

In [614...]

```
import pandas as pd
#Importing of a CSV File
df=pd.read_csv("vaers_jan_nov_2021.csv",low_memory=False,index_col=0)
df.head()
```

Out[614...]

VAERS_ID		SYMPTOM1	SYMPTOMVERSION1	SYMPTOM2	SYMPTOMVERSION2	SYMPTOM3	SYMPTOMVERSION3	SYMPTOM4	SYMPTOMVERSIC
1343801	5-hydroxyindolacetic acid		24.0	Blood catecholamines		24.0	Blood thyroid stimulating hormone	24.0	Cardiac stress test
1731624	5-hydroxyindolacetic acid		24.1	Biopsy bone marrow normal		24.1	Bronchospasm	24.1	Cough
1519755	5-hydroxyindolacetic acid in urine		24.0	Abdominal pain		24.0	Abdominal pain lower	24.0	Abnormal loss of weight
1704292	5-hydroxyindolacetic acid in urine		24.1	Activated partial thromboplastin time		24.1	Angiogram pulmonary	24.1	Anti-RNA polymerase III antibody
1845243	5-hydroxyindolacetic acid in urine		24.1	Blood catecholamines		24.1	Blood creatinine	24.1	Blood culture

5 rows × 51 columns

In []:

df.info()

In [615...]

df.describe()

Out[615...]

	SYMPTOMVERSION1	SYMPTOMVERSION2	SYMPTOMVERSION3	SYMPTOMVERSION4	SYMPTOMVERSIONS	AGE_YRS	CAGE_YR	CAGE_
count	890836.000000	700014.000000	542889.000000	414887.000000	311516.000000	819268.000000	728957.000000	1327.000
mean	23.938168	23.938262	23.937684	23.939902	23.940053	50.053790	49.768582	0.061
std	0.250567	0.250345	0.251181	0.249035	0.250619	18.574649	18.740089	0.157
min	23.100000	23.100000	23.100000	23.100000	23.100000	0.080000	0.000000	0.000
25%	24.000000	24.000000	24.000000	24.000000	24.000000	36.000000	35.000000	0.000
50%	24.000000	24.000000	24.000000	24.000000	24.000000	50.000000	50.000000	0.000
75%	24.000000	24.000000	24.000000	24.000000	24.000000	65.000000	64.000000	0.000
max	24.100000	24.100000	24.100000	24.100000	24.100000	119.000000	120.000000	1.000

In [409...]

```
#round the ages and drop the NaNs
df['AGE_YRS'] = df['AGE_YRS'].round()
df.dropna(subset = ['AGE_YRS'], inplace=True)
print(df['AGE_YRS'].head())
```

VAERS_ID
1343801 34.0
1731624 18.0
1519755 60.0
1704292 44.0
997550 54.0
Name: AGE_YRS, dtype: float64

In [616...]

```
#Combine all 5no. symptoms columns into one new column called "Allsymptoms"
df["Allsymptoms"] = df["SYMPTOM1"] + df["SYMPTOM2"] + df["SYMPTOM3"] + df["SYMPTOM4"] + df["SYMPTOM5"]
```

In [617...]

```
print(df["Allsymptoms"])
```

VAERS_ID
1343801 5-hydroxyindolacetic acidBlood catecholaminesB...
1731624 5-hydroxyindolacetic acidBiopsy bone marrow no...
1519755 5-hydroxyindolacetic acid in urineAbdominal pa...
1704292 5-hydroxyindolacetic acid in urineActivated pa...

```
1845243    5-hydroxyindolacetic acid in urineBlood catech...
...
1559889                               NaN
1565069                               NaN
1633155                               NaN
1662491                               NaN
1598989                               NaN
Name: Allsymptoms, Length: 890836, dtype: object
```

In [347...]

