

# MEXIMORS

NEWS

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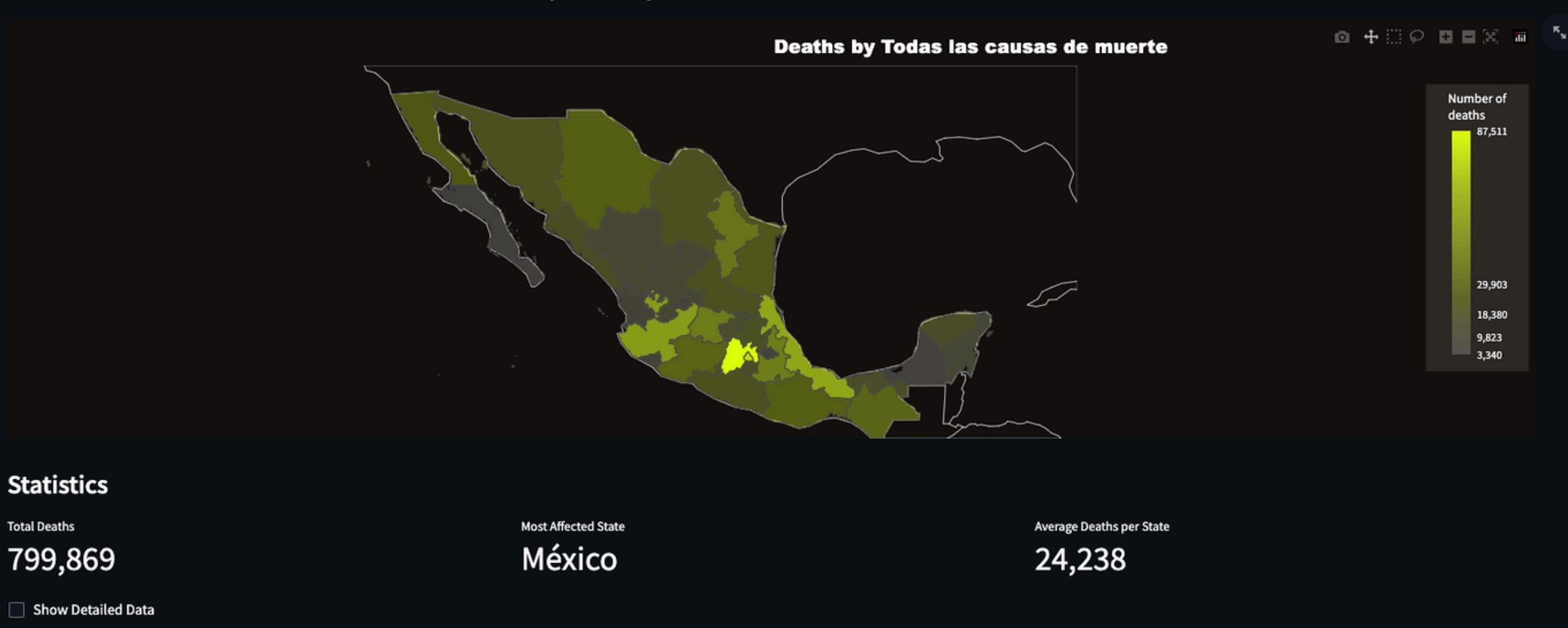
# DEATHS

799,869

Was the Number of Deaths  
reported in Mexico



## Deaths Distribution in Mexico (2023)

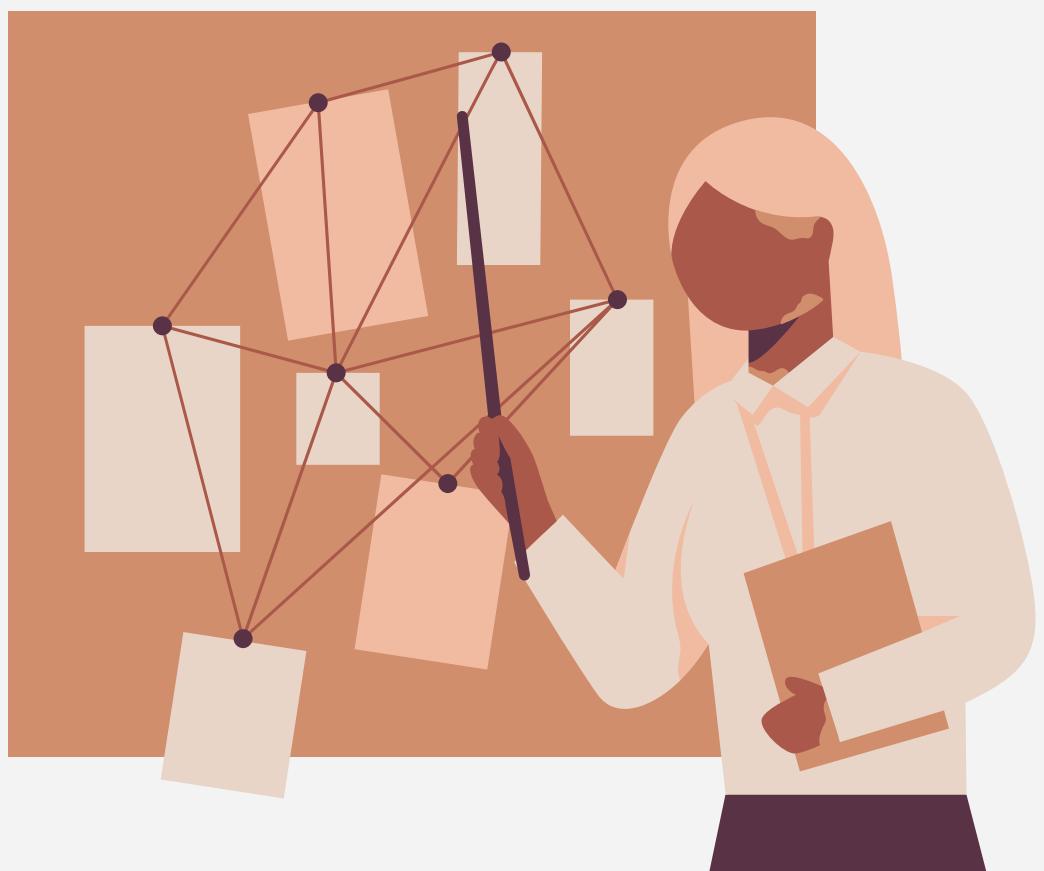


# PREDICTING DEATH WITH ML

A Mexico where data-driven insights lead to effective public health policies, reduced mortality rates, and enhanced quality of life for all citizens through better understanding and proactive measures.

- Predictive model
- Faster analysis
- Promote preventive measures through data insights

Why do people die in mexico?



MODEL

# MPD – MODELO PREDICTOR DEFUNCIÓN

Identify the cause of death given significant features  
of the individual.

