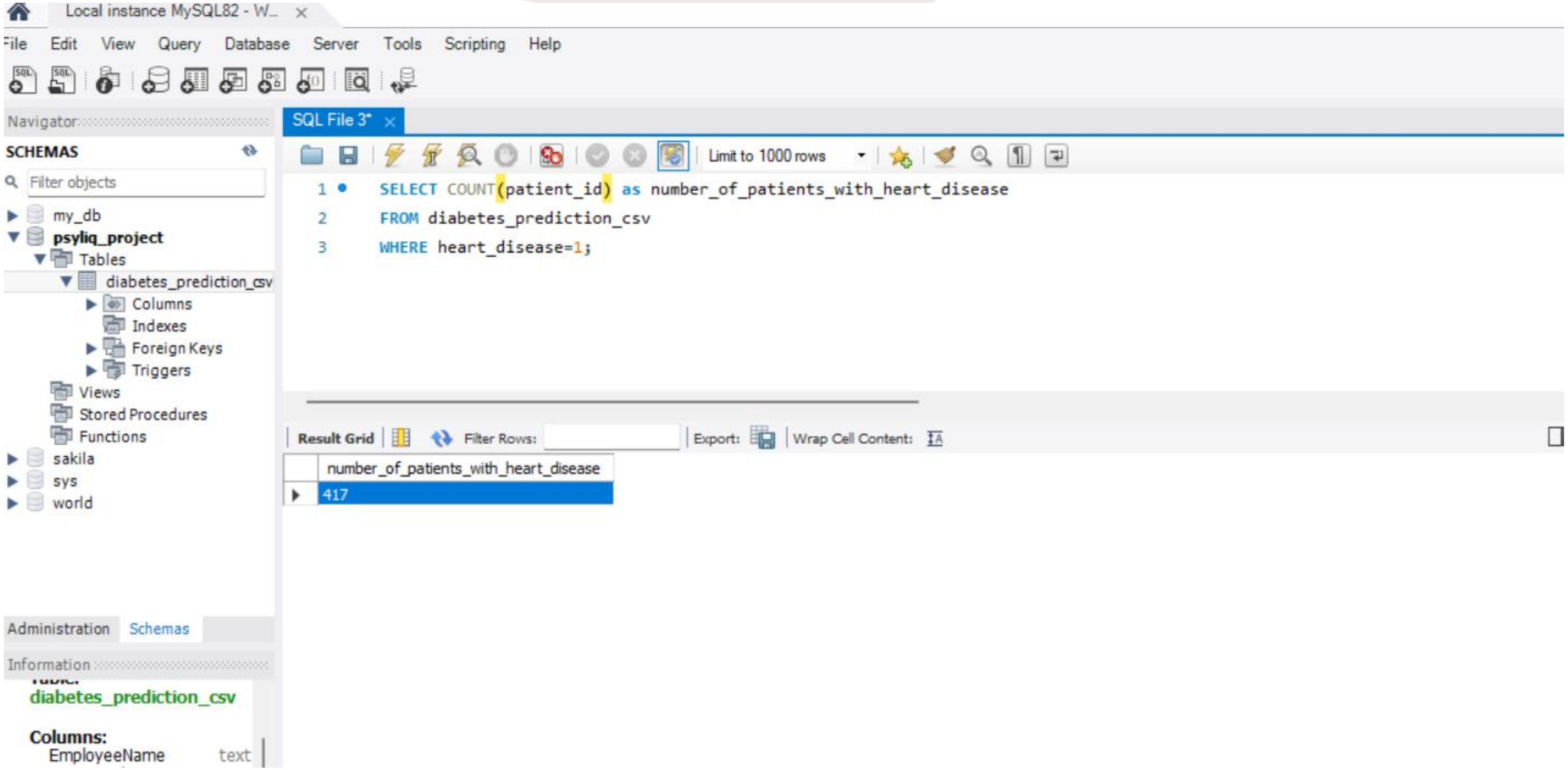
Find patients who have hypertension and diabetes



```sql
SELECT EmployeeName,patient_id,gender,age,hypertension,diabetes
FROM diabetes_prediction_csv
WHERE diabetes=1 and hypertension=1;
```

EmployeeName	patient_id	gender	age	hypertension	diabetes
JONES WONG	PT139	Male	50	1	1
PATRIC STEELE	PT205	Female	80	1	1
ARTHUR STELLINI	PT343	Male	57	1	1
CHAD LAW	PT355	Male	63	1	1
CATHERINE JAMES	PT451	Female	52	1	1
JOHN HART	PT565	Male	48	1	1
JOHN BARKER	PT567	Female	79	1	1
ROBERT BONNET	PT632	Female	49	1	1
VITANI BENJAMIN	PT727	Male	43	1	1
LANNIE ADELMAN	PT828	Female	38	1	1
JOEL DELIZONNA	PT852	Female	28	1	1
KAREN KUBICK	PT861	Male	59	1	1

