



Health Insurance Analytics

科技115 41171207H 林軒宇



Motivation

1. Analyze Key Factors Influencing Insurance Costs
2. Provide Data-Driven Insights into Health Behaviors
3. Present Data Insights Visually



Alteryx

Read the data

insurance.csv

Results - Input Data (6) - Output

7 of 7 Fields | Cell Viewer | 1,338 records displayed

Record	age	sex	bmi	children	smoker	region	charges
1	19	female	27.9	0	yes	southwest	16884.924
2	18	male	33.77	1	no	southeast	1725.5523
3	28	male	33	3	no	southeast	4449.462
4	33	male	22.705	0	no	northwest	21984.47061
5	32	male	28.88	0	no	northwest	3866.8552
6	31	female	25.74	0	no	southeast	3756.6216
7	46	female	33.44	1	no	southeast	8240.5896
8	37	female	27.74	3	no	northwest	7281.5056
9	37	male	29.83	2	no	northeast	6406.4107
10	60	female	25.84	0	no	northwest	28923.13692
11	25	male	26.22	0	no	northeast	2721.3208
12	62	female	26.29	0	yes	southeast	27808.7251
13	23	male	34.4	0	no	southwest	1826.843
14	56	female	39.82	0	no	southeast	11090.7178
15	27	male	42.13	0	yes	southeast	39611.7577

Check the data types

Options ▾

↑ ↓ ⓘ Search

	Column	Type	Size	Rename	Description
>	age	V_String	254		
	sex	V_String	254		
	bmi	Float	4		
	children	V_String	254		
	smoker	V_String	254		
	region	V_String	254		
	charges	Float	4		
	*Unknown	Unknown	0		Dynamic or U...

insurance.csv

The screenshot shows a data processing interface with a table of column types and a flow diagram below it.

The table has columns: Column, Type, Size, Rename, and Description. The rows show the following data:

- age: V_String, 254
- sex: V_String, 254
- bmi: Float, 4
- children: V_String, 254
- smoker: V_String, 254
- region: V_String, 254
- charges: Float, 4
- *Unknown: Unknown, 0, Dynamic or U...

The flow diagram consists of three nodes connected by arrows:

- A green book icon labeled "insurance.csv" is connected to a blue circular icon with a white line graph.
- The blue circular icon is connected to a blue rectangular frame containing a blue circular icon with a white line graph.

Filter normal weight and overweight

Select Basic or Custom Filter

Basic filter
bmi < 23

insurance.csv

Normal weight (BMI < 23)

Record	age	sex	bmi	children	smoker	region	charges
1	33	male	22.705	0	no	northwest	21984.47
2	23	male	17.385	1	no	northwest	2775.192
3	19	male	20.425	0	no	northwest	1625.434
4	26	male	20.8	0	no	southwest	2302.3
5	41	male	21.78	1	no	southeast	6272.477

Overweight (BMI > 23)

Record	age	sex	bmi	children	smoker	region	charges
1	19	female	27.9	0	yes	southwest	16884.92
2	18	male	33.77	1	no	southeast	1725.552
3	28	male	33	3	no	southeast	4449.462
4	32	male	28.88	0	no	northwest	3866.855
5	31	female	25.74	0	no	southeast	3756.622

Filter smokers and non-smokers.

Select Basic or Custom Filter

Basic filter

smoker Equals yes

```
graph LR; A[insurance.csv] --> B(( )); B --> C1{ }; C1 --> D1["[bmi] < 23"]; D1 --> E1{ }; E1 --> F1["[smoker] = 'yes'"]; E1 --> G1{ }; F1 --> G1; G1 --> H1[Smoker]; G1 --> H2[Non Smoker]
```