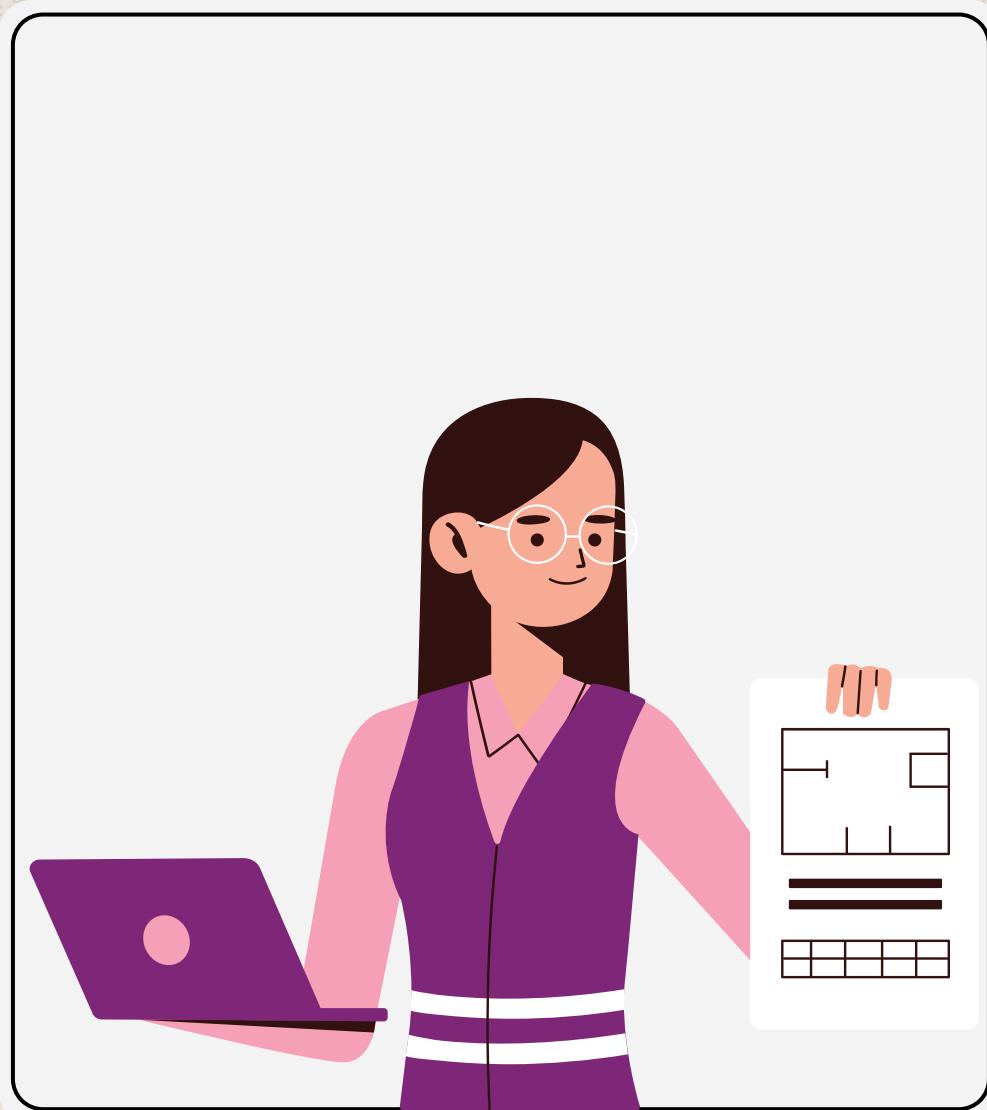
# MODEL FEATURES



GENDER

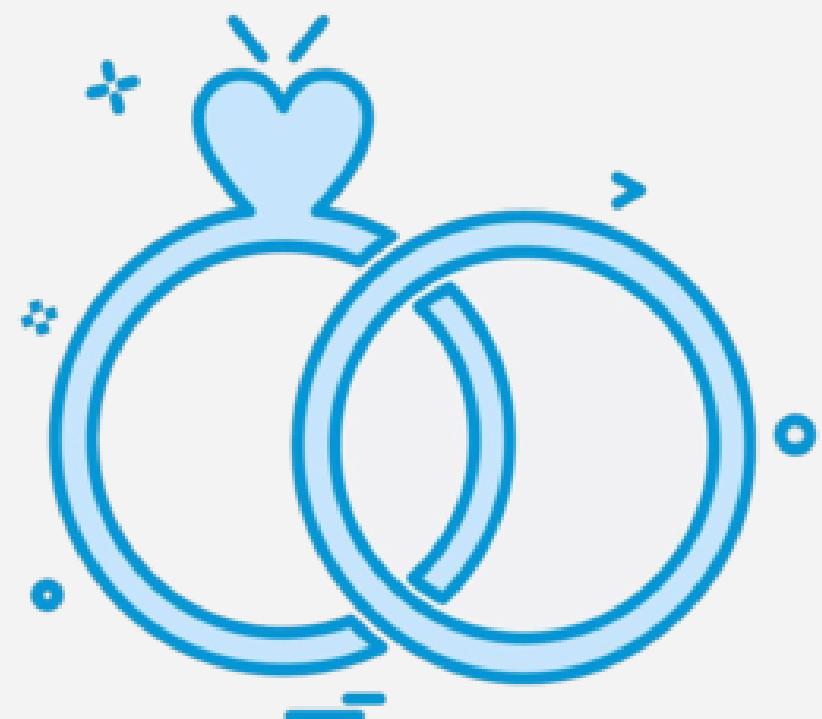


AGE



JOB

# MODEL FEATURES



MARITAL STATUS



ECONOMIC ACTIVITY

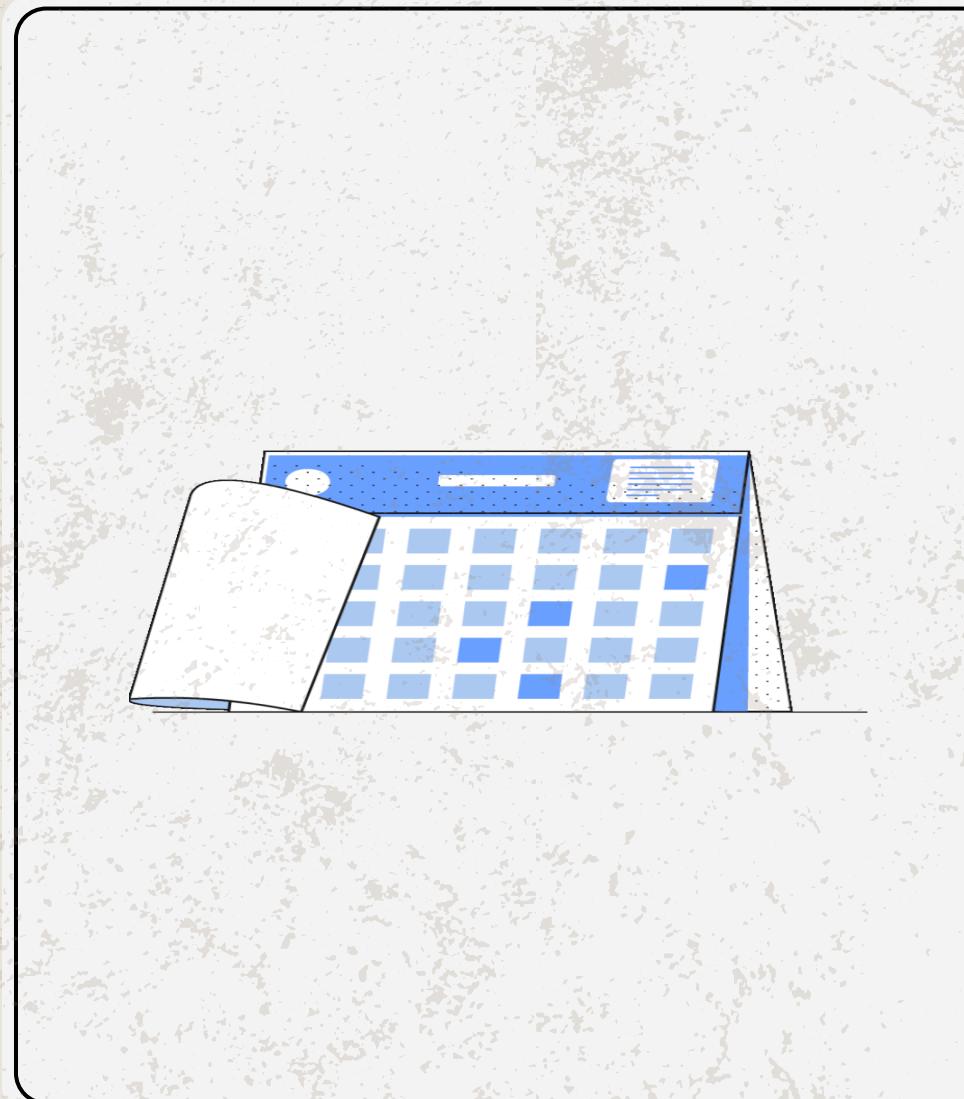


SOCIAL SECURITY

# MODEL FEATURES



SIZE OF THE LOCALITY



MONTH OF OCCURRENCE

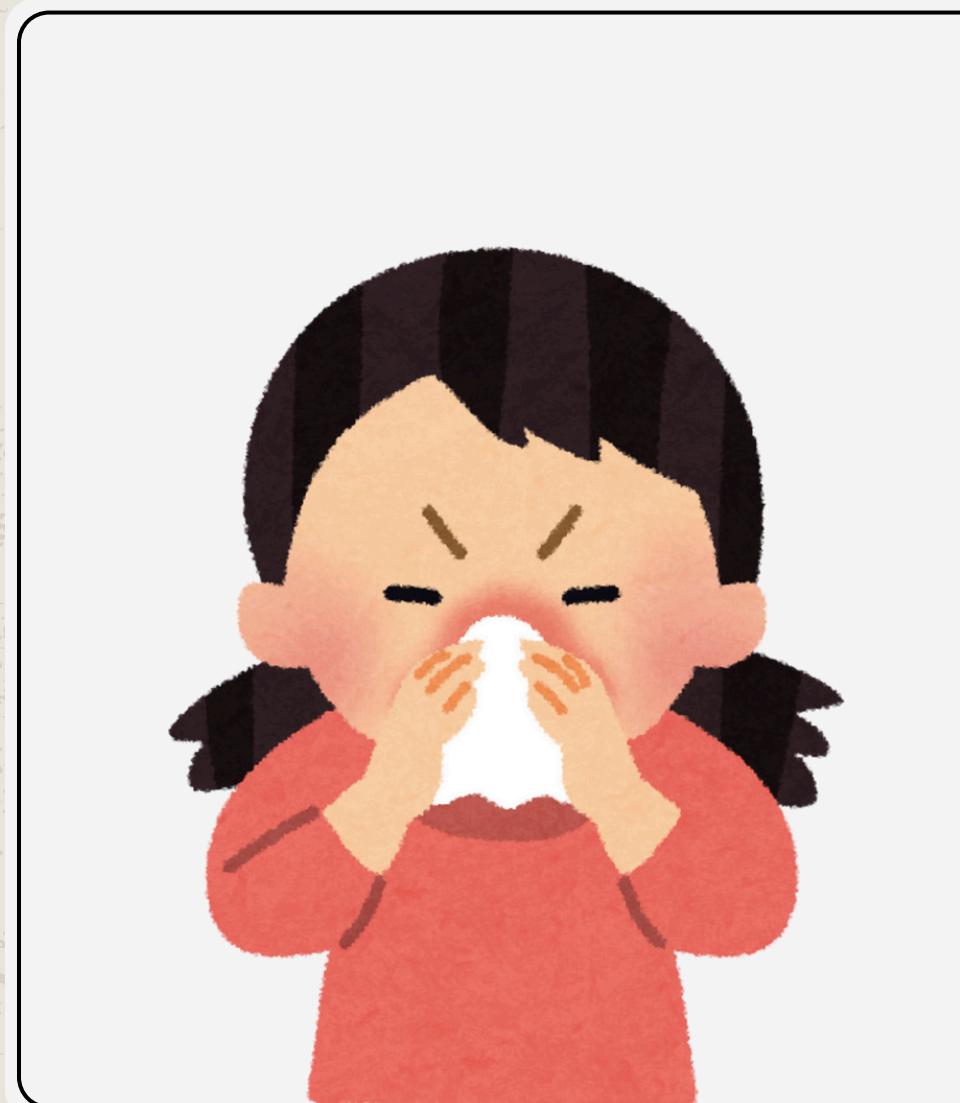


HOUR OF OCCURRENCE

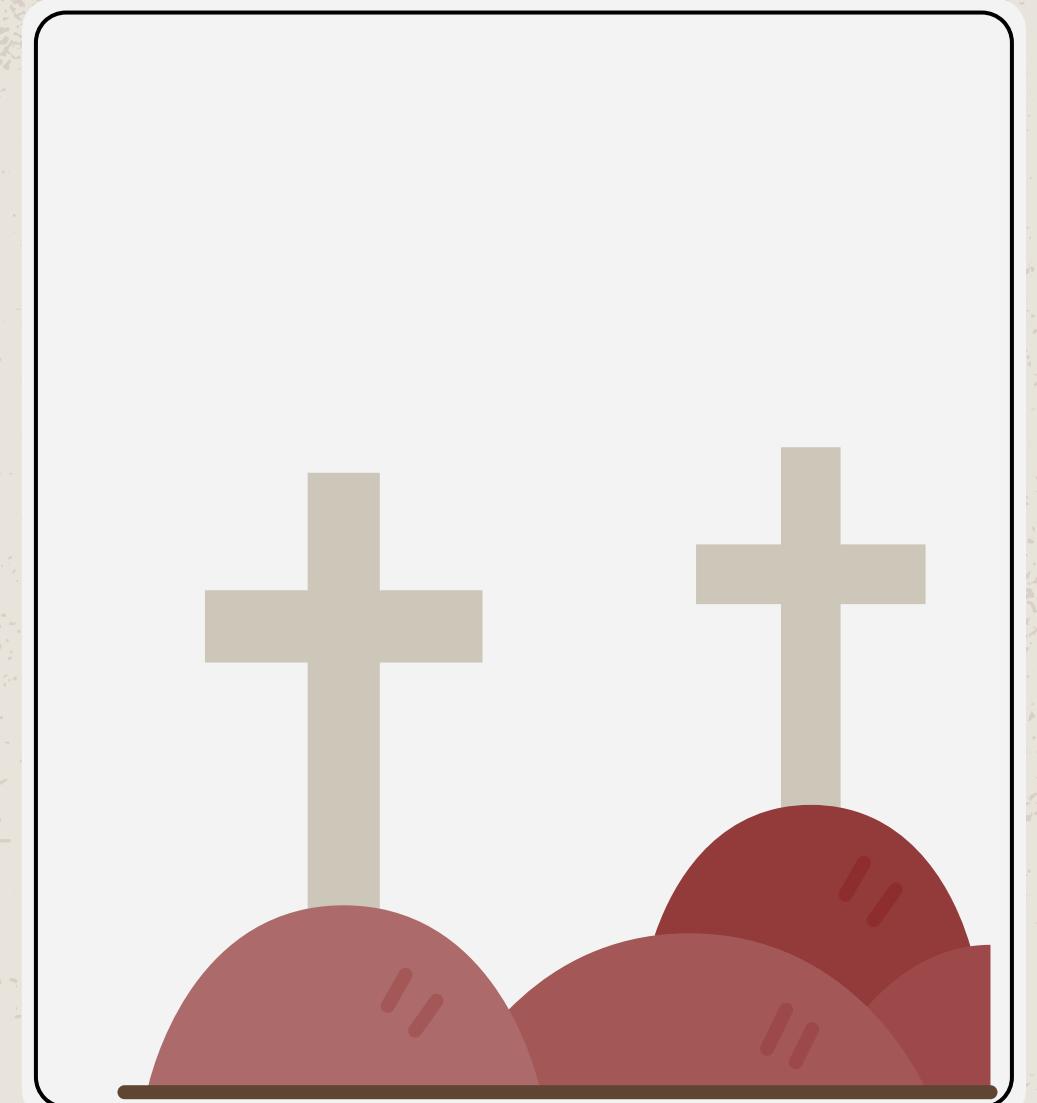
# MODEL FEATURES



WEIGHT



COVID OR FLU



VARIABLE TO PREDICT: CAUSE OF DEATH

# MODEL INSIGHTS

1

HEART ATTACK AND DEATH FROM LIVER DISEASE ARE MORE COMMONLY OBSERVED IN OVERWEIGHT OR OBESE PEOPLE.



2

HAVING CONTRACTED COVID OR INFLUENZA IS AN IMPORTANT FACTOR IN DEATHS FROM PNEUMONIA AND COPD



3