Determine the number of patients with heart disease



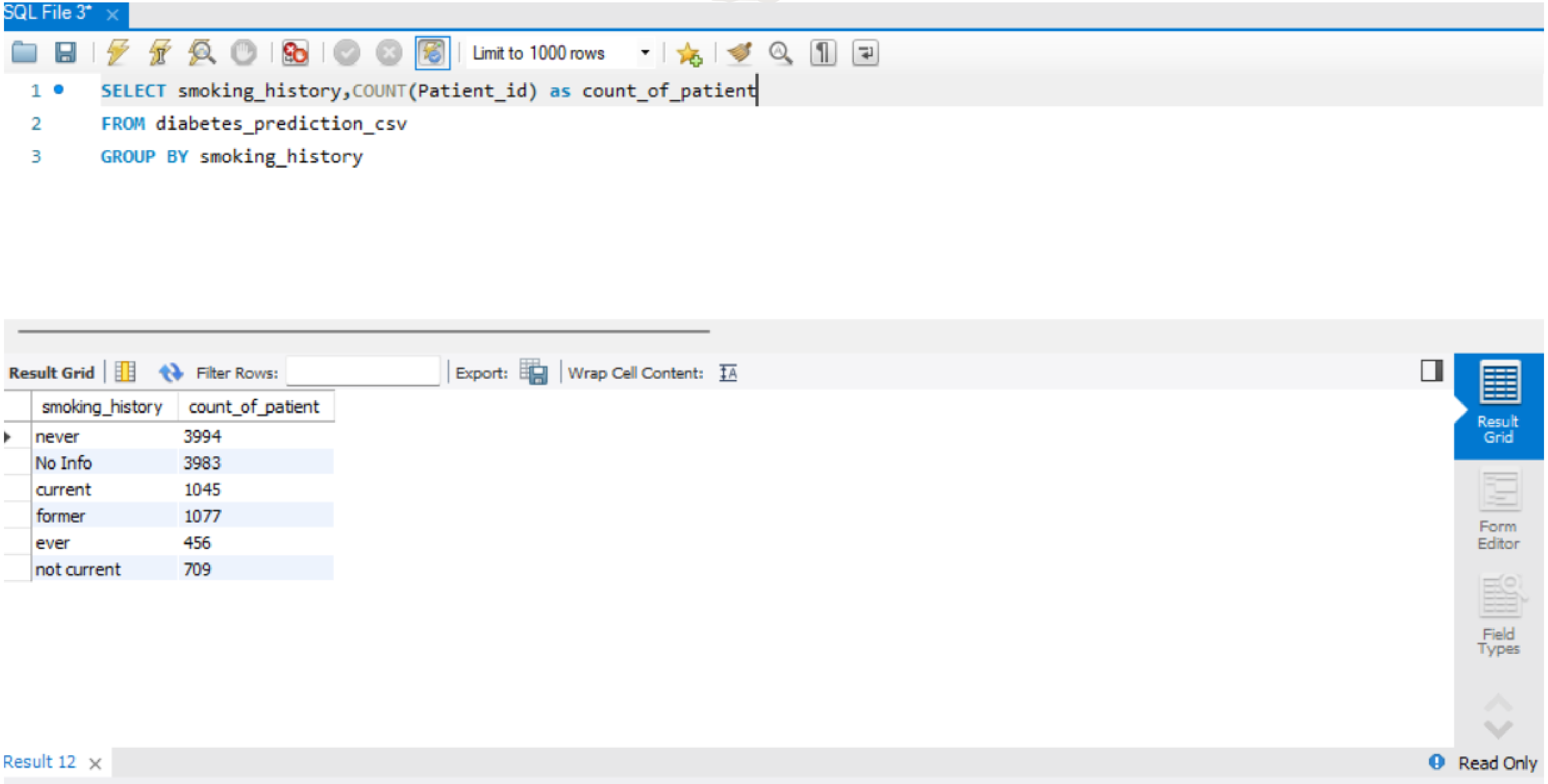
```
SELECT COUNT(patient_id) as number_of_patients_with_heart_disease
FROM diabetes_prediction_csv
WHERE heart_disease=1;
```

number_of_patients_with_heart_disease
417

Table:
diabetes_prediction_csv

Columns:
EmployeeName text

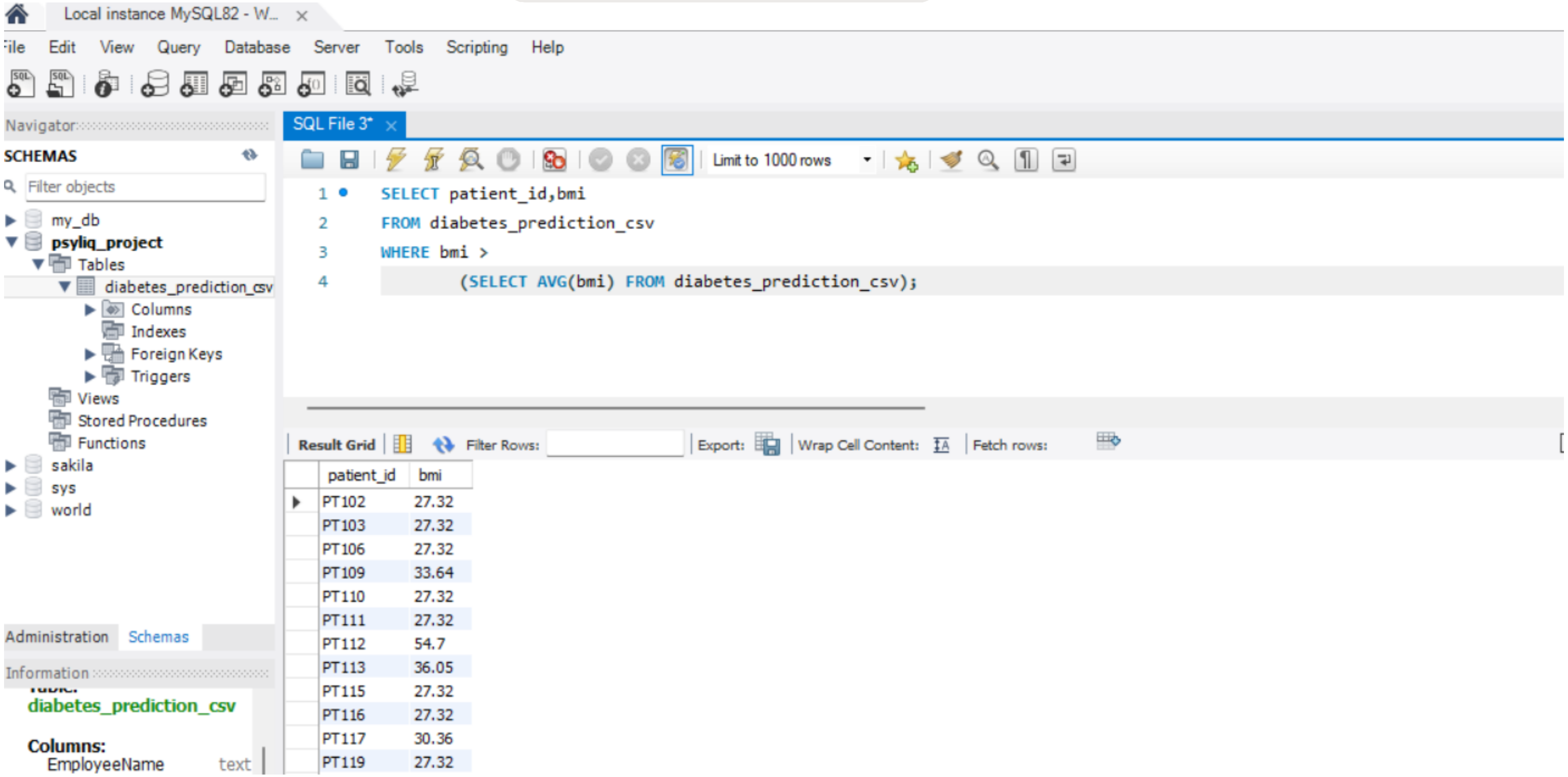
Group patients by smoking history and count how many smokers and non-smokers there are.



```sql
SELECT smoking_history,COUNT(Patient_id) as count_of_patient
FROM diabetes_prediction_csv
GROUP BY smoking_history
```