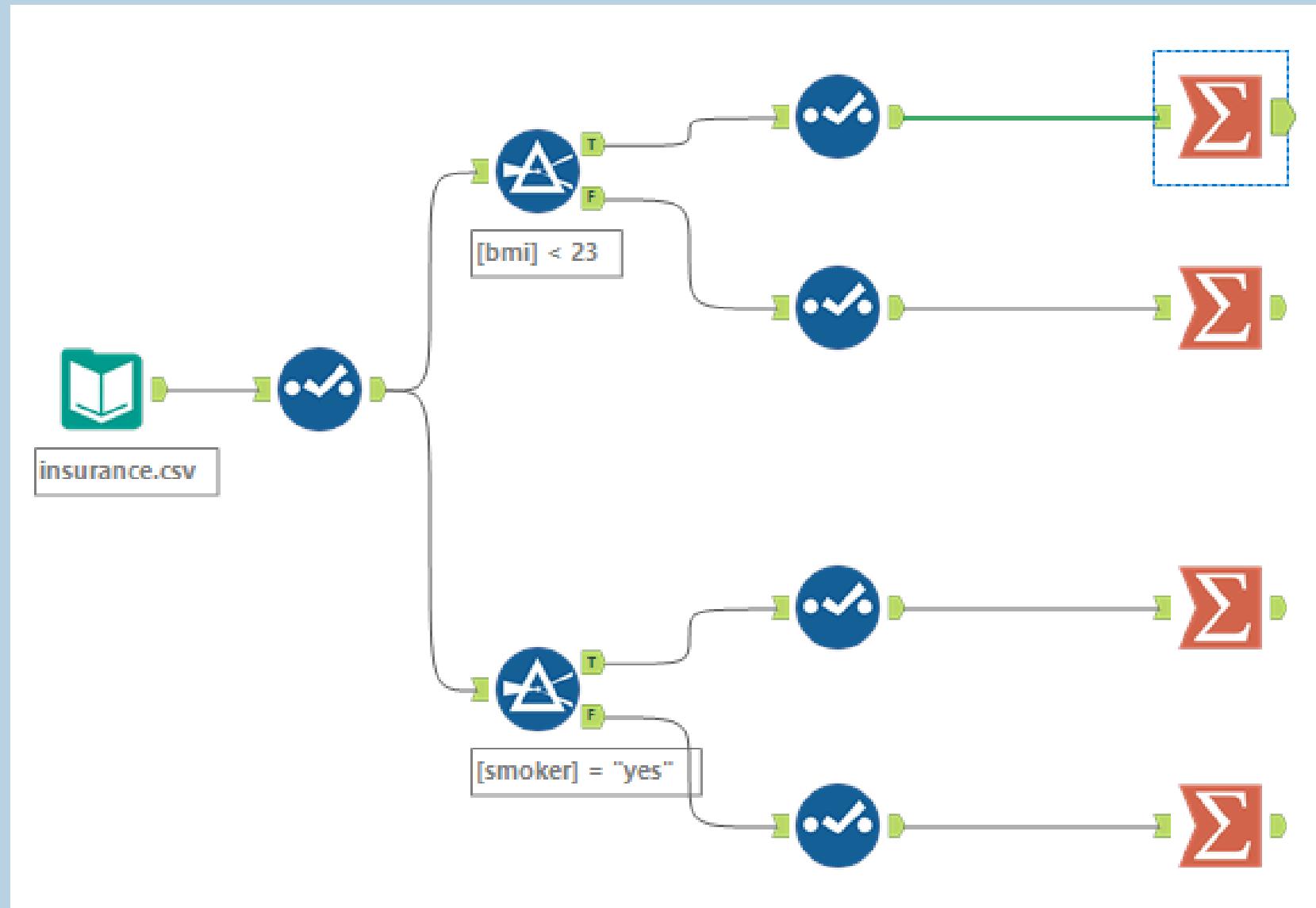
Record	age	sex	bmi	children	smoker	region	charges
1	19	female	27.9	0	yes	southwest	16884.92
2	62	female	26.29	0	yes	southeast	27808.72
3	27	male	42.13	0	yes	southeast	39611.76
4	30	male	35.3	0	yes	southwest	36837.47
5	34	female	31.92	1	yes	northeast	37701.88