IF YOU ARE A YOUNG PERSON OR BETWEEN 20 AND 50 YEARS OLD, YOU ARE MORE LIKELY TO DIE FROM HOMICIDE



# MODEL INSIGHTS

4

AT 12 O'CLOCK IS WHEN A PERSON IS MOST LIKELY TO DIE FROM AN ASSAULT



5

MEN TEND TO DIE MORE OFTEN THAN WOMAN



EXAMPLES

# CASE OF DEATH AND PREDICTIONS

1



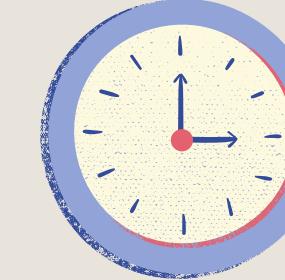
2



PNEUMONIA

DIABETES

3



4



HOMICIDE

HEART ATTACK

EXAMPLES

# CASE OF DEATH AND PREDICTIONS

5



COPD

6



LIVER DISEASE

PART THREE

# EXAMPLES OF APPLICATION

# PERSON 1

We have a death man on December, his body was found death at 24 hours, looking more into the case person was married, had work in industry or machines, was 54 years, weighted 78 kilograms, and suffer covid,

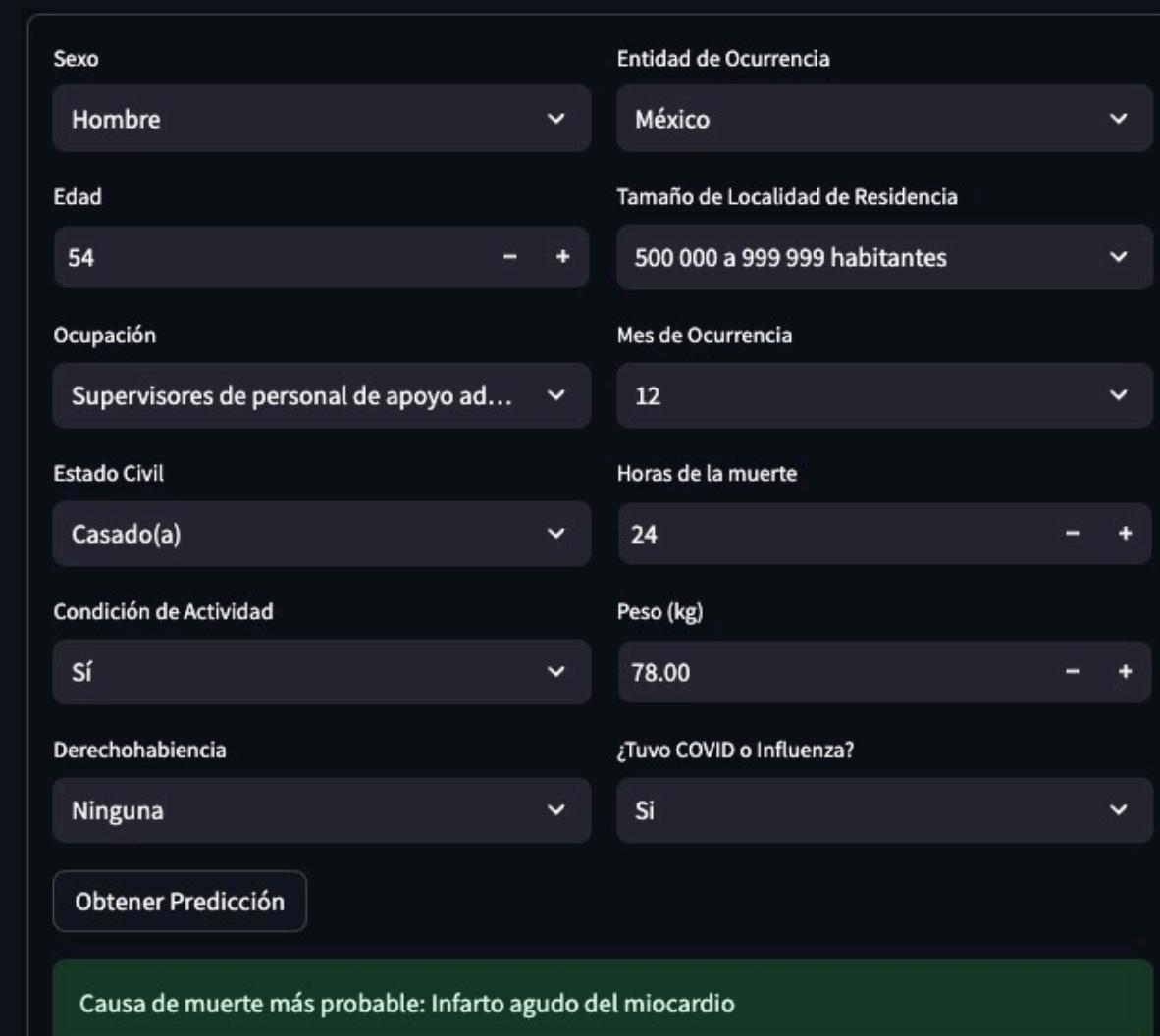
## Cause of death?