smoking_history	count_of_patient
never	3994
No Info	3983
current	1045
former	1077
ever	456
not current	709

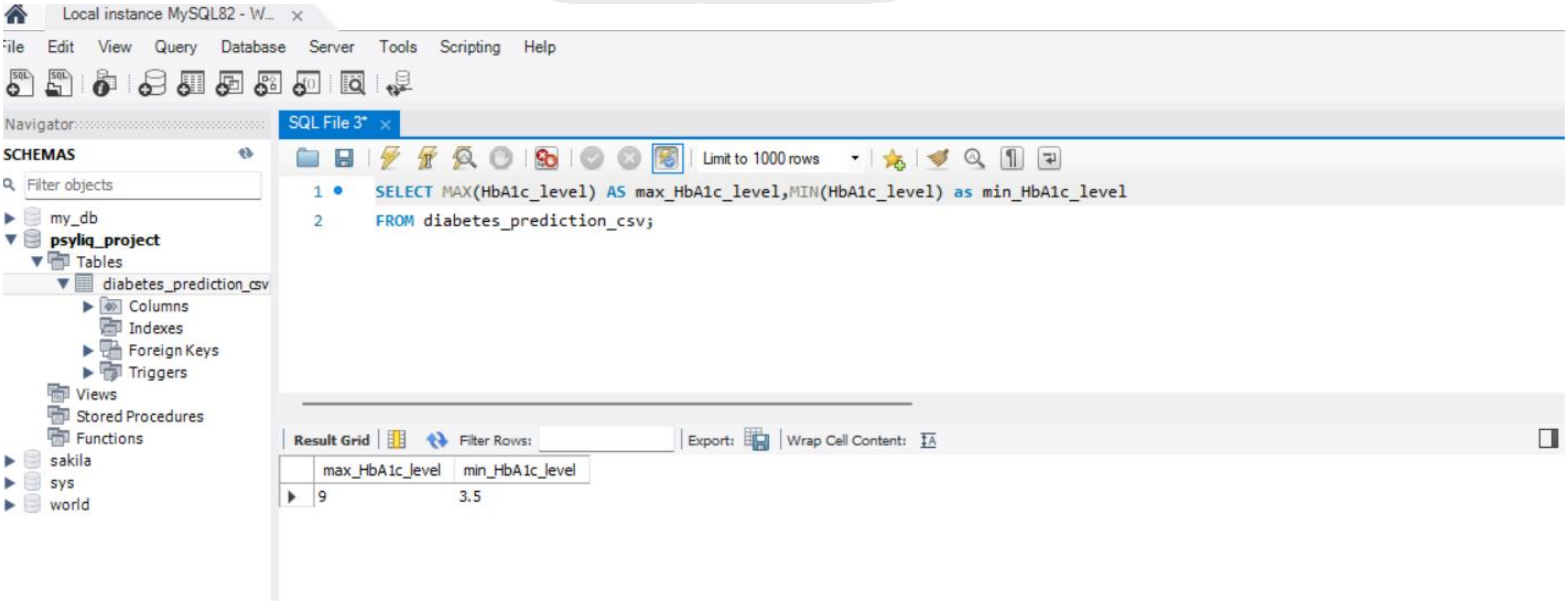
Retrieve the Patient_ids of patients who have a BMI greater than the average BMI



```sql
SELECT patient_id,bmi
FROM diabetes_prediction_csv
WHERE bmi >
        (SELECT AVG(bmi) FROM diabetes_prediction_csv);
```

patient_id	bmi
PT102	27.32
PT103	27.32
PT106	27.32
PT109	33.64
PT110	27.32
PT111	27.32
PT112	54.7
PT113	36.05
PT115	27.32
PT116	27.32
PT117	30.36
PT119	27.32