Smoker

Record	age	sex	bmi	children	smoker	region	charges
1	18	male	33.77	1	no	southeast	1725.552
2	28	male	33	3	no	southeast	4449.462
3	33	male	22.705	0	no	northwest	21984.47
4	32	male	28.88	0	no	northwest	3866.855
5	31	female	25.74	0	no	southeast	3756.622

Non Smoker

Relationship between BMI, Smoking status and Average charges



Record	Normal_Bmi_Avg_charges
1	9531.423585

Avg charge for normal weight people

Record	Abnormal_Bmi_Avg_charges
1	13693.470363

Avg charge for overweight people

Record	Smoker_Avg_charges
1	32050.23178

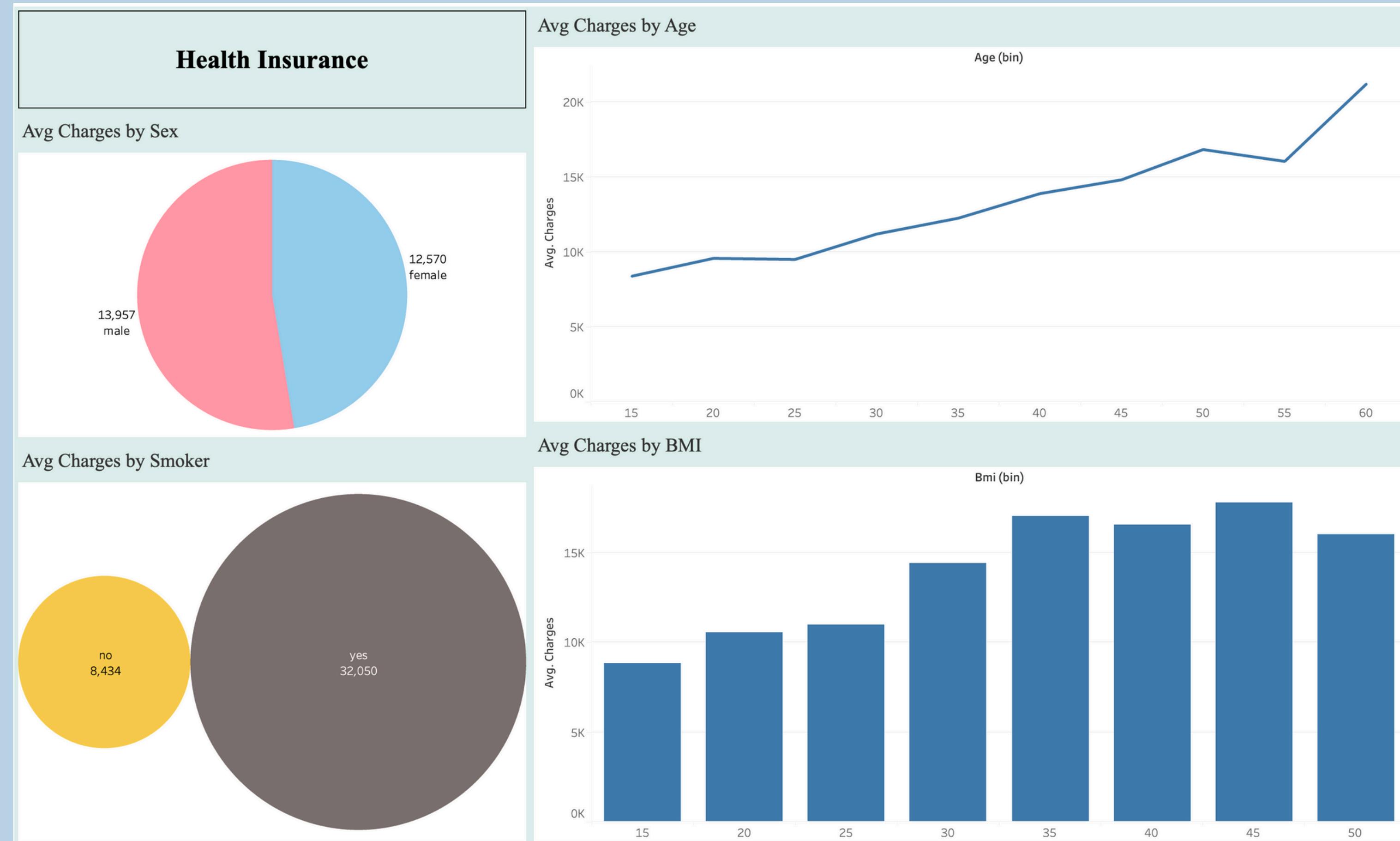
Avg charge for smoker

Record	Non_Smoker_Avg_charges
1	8434.268304

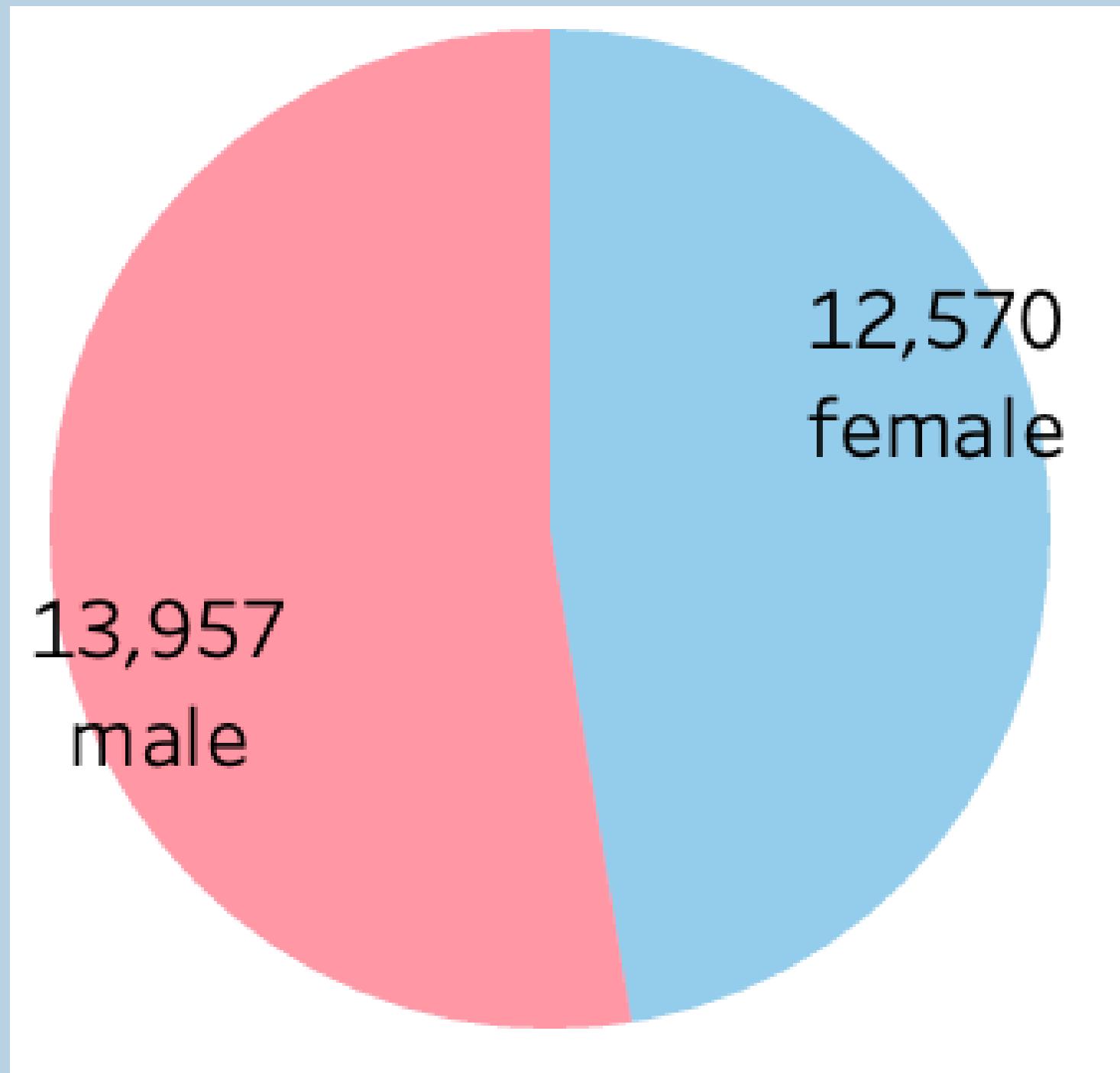