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 819268 entries, 1343801 to 1598989
Data columns (total 52 columns):
 #   Column           Non-Null Count  Dtype  
--- 
 0   SYMPTOM1        819268 non-null   object 
 1   SYMPTOMVERSION1 819268 non-null   float64
 2   SYMPTOM2        653850 non-null   object 
 3   SYMPTOMVERSION2 653850 non-null   float64
 4   SYMPTOM3        511848 non-null   object 
 5   SYMPTOMVERSION3 511848 non-null   float64
 6   SYMPTOM4        395017 non-null   object 
 7   SYMPTOMVERSION4 395017 non-null   float64
 8   SYMPTOM5        298127 non-null   object 
 9   SYMPTOMVERSION5 298127 non-null   float64
 10  VAX_TYPE        819268 non-null   object 
 11  VAX_MANU        819268 non-null   object 
 12  VAX_LOT         603708 non-null   object 
 13  VAX_DOSE_SERIES 815492 non-null   object 
 14  VAX_ROUTE       658981 non-null   object 
 15  VAX_SITE        667295 non-null   object 
 16  VAX_NAME        819268 non-null   object 
 17  RECVDATE        819268 non-null   object 
 18  STATE           753840 non-null   object 
 19  AGE_YRS         819268 non-null   float64
 20  CAGE_YR         722230 non-null   float64
 21  CAGE_MO         1039 non-null    float64
 22  SEX              819268 non-null   object 
 23  RPT_DATE        301 non-null    object 
 24  SYMPTOM_TEXT    819115 non-null   object 
 25  DIED             14912 non-null   object 
 26  DATEDIED        14360 non-null   object
```

```
27 L_THREAT      22129 non-null  object
28 ER_VISIT       48 non-null   object
29 HOSPITAL      87080 non-null  object
30 HOSPDAYS     64320 non-null  float64
31 X_STAY        601 non-null   object
32 DISABLE       21631 non-null  object
33 RECOVD        746908 non-null object
34 VAX_DATE      804922 non-null object
35 ONSET_DATE    798737 non-null object
36 NUMDAYS       776270 non-null float64
37 LAB_DATA      401909 non-null object
38 V_ADMINBY     819268 non-null object
39 V_FUNDBY      325 non-null   object
40 OTHER_MEDS    553552 non-null object
41 CUR_ILL       434723 non-null object
42 HISTORY        568199 non-null object
43 PRIOR_VAX    47526 non-null  object
44 SPLTTYPE      177720 non-null object
45 FORM_VERS     819268 non-null int64
46 TODAYS_DATE   813250 non-null object
47 BIRTH_DEFECT  670 non-null   object
48 OFC_VISIT     200942 non-null object
49 ER_ED_VISIT   145134 non-null object
50 ALLERGIES     492980 non-null object
51 Allsymptoms   298127 non-null object
dtypes: float64(10), int64(1), object(41)
memory usage: 331.3+ MB
```

In [348...]

```
#drop rows with all NAs
df.dropna(how='all', inplace=True)
```

In [349...]

```
#remove rows with no symptoms at all
df.dropna(subset = ['Allsymptoms'], inplace=True)
```

In [350...]

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 298127 entries, 1343801 to 1179026
Data columns (total 52 columns):
 #   Column          Non-Null Count  Dtype 

```

```
----  
0  SYMPTOM1           298127 non-null object  
1  SYMPTOMVERSION1   298127 non-null float64  
2  SYMPTOM2           298127 non-null object  
3  SYMPTOMVERSION2   298127 non-null float64  
4  SYMPTOM3           298127 non-null object  
5  SYMPTOMVERSION3   298127 non-null float64  
6  SYMPTOM4           298127 non-null object  
7  SYMPTOMVERSION4   298127 non-null float64  
8  SYMPTOM5           298127 non-null object  
9  SYMPTOMVERSION5   298127 non-null float64  
10 VAX_TYPE            298127 non-null object  
11 VAX_MANU            298127 non-null object  
12 VAX_LOT             223220 non-null object  
13 VAX_DOSE_SERIES    296529 non-null object  
14 VAX_ROUTE           243257 non-null object  
15 VAX_SITE            249086 non-null object  
16 VAX_NAME            298127 non-null object  
17 RECVDATE           298127 non-null object  
18 STATE               282050 non-null object  
19 AGE_YRS             298127 non-null float64  
20 CAGE_YR              262590 non-null float64  
21 CAGE_MO              227 non-null float64  
22 SEX                 298127 non-null object  
23 RPT_DATE            62 non-null object  
24 SYMPTOM_TEXT         298127 non-null object  
25 DIED                6986 non-null object  
26 DATEDIED           6759 non-null object  
27 L_THREAT             13392 non-null object  
28 ER_VISIT            15 non-null object  
29 HOSPITAL             50024 non-null object  
30 HOSPDAYS            39340 non-null float64  
31 X_STAY              320 non-null object  
32 DISABLE              12746 non-null object  
33 RECOVD              284247 non-null object  
34 VAX_DATE             293214 non-null object  
35 ONSET_DATE           292912 non-null object  
36 NUMDAYS              283400 non-null float64  
37 LAB_DATA             189363 non-null object  
38 V_ADMINBY            298127 non-null object  
39 V_FUNDBY              67 non-null object  
40 OTHER_MEDS           228641 non-null object  
41 CUR_ILL              179868 non-null object  
42 HISTORY              233953 non-null object
```

```
43  PRIOR_VAX      22032 non-null  object
44  SPLTTYPE       66606 non-null  object
45  FORM_VERS      298127 non-null int64
46  TODAYS_DATE    296386 non-null  object
47  BIRTH_DEFECT   320 non-null   object
48  OFC_VISIT      91001 non-null  object
49  ER_ED_VISIT   75936 non-null  object
50  ALLERGIES      202540 non-null object
51  Allsymptoms    298127 non-null object
dtypes: float64(10), int64(1), object(41)
memory usage: 120.6+ MB
```