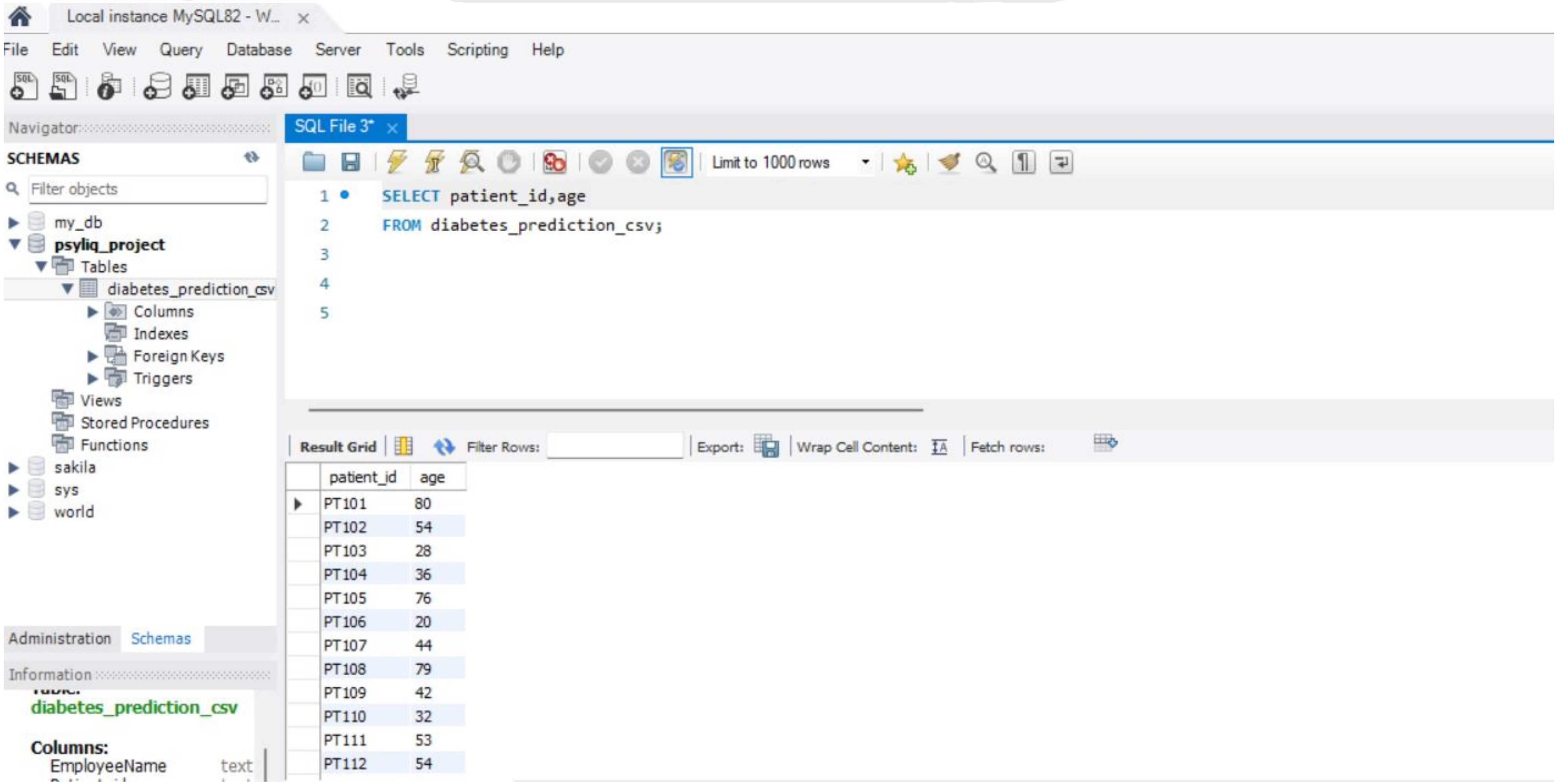
Find the patient with the highest HbA1c level and the patient with the lowest HbA1clevel



```sql
SELECT MAX(HbA1c_level) AS max_HbA1c_level,MIN(HbA1c_level) as min_HbA1c_level
FROM diabetes_prediction_csv;
```