# REASON OF DEATH

Hearth attack

When we look at the characteristics of our deceased, we can see that he was:

- Old
- Overweighted
- Man



Sexo: Hombre | Entidad de Ocurrencia: México

Edad: 54 | Tamaño de Localidad de Residencia: 500 000 a 999 999 habitantes

Ocupación: Supervisores de personal de apoyo ad... | Mes de Ocurrencia: 12

Estado Civil: Casado(a) | Horas de la muerte: 24

Condición de Actividad: Sí | Peso (kg): 78.00

Derechohabiencia: Ninguna | ¿Tuvo COVID o Influenza?: Si

Obtener Predicción

Causa de muerte más probable: Infarto agudo del miocardio

Top 3 causas más probables:

- Infarto agudo del miocardio: 30.86%
- Diabetes mellitus: 28.15%
- Otras enfermedades del hígado: 16.20%

THANKS

# SOLVING CRIMES

To have a better Mexico, we need to understand what's  
happening on it

# HOW TO USE THE MODEL

1

Access the web page, and go to predict

2

Select the features of the deceased

3

Analyze the results



DATA

# IMPORTANT REALTIONS

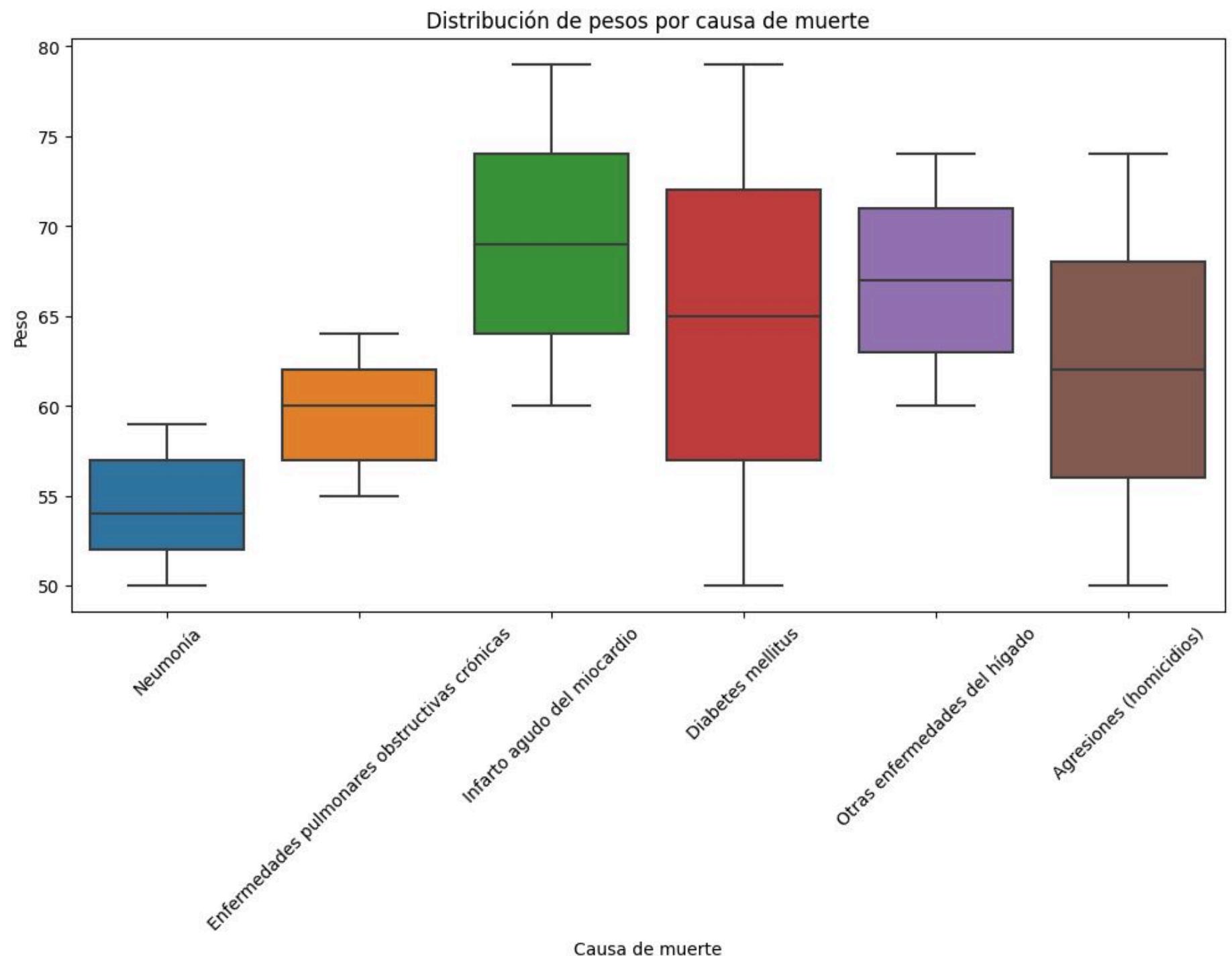
*Individuals share characteristics, but which ones are  
more important?*

# Death causes

Based on the weight, what causes death?

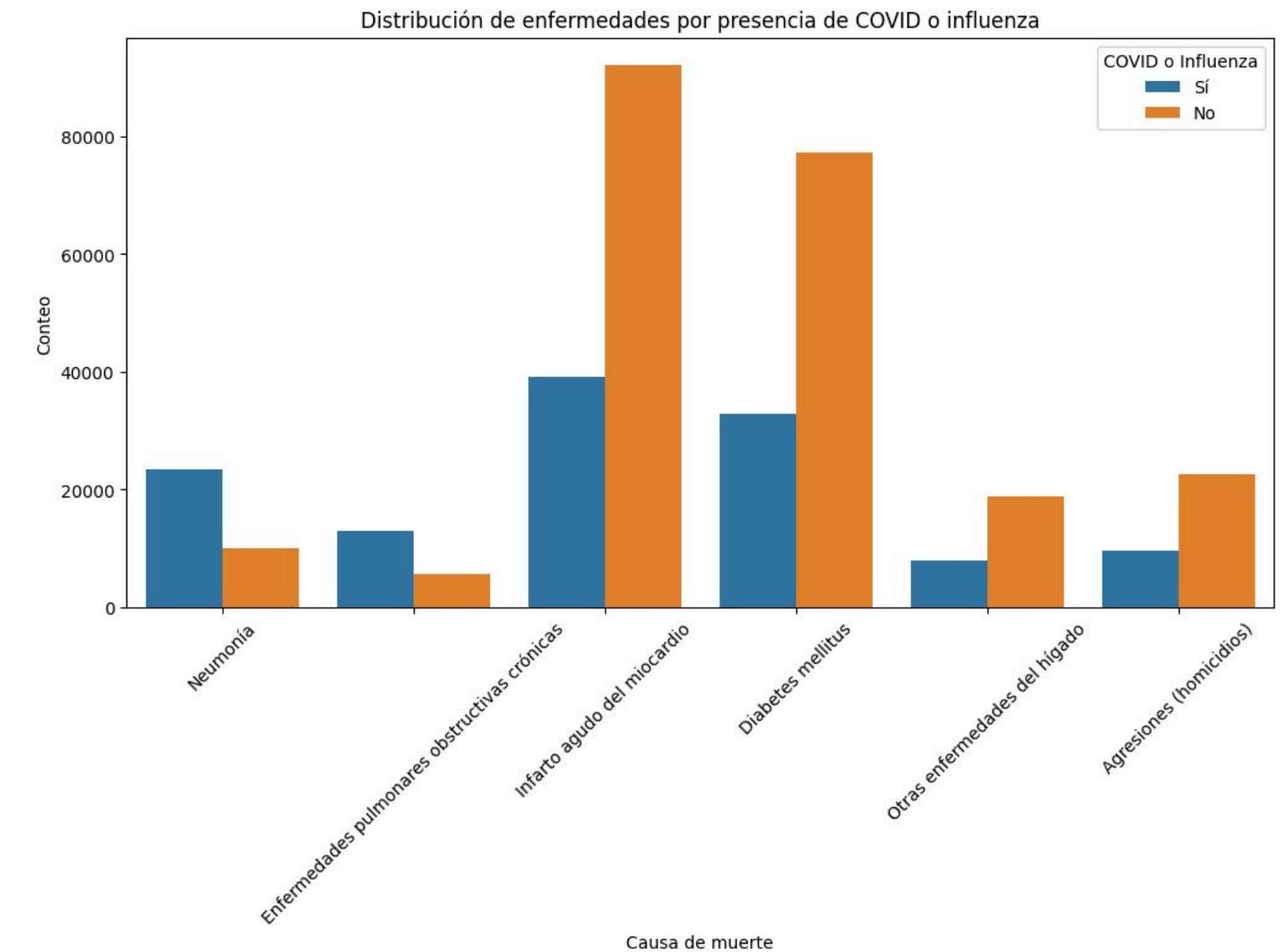
Heart attack and death from liver disease are commonly observed in overweight or obese people.