Avg charge for non-smoker

Data visualization using Tableau

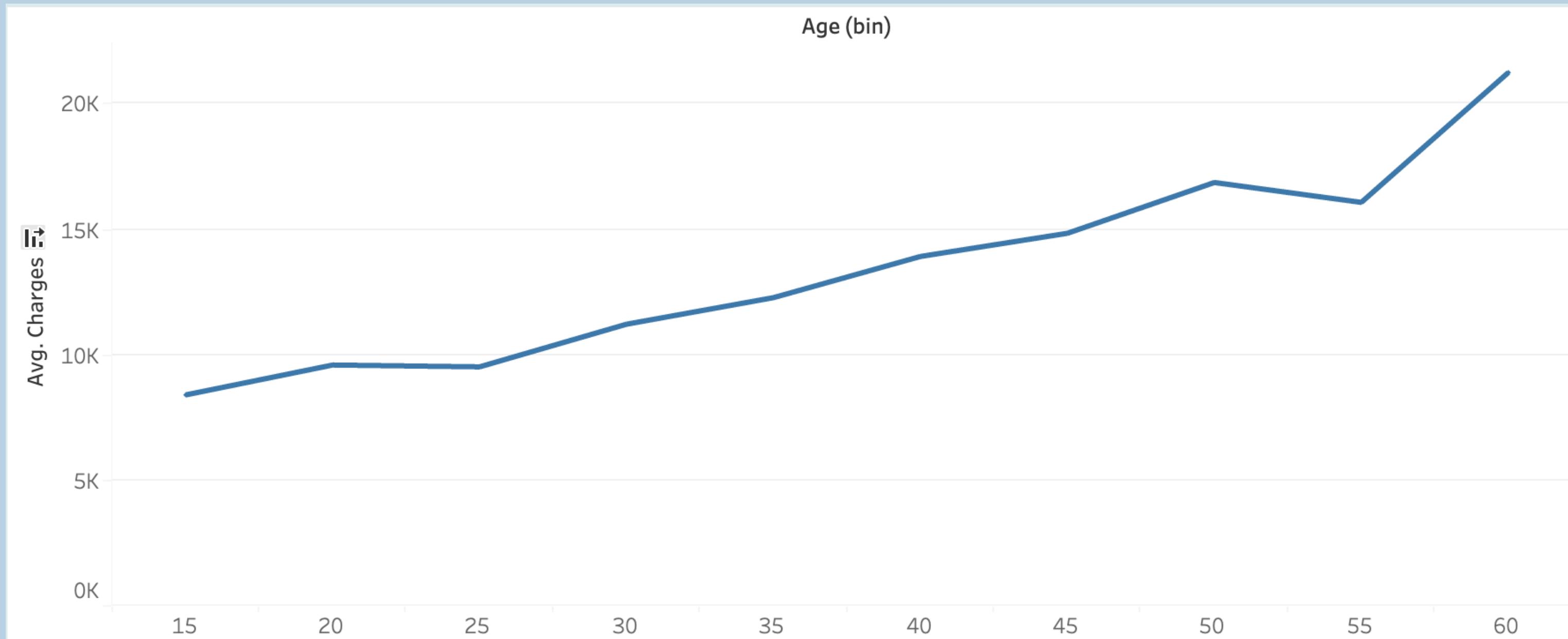
Tableau Dashboard



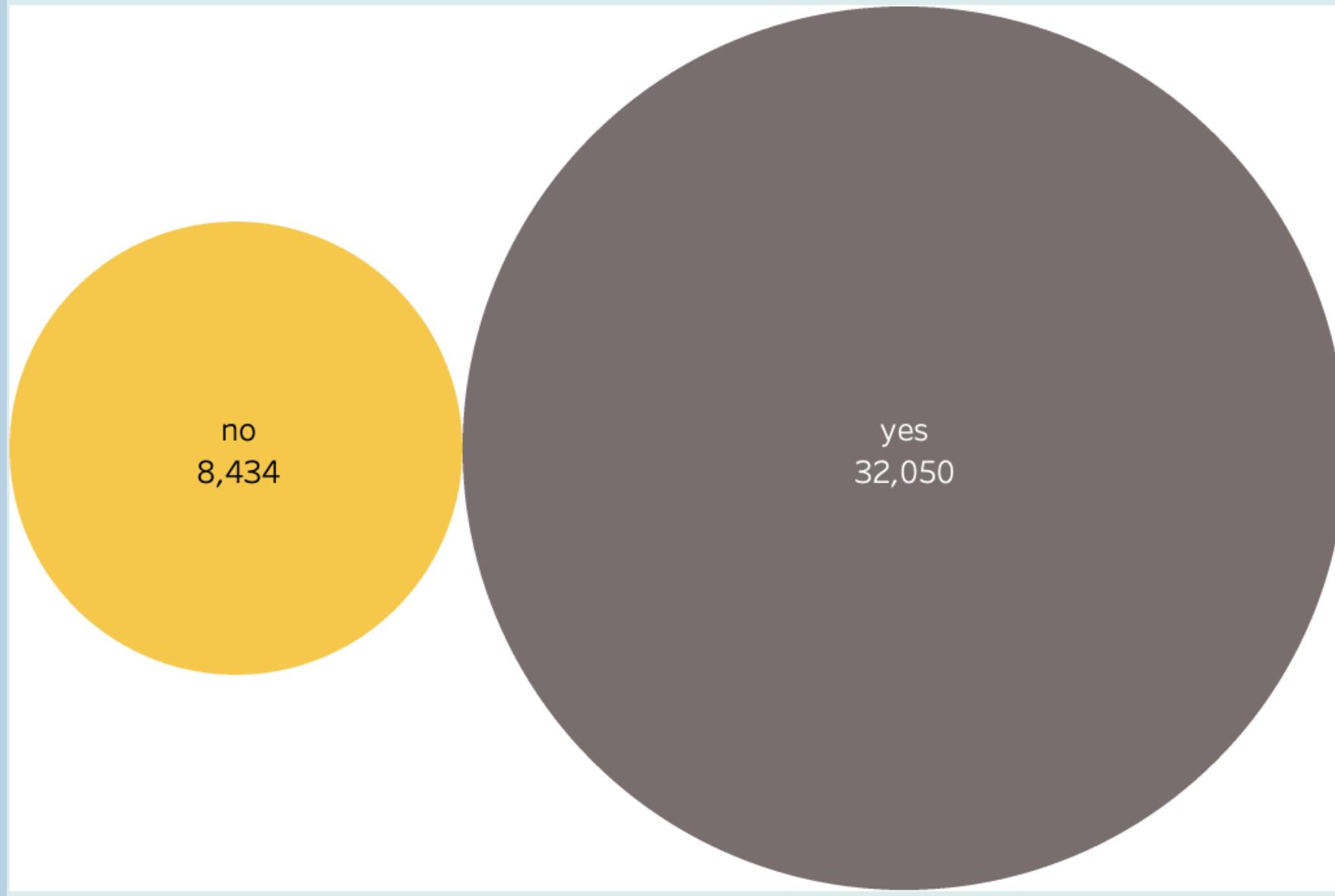
Average Charges by Gender



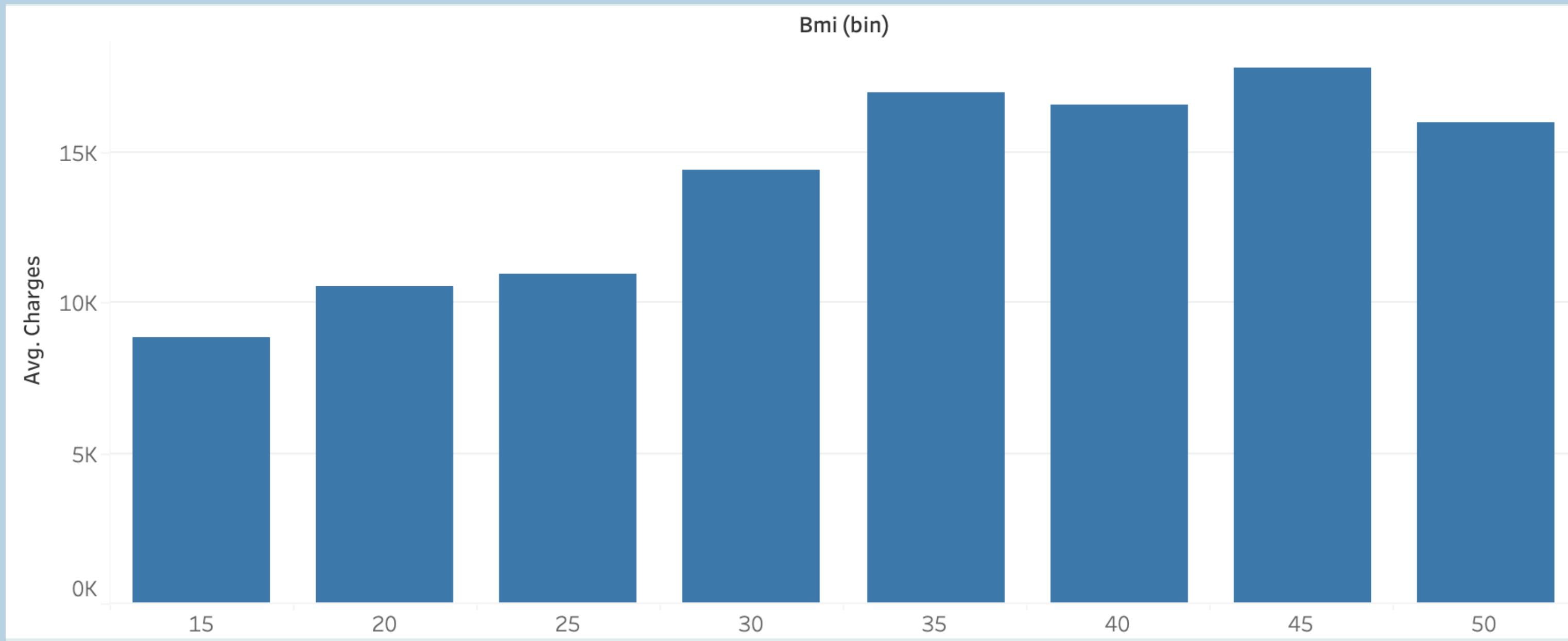
Average Charges by Age



Average Charges by Smoker



Average Charges by BMI



Conclusion

Body Mass Index and Insurance Charges

There is a noticeable relationship between BMI and average insurance charges. Overweight individuals tend to incur higher charges compared to individuals with normal weight.

Smoking Status and Insurance Costs

Smoking significantly impacts insurance charges. Smokers consistently face higher average costs compared to non-smokers, highlighting the influence of lifestyle choices on health expenses.

Visualization Insights

Gender, age, BMI, and smoking status are key variables impacting insurance charges. The data visualization provides a clear overview, helping stakeholders identify critical cost drivers and target areas for intervention.