max_HbA1c_level	min_HbA1c_level
9	3.5

Calculate the age of patients in years



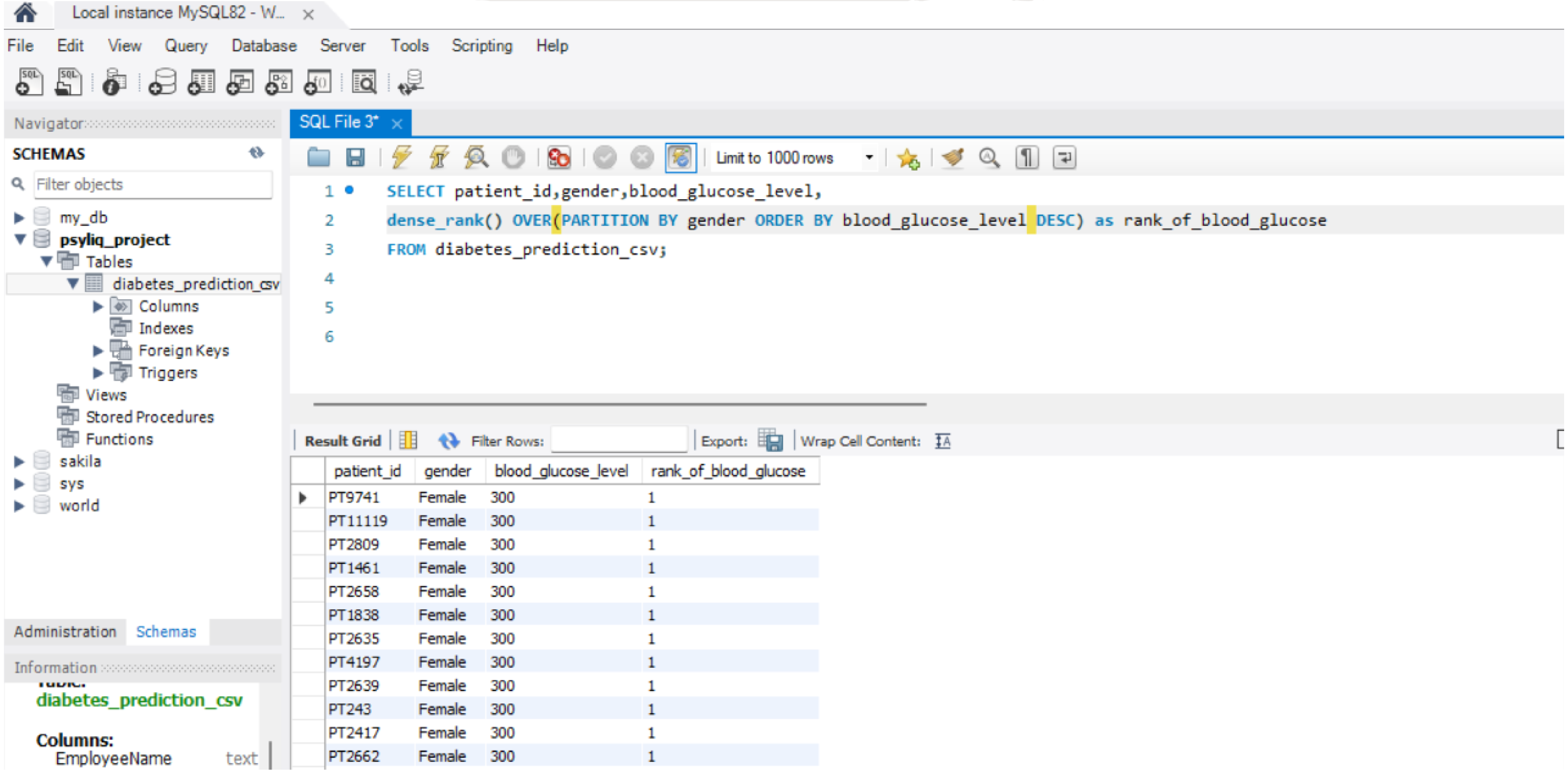
```sql
SELECT patient_id,age
FROM diabetes_prediction_csv;
```

patient_id	age
PT101	80
PT102	54
PT103	28
PT104	36
PT105	76
PT106	20
PT107	44
PT108	79
PT109	42
PT110	32
PT111	53
PT112	54

Table:
diabetes_prediction_csv

Columns:
EmployeeName text

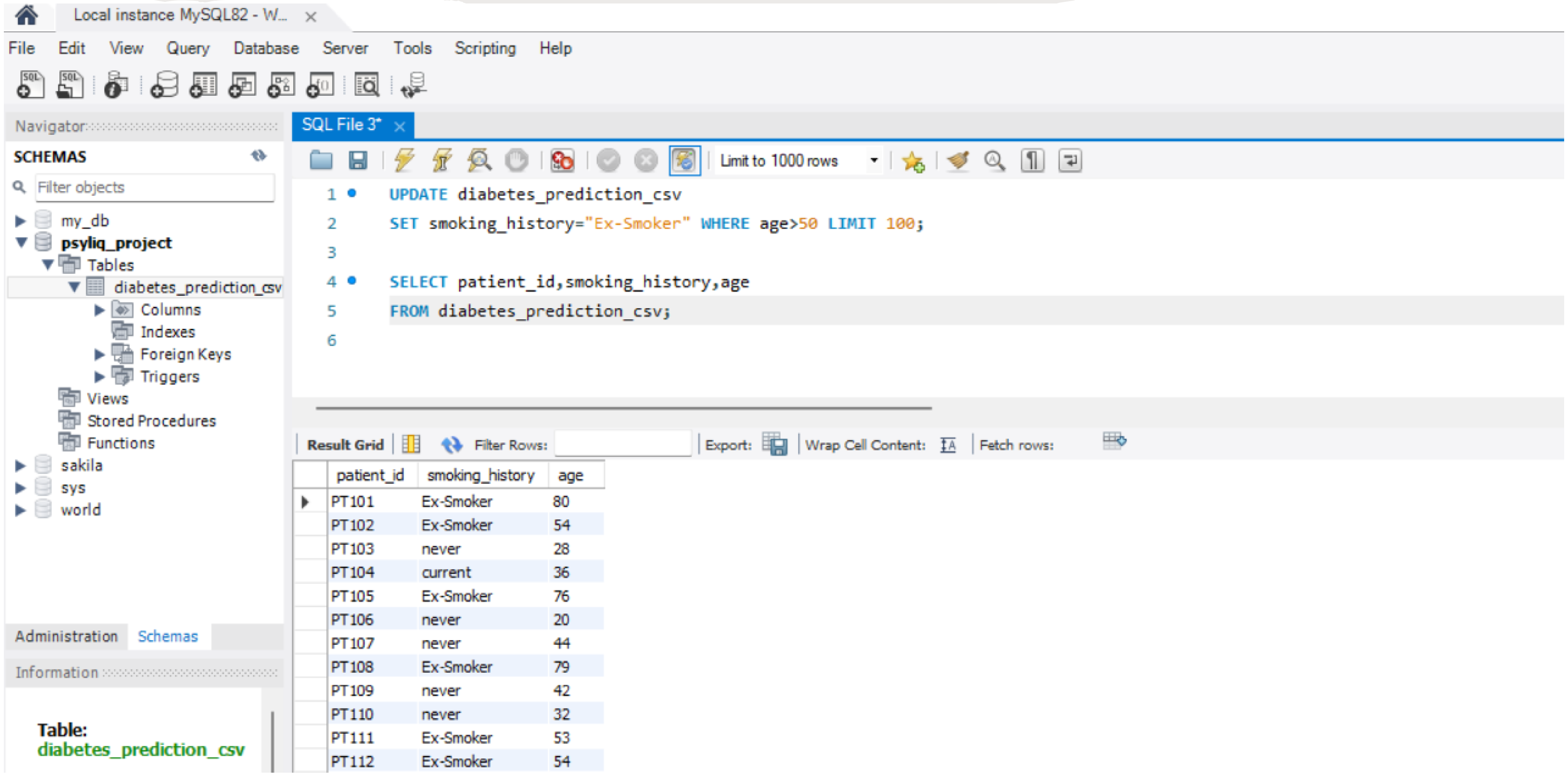
Rank patients by blood glucose level within each gender group



```sql
SELECT patient_id,gender,blood_glucose_level,
dense_rank() OVER(PARTITION BY gender ORDER BY blood_glucose_level DESC) as rank_of_blood_glucose
FROM diabetes_prediction_csv;
```