While Pneumonia is the main cause in people with low weight.



# Illness as a factor

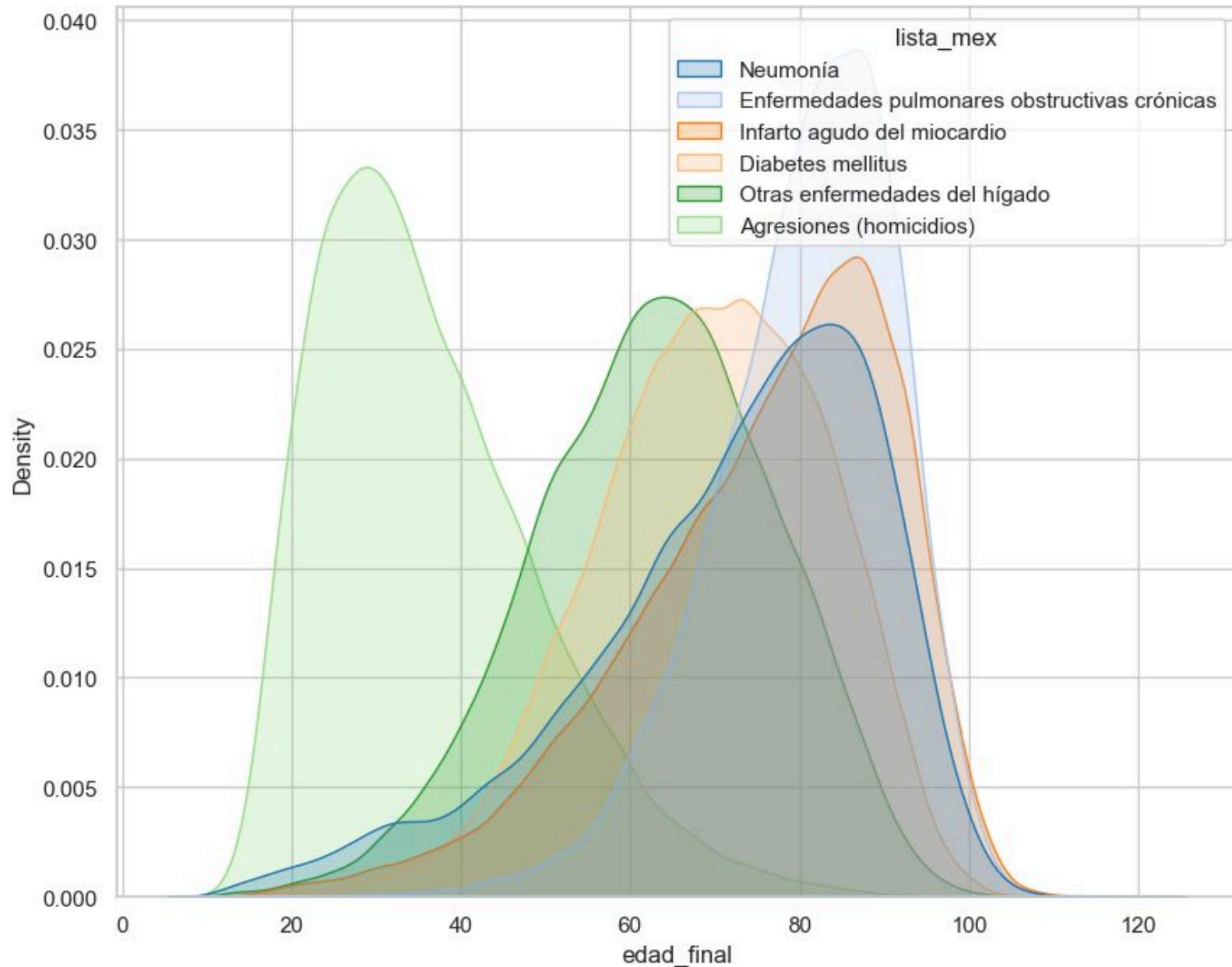
We know covid came to stay:  
But is it a factor in mexican death?



# Age

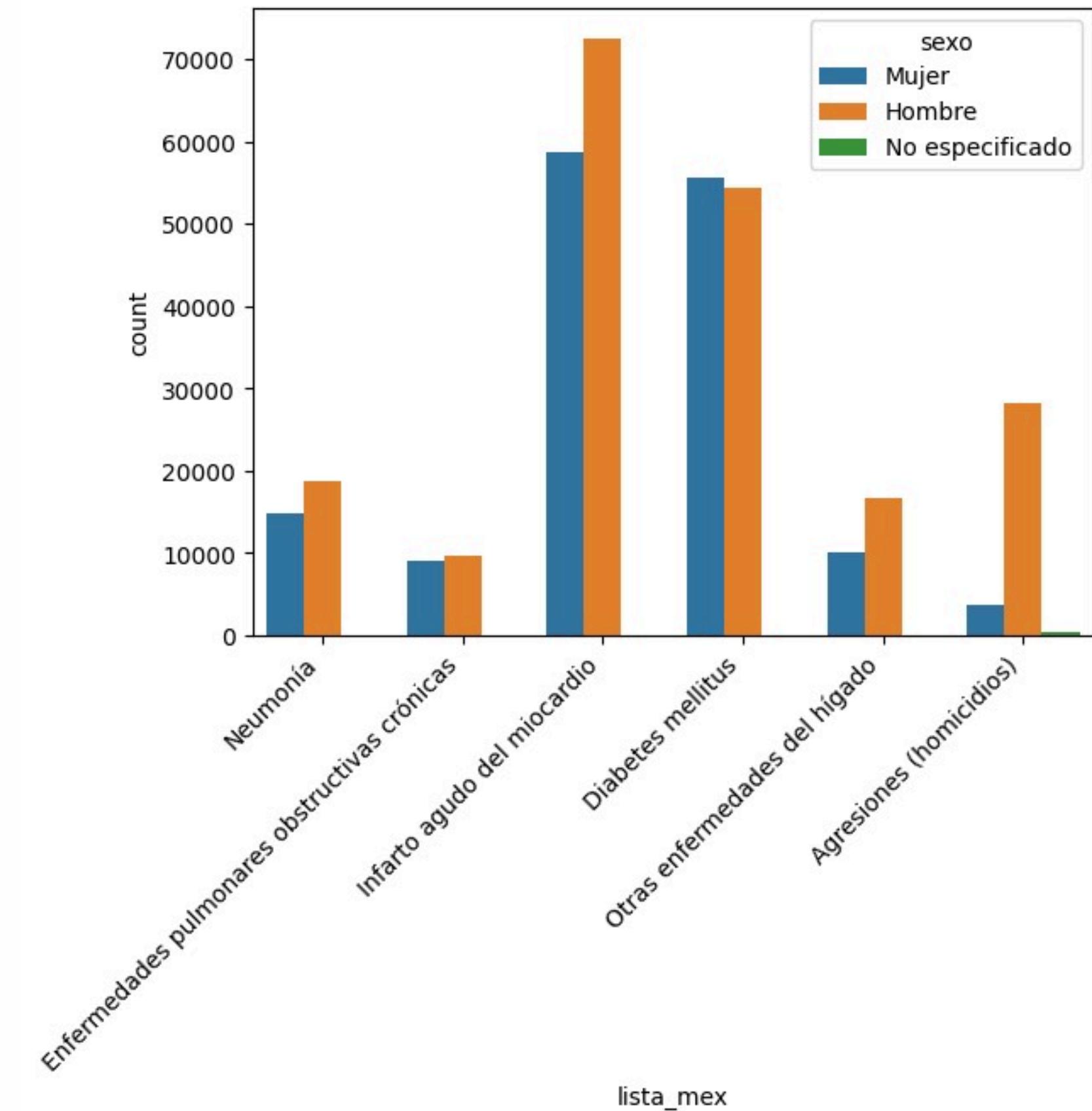
The likelihood of experiencing a disease or becoming a victim of violence varies significantly with age.

