In [43]:

```
import pandas as pd
import numpy as np
from sklearn.preprocessing import LabelEncoder
import matplotlib.pyplot as plt
import seaborn as sns
```

Выберем датасет по инсультам с Kaggle

In [34]:

```
df = pd.read_csv('healthcare-dataset-stroke-data.csv')
df.head(5)
```

Out[34]:

	id	gender	age	hypertension	heart_disease	ever_married	work_type	Residence_type	a
0	9046	Male	67.0	0	1	Yes	Private	Urban	
1	51676	Female	61.0	0	0	Yes	Self-employed	Rural	
2	31112	Male	80.0	0	1	Yes	Private	Rural	
3	60182	Female	49.0	0	0	Yes	Private	Urban	
4	1665	Female	79.0	1	0	Yes	Self-employed	Rural	

In [35]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5110 entries, 0 to 5109
Data columns (total 12 columns):
 #   Column             Non-Null Count  Dtype  
---  ------             --------------  -----  
 0   id                 5110 non-null   int64  
 1   gender             5110 non-null   object 
 2   age                5110 non-null   float64
 3   hypertension       5110 non-null   int64  
 4   heart_disease      5110 non-null   int64  
 5   ever_married       5110 non-null   object 
 6   work_type          5110 non-null   object 
 7   Residence_type     5110 non-null   object 
 8   avg_glucose_level  5110 non-null   float64
 9   bmi                4909 non-null   float64
 10  smoking_status     5110 non-null   object 
 11  stroke             5110 non-null   int64  
dtypes: float64(3), int64(4), object(5)
memory usage: 479.2+ KB
```

Проведем обнаружение и удаление выбросов на основе 5% и 95% квантилей для признака avg_glucose_level

In [36]:

```
min = np.percentile(df.avg_glucose_level, 5)
max = np.percentile(df.avg_glucose_level, 95)
```

In [37]:

```
df = df[(df.avg_glucose_level > min) & (df.avg_glucose_level < max)]
```

Сделаем LabelEncoding для признака gender

In [38]:

```
df = df[ df.gender != 'Other']  # сбросим одно значение с неизвестным полом
print(df.gender.unique())
```

```
['Female' 'Male']
```

In [39]:

```
le = LabelEncoder()
df['gender'] = le.fit_transform(df.gender)
df.gender
```

Out[39]:

```
1       0
2       1
3       0
4       0
5       1
       ..
5105    0
5106    0
5107    0
5108    1
5109    0
Name: gender, Length: 4597, dtype: int64
```

Построим ViolinPlot ависимости целевого признака от среднего уровня глюкоза

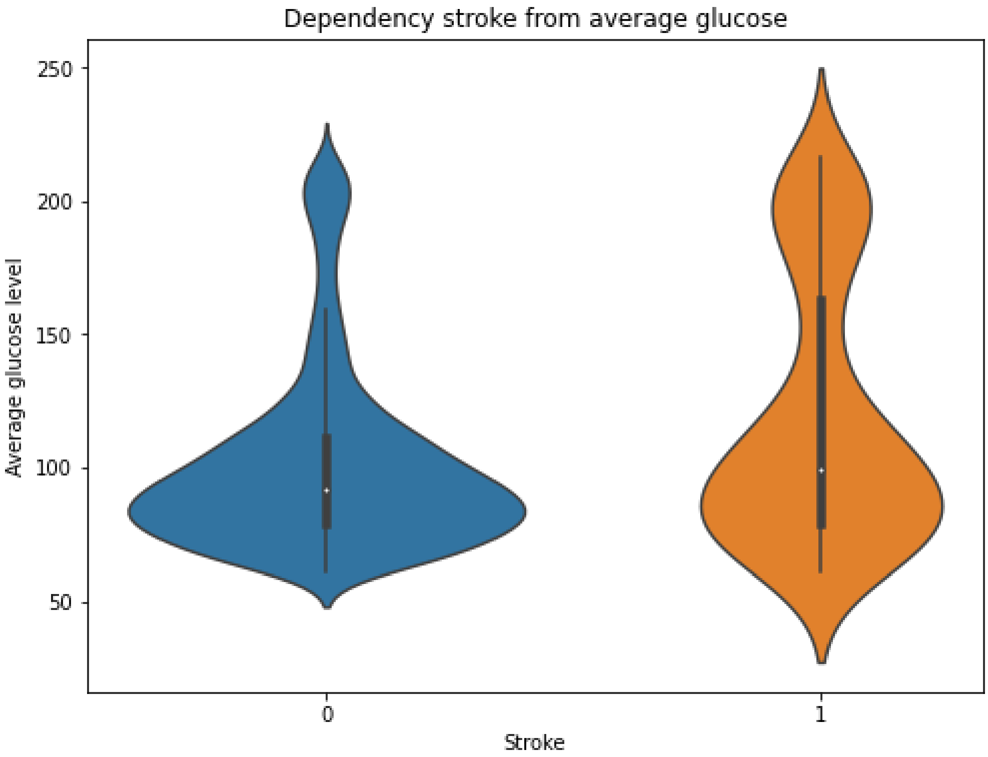
In [45]:

```
plt.figure(figsize=(8, 6))
ax = sns.violinplot(df.stroke, df.avg_glucose_level)
ax.set(xlabel='Stroke', ylabel='Average glucose level', title='Dependency str
plt.plot()
```

```
/usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43: FutureWarni
ng: Pass the following variables as keyword args: x, y. From version 0.12, th
e only valid positional argument will be `data`, and passing other arguments
without an explicit keyword will result in an error or misinterpretation.
  FutureWarning
```

Out[45]:

```
[]
```


Dependency stroke from average glucose
Average glucose level
250
200
150
100
50
0
1
Stroke