patient_id	gender	blood_glucose_level	rank_of_blood_glucose
PT9741	Female	300	1
PT11119	Female	300	1
PT2809	Female	300	1
PT1461	Female	300	1
PT2658	Female	300	1
PT1838	Female	300	1
PT2635	Female	300	1
PT4197	Female	300	1
PT2639	Female	300	1
PT243	Female	300	1
PT2417	Female	300	1
PT2662	Female	300	1

Update the smoking history of patients who are older than 50 to "Ex-smoker."



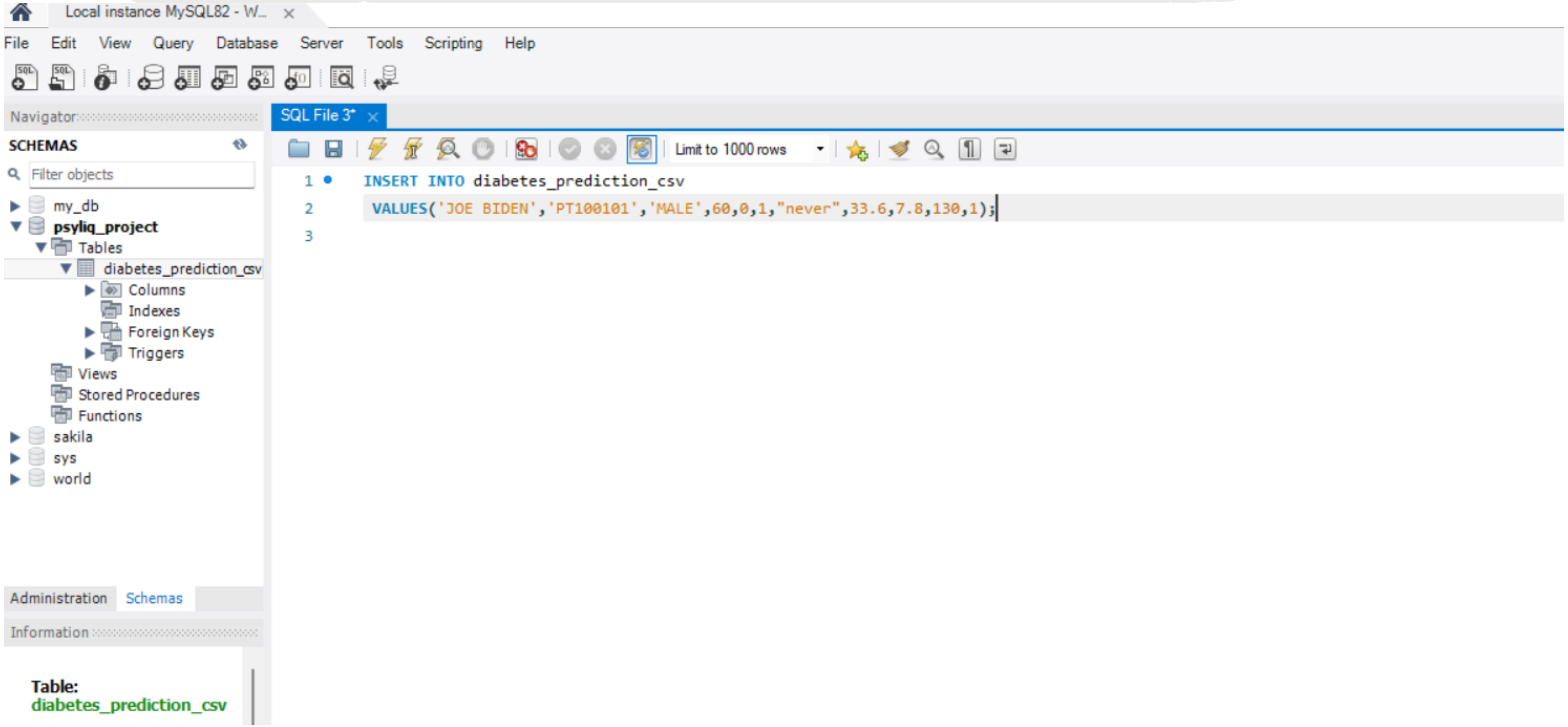
```
UPDATE diabetes_prediction_csv
SET smoking_history="Ex-Smoker" WHERE age>50 LIMIT 100;

SELECT patient_id,smoking_history,age
FROM diabetes_prediction_csv;
```

patient_id	smoking_history	age
PT101	Ex-Smoker	80
PT102	Ex-Smoker	54
PT103	never	28
PT104	current	36
PT105	Ex-Smoker	76
PT106	never	20
PT107	never	44
PT108	Ex-Smoker	79
PT109	never	42
PT110	never	32
PT111	Ex-Smoker	53
PT112	Ex-Smoker	54