If you are youngest is more probably that you are going to be kill.



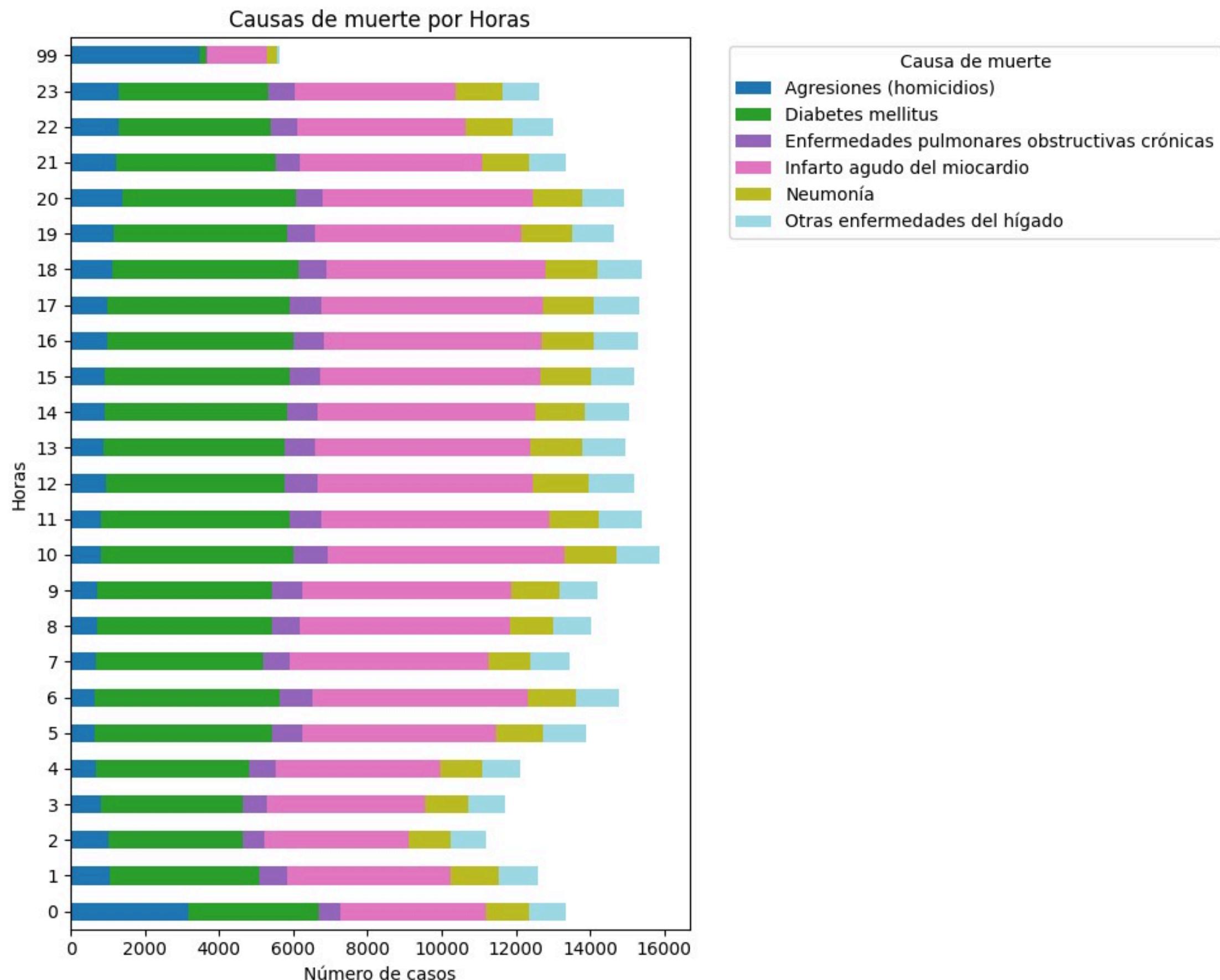
# Sex

Men die more often than women. The only exception is diabetes, where slightly more women die than men, but the difference is not significant



# Hour

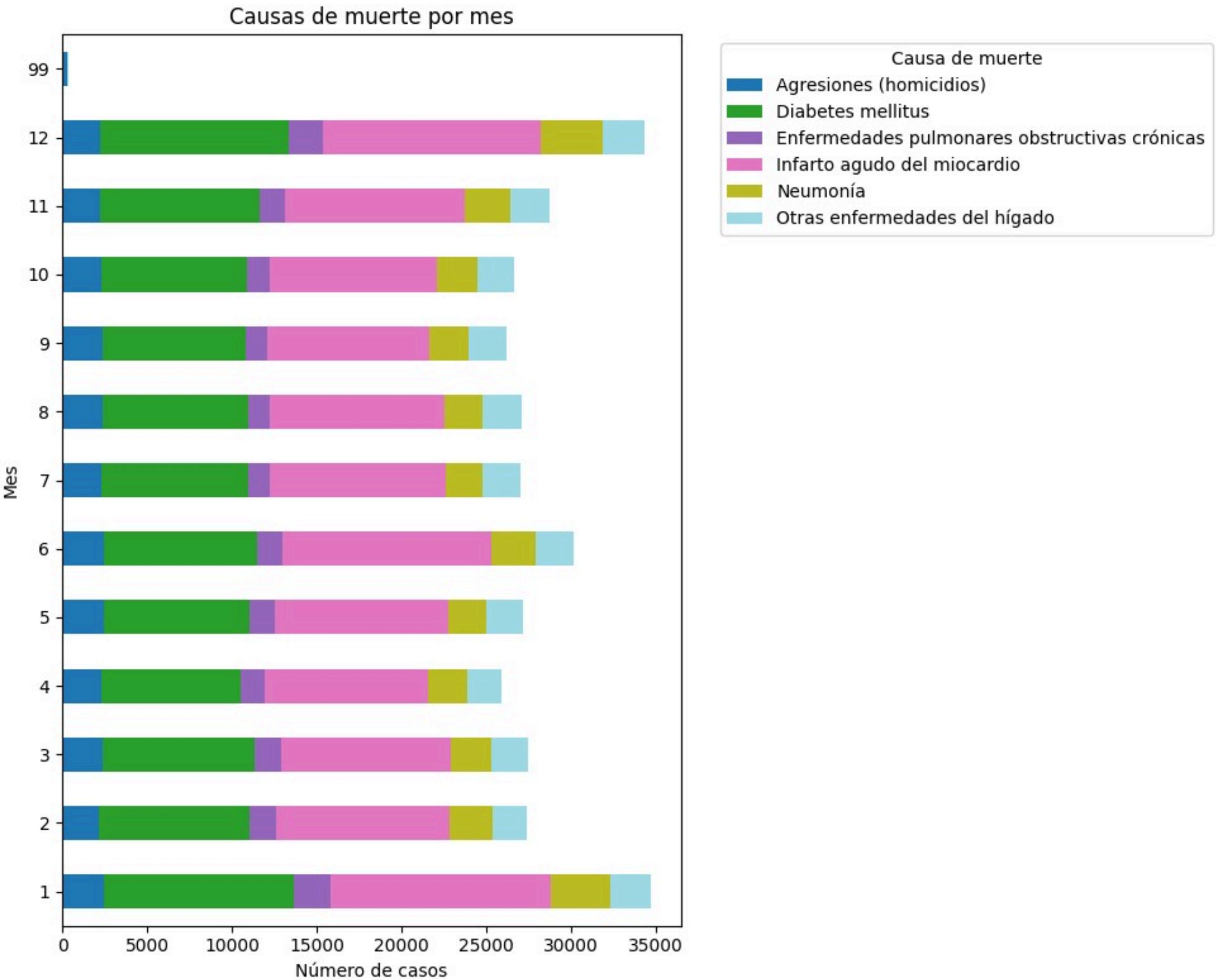
As the night progresses, the number of deaths from assaults increases, peaking at midnight. It is advisable to avoid going out at night, to be accompanied if you do go out, or to stay alert to your surroundings.