Table:
diabetes_prediction_csv

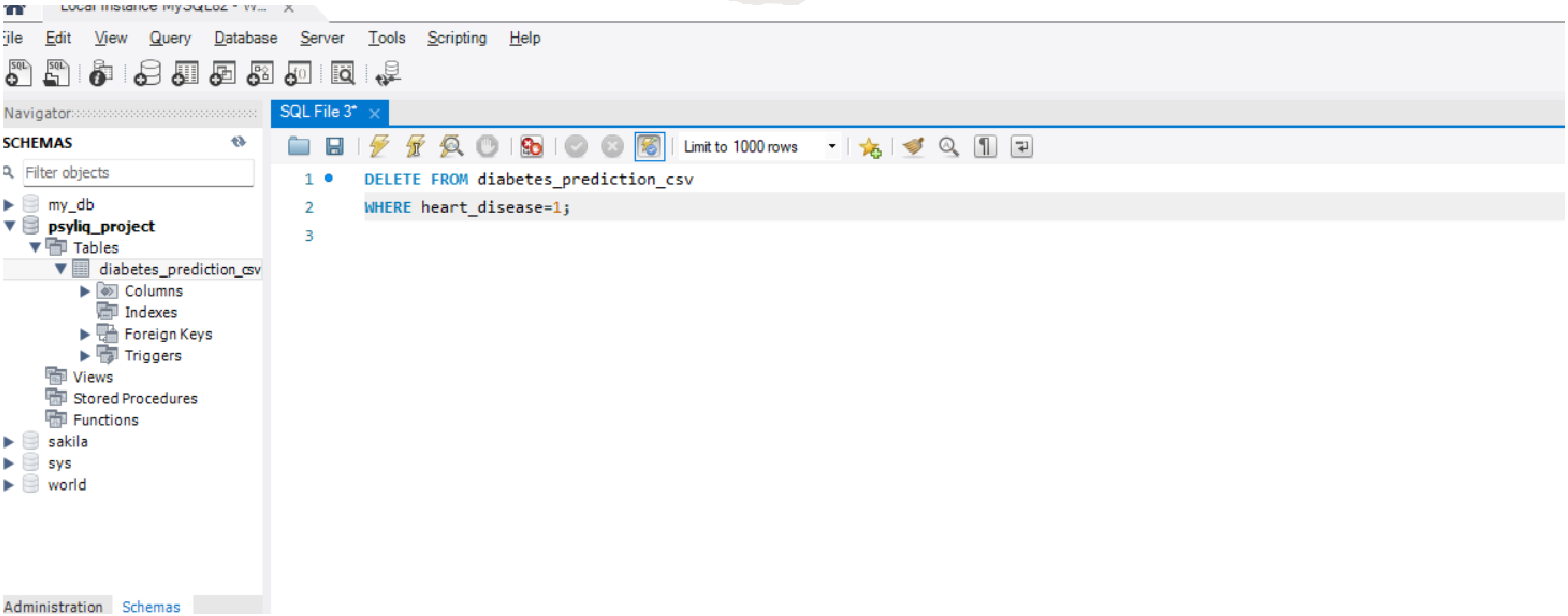
Insert a new patient into the database with sample data



```sql
INSERT INTO diabetes_prediction_csv
 VALUES('JOE BIDEN','PT100101','MALE',60,0,1,"never",33.6,7.8,130,1);
```