# Month

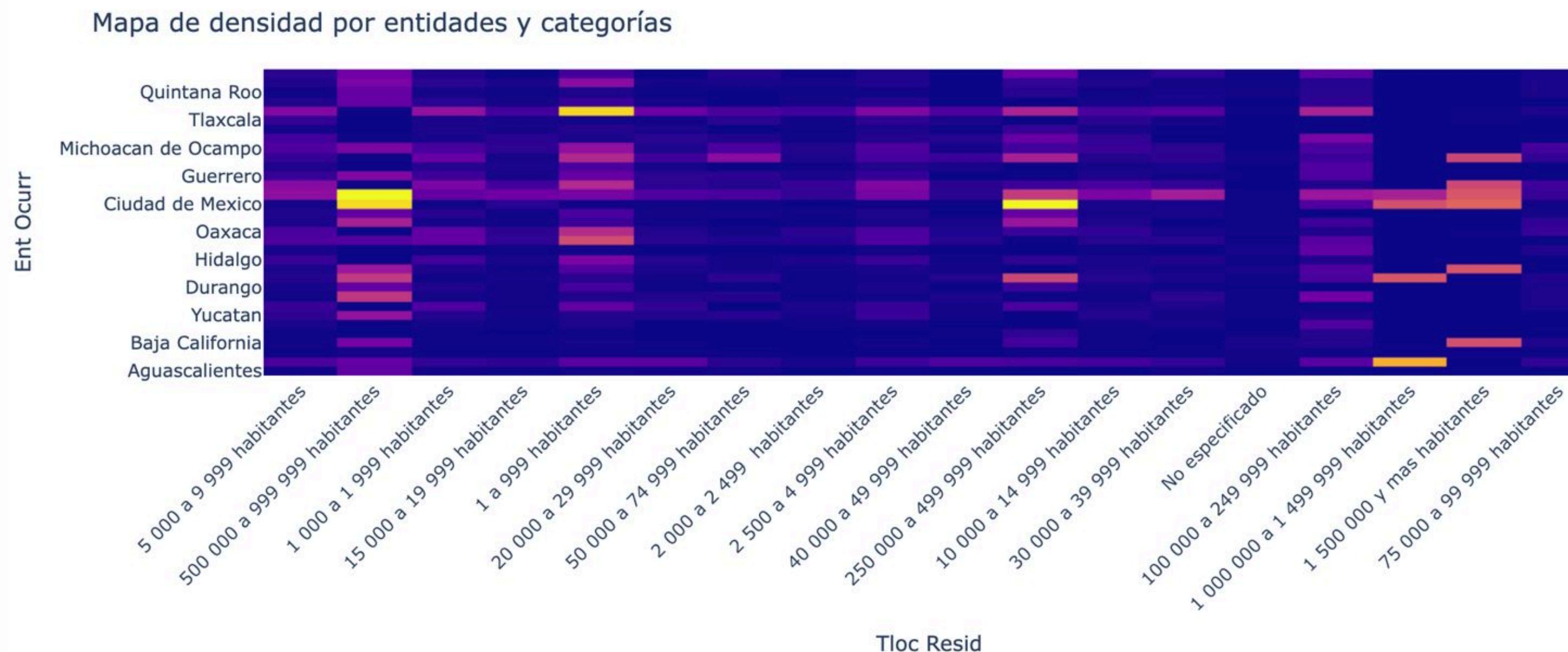
There are more deaths in January and December. In fact, these are the months with the highest number of deaths from pneumonia.

Seasonal factors may contribute to certain diseases.



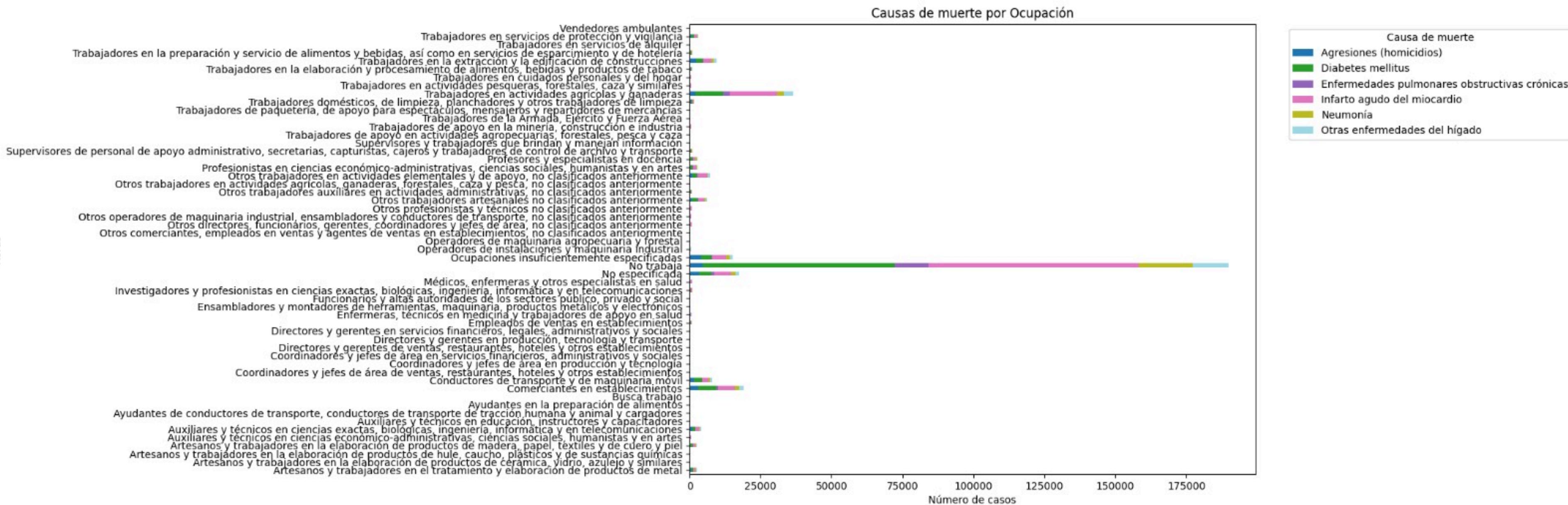
# Population

Depend of how many people live where you have your experience with dead could define your destiny



# Occupation

Most of those who died were not working. The two most common causes of death are heart attack and diabetes in all occupations

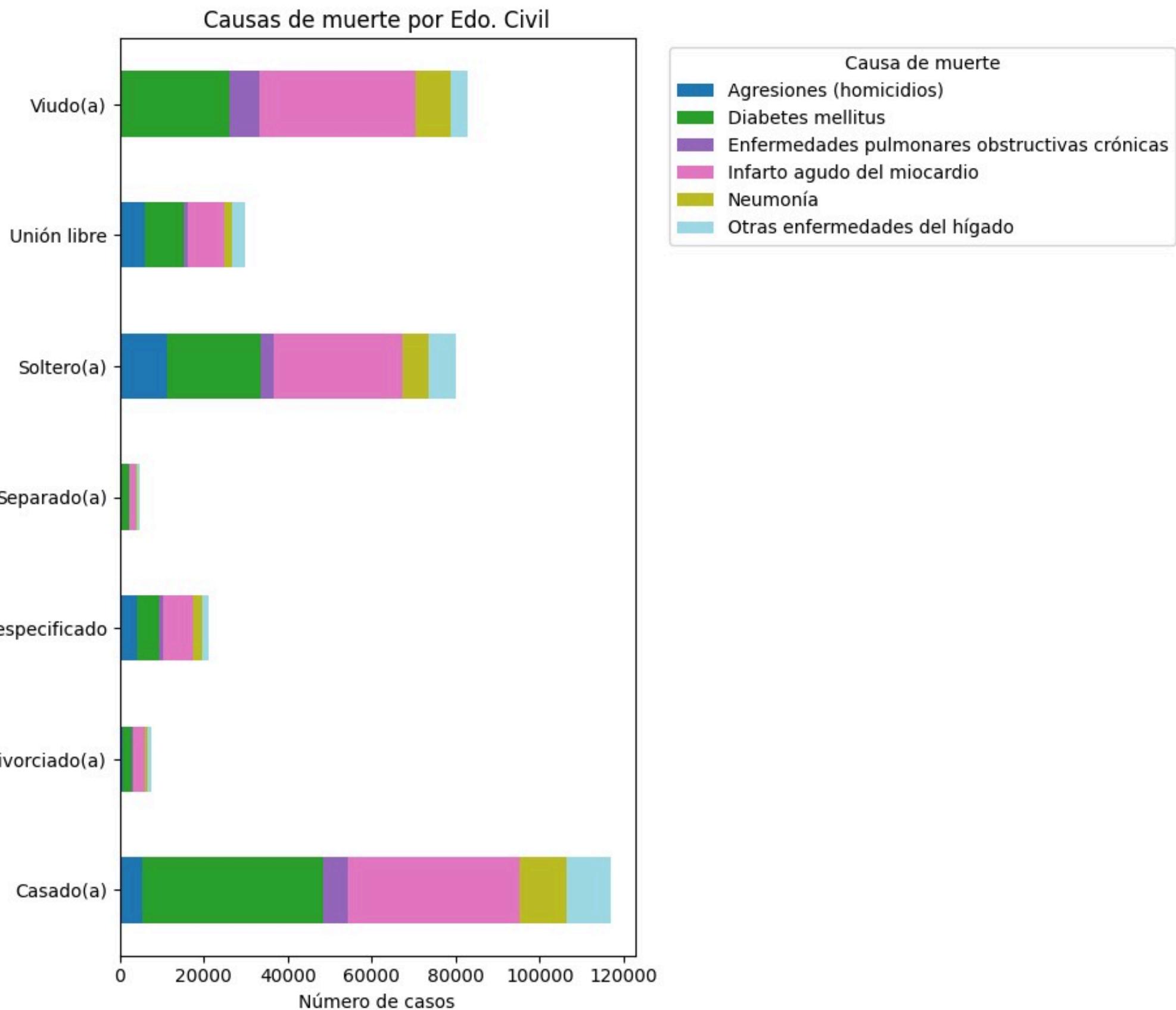


# Marital Status

Diabetes and heart attacks are among the top 3 causes of death across all marital statuses.

Singles have the highest number of assault deaths, possibly because they are easier targets when out alone. Married and cohabiting people have slightly less than half the number of homicide deaths compared to singles.

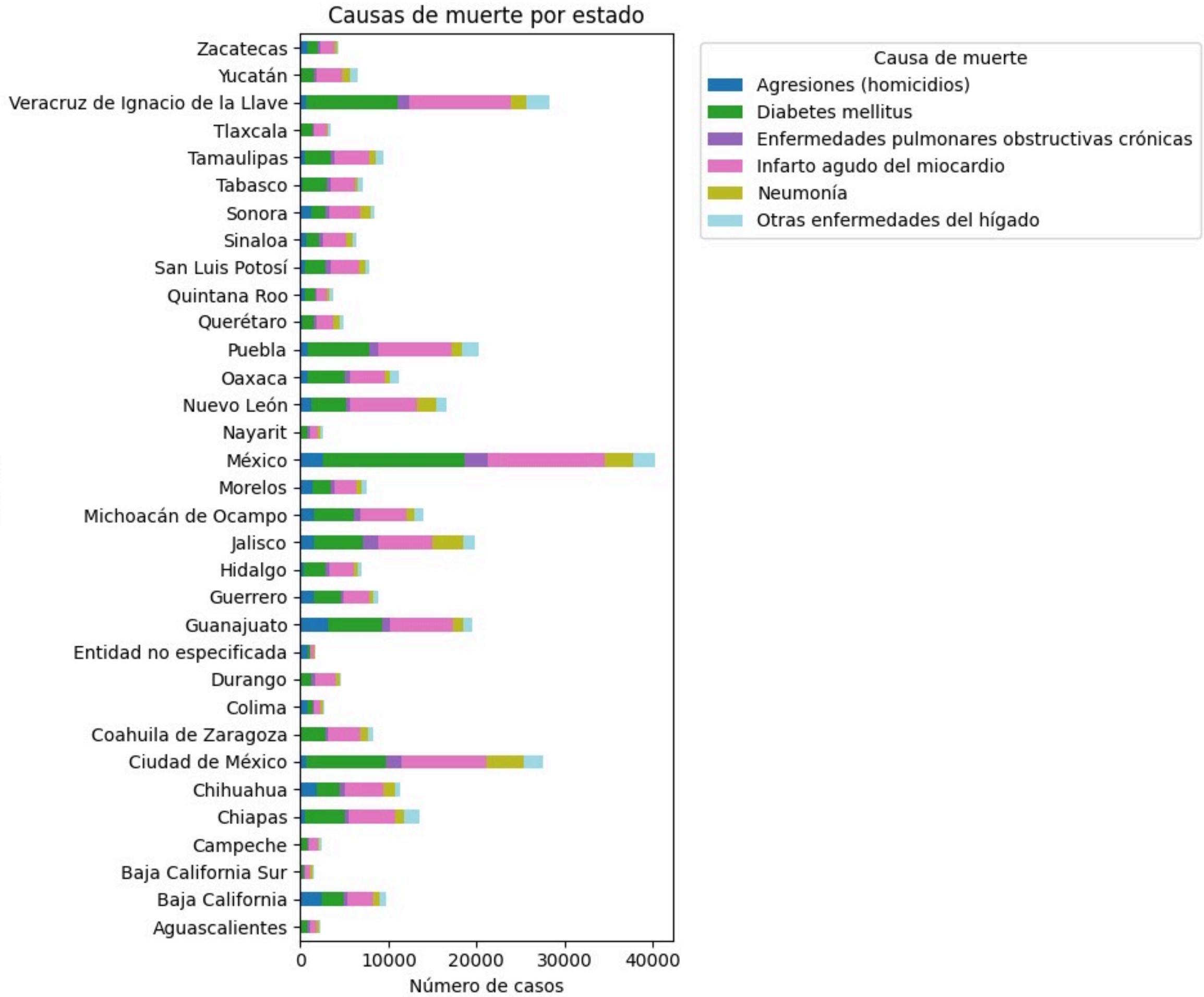
Significant assault deaths are not seen among widowed people, which could suggest that older adults are not targeted for assault because of their age, assuming widows and widowers are older adults.



# State

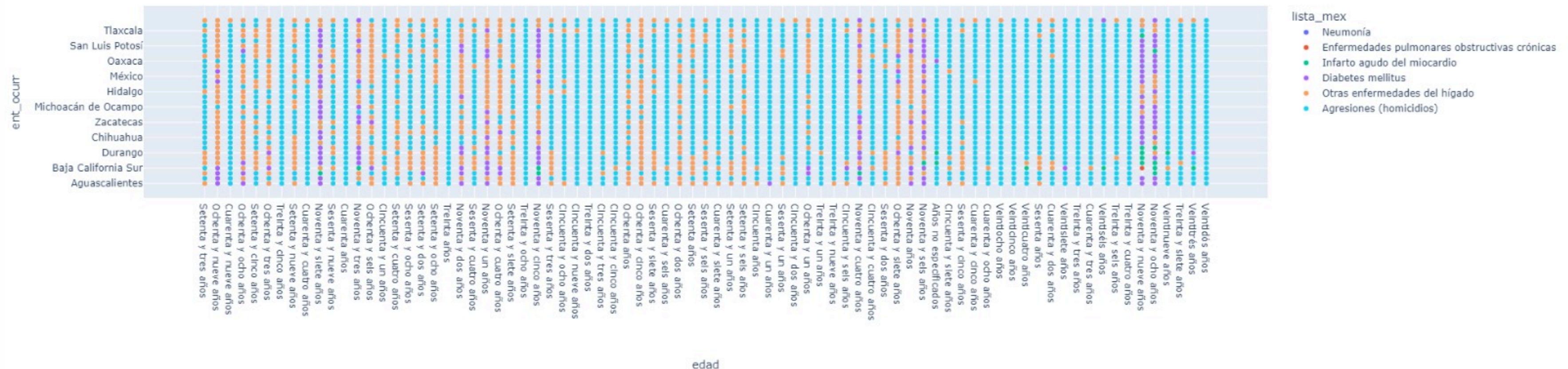
In almost every state, the leading causes of mortality are heart attacks and diabetes.

There is a significant difference in the number of deaths depending on the state. Naturally, if a state has a larger population, it means there are more people who could potentially pass away.



# Age relation to Entity

Different states react specifically according to age, which is why we need to examine more deeply which types of death are most common by age.



MODEL

# LET'S TALK ABOUT METRICS

How well does our model behaves and how was it build

Mejores hiperparámetros: {'class\_\_max\_depth': 20, 'class\_\_min\_samples\_leaf': 1, 'class\_\_min\_samples\_split': 500, 'class\_\_n\_estimators': 400}  
Mejor puntuación: 0.5805373304329254

		precision	recall	f1-score	support
	Agresiones (homicidios)	0.58	0.87	0.69	7195
	Diabetes mellitus	0.59	0.16	0.25	27368
Enfermedades pulmonares obstructivas cronicas		0.30	0.62	0.41	4606
	Infarto agudo del miocardio	0.67	0.64	0.66	32433
	Neumonia	0.45	0.75	0.56	8042
Otras enfermedades del higado		0.19	0.42	0.27	6610
	accuracy			0.50	86254
	macro avg	0.46	0.58	0.47	86254
	weighted avg	0.56	0.50	0.48	86254

		Feature	Importance
3		num_Peso	0.352586
0		num_edad_final	0.293288
127		cat_COVID_Influenza_Si	0.079224
2		num_horas	0.031732
68		cat_cond_act_Si	0.026493
66		cat_edo_civil_Viudo(a)	0.021993
30		cat_ocupacion_No trabaja	0.021496
64		cat_edo_civil_Soltero(a)	0.015962
4		cat_sexo_Mujer	0.015907
..		...	...
57	cat_ocupacion_Trabajadores en servicios de al...		0.000012
11	cat_ocupacion_Auxiliares y tecnicos en educac...		0.000012
18	cat_ocupacion_Coordinadores y jefes de area e...		0.000010

- 0- Homicides
- 1- Diabetes
- 2- COPD
- 3- Heart attack
- 4- Pneumonia
- 5- Liver diseases