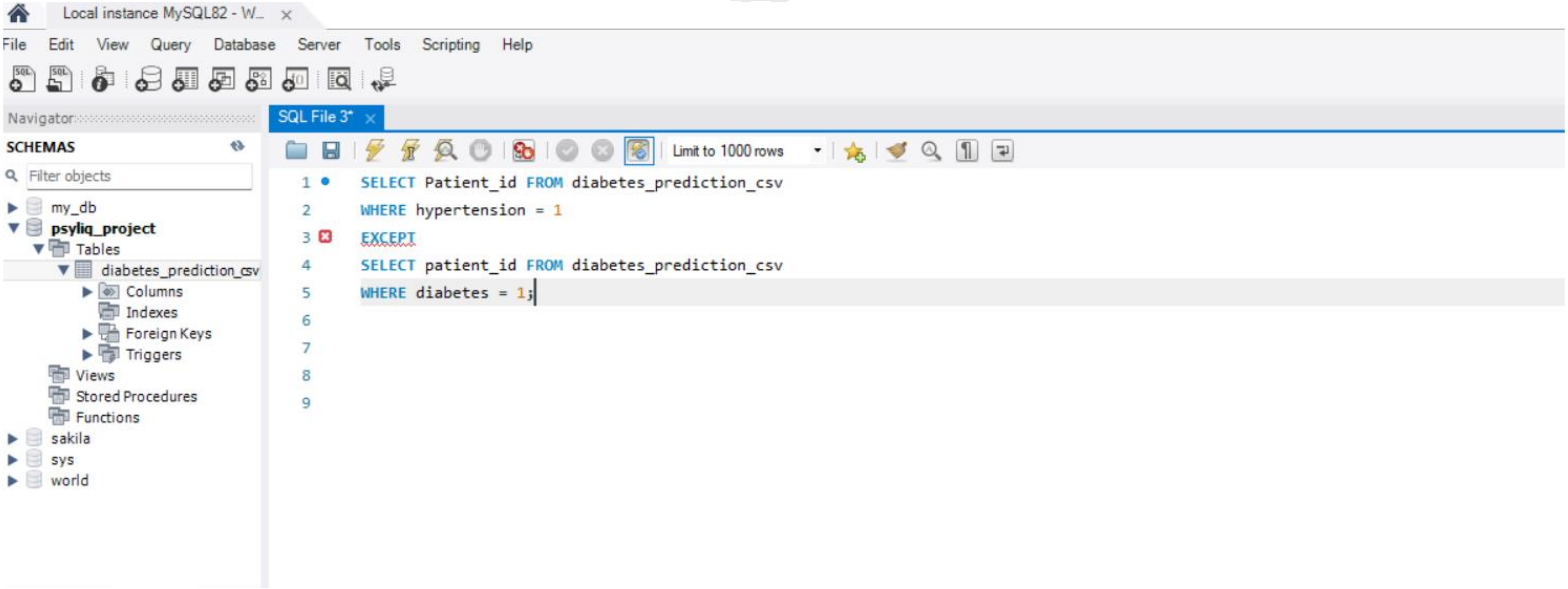
Table: diabetes_prediction_csv

Delete all patients with heart disease from the database.



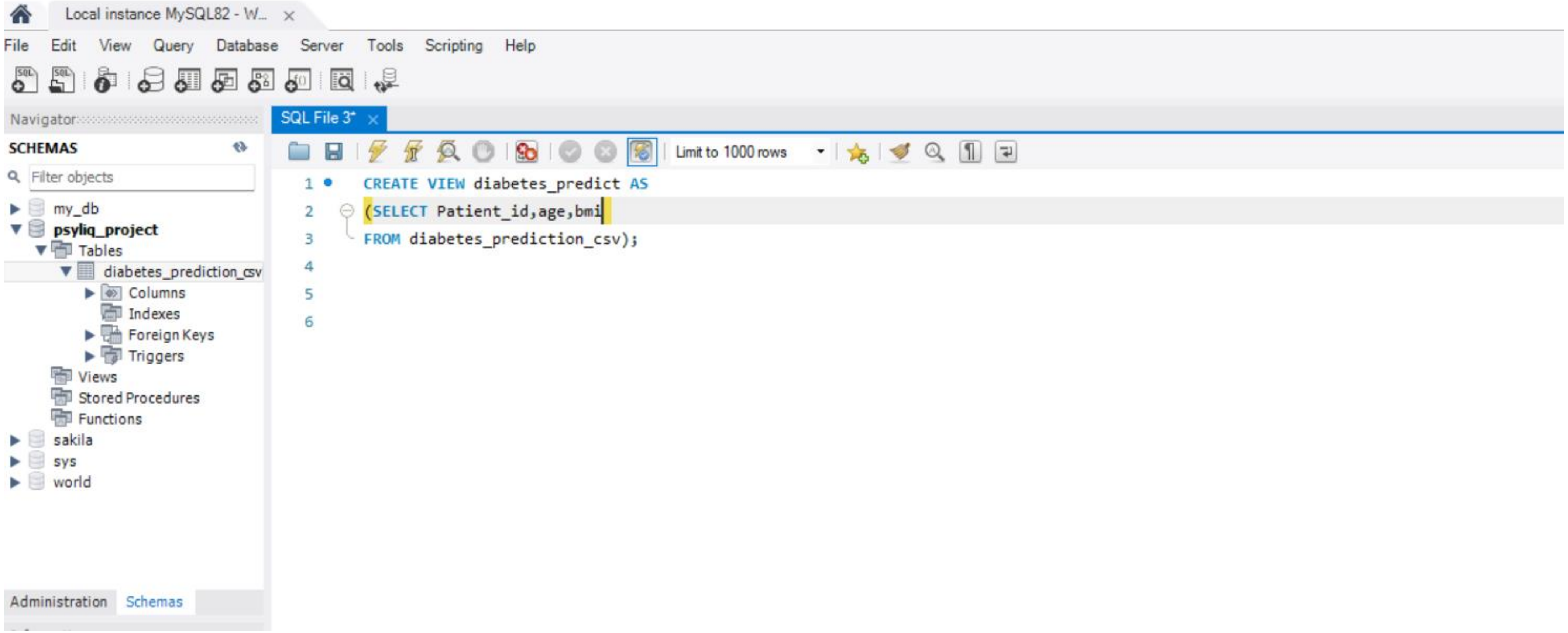
```sql
DELETE FROM diabetes_prediction_csv
WHERE heart_disease=1;
```

Find patients who have hypertension but not diabetes using the EXCEPT operator



```sql
SELECT Patient_id FROM diabetes_prediction_csv
WHERE hypertension = 1
EXCEPT
SELECT patient_id FROM diabetes_prediction_csv
WHERE diabetes = 1;
```

Create a view that displays the Patient_ids, ages, and BMI of patients



```
CREATE VIEW diabetes_predict AS
(SELECT Patient_id,age,bmi
FROM diabetes_prediction_csv);
```

Suggest improvements in the database schema to reduce data redundancy and improve data integrity.

- Moving employee’s name to another table and replacing them by employee id.
- Adding a table for the patient’s name, age, gender and other info, hence, removing them from data table.
- Using primary and foreign keys for patients, employees and general data.
- Setting up constraints such as unique, not null and check.

Explain how you can optimize the performance of SQL queries on this dataset

- Using correct data types.
- If there are frequently used columns, we can make use of indexing
- Writing simple queries and avoiding sub-queries.
- Avoiding the (SELECT *) queries and instead retrieving only necessary columns.