In [618...]

```
#use of iloc for indexing to remove unnecessary columns
dfsmall=df.iloc[:,[10,11,17,18,19,20,22,23,25,26,30,33,34,35,36,40,41,42,43,50,51]]
```

In [619...]

```
dfsmall.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 890836 entries, 1343801 to 1598989
Data columns (total 21 columns):
 #   Column        Non-Null Count  Dtype  
--- 
 0   VAX_TYPE      890836 non-null  object 
 1   VAX_MANU     890836 non-null  object 
 2   RECVDATE     890836 non-null  object 
 3   STATE         795250 non-null  object 
 4   AGE_YRS      819268 non-null  float64
 5   CAGE_YR       728957 non-null  float64
 6   SEX           890836 non-null  object 
 7   RPT_DATE     316 non-null    object 
 8   DIED          15824 non-null   object 
 9   DATEDIED     14610 non-null   object 
 10  HOSPDAYS     65176 non-null  float64
 11  RECOVD        817819 non-null  object 
 12  VAX_DATE      840719 non-null  object 
 13  ONSET_DATE    834734 non-null  object 
 14  NUMDAYS       799488 non-null  float64
 15  OTHER_MEDS    560472 non-null  object 
 16  CUR_ILL       440894 non-null  object 
 17  HISTORY        594736 non-null  object 
 18  PRIOR_VAX     47684 non-null   object 
 19  ALLERGIES     493804 non-null  object
```

```
20 Allsymptoms    311516 non-null  object
dtypes: float64(4), object(17)
memory usage: 149.5+ MB
```

In [399...]

```
#fill NAs wtih zeros in the HOSPDAYS column
df['HOSPDAYS'].fillna(value=0, inplace=True)
dfsmall.info()
print(dfsmall.head())
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 244360 entries, 1343801 to 1179026
Data columns (total 21 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   VAX_TYPE    244360 non-null  object  
 1   VAX_MANU    244360 non-null  object  
 2   RECVDATE    244360 non-null  object  
 3   STATE        231735 non-null  object  
 4   AGE_YRS     244360 non-null  float64 
 5   CAGE_YR     213233 non-null  float64 
 6   SEX          244360 non-null  object  
 7   RPT_DATE    52 non-null     object  
 8   DIED         5642 non-null    object  
 9   DATEDIED    5457 non-null    object  
 10  HOSPDAYS    33558 non-null   float64 
 11  RECOVD       233812 non-null  object  
 12  VAX_DATE    240001 non-null  object  
 13  ONSET_DATE  239735 non-null  object  
 14  NUMDAYS     231149 non-null  float64 
 15  OTHER_MEDS  187778 non-null  object  
 16  CUR_ILL     148472 non-null  object  
 17  HISTORY      192923 non-null  object  
 18  PRIOR_VAX   17902 non-null   object  
 19  ALLERGIES    165359 non-null  object  
 20  Allsymptoms  244360 non-null  object  
dtypes: float64(4), object(17)
memory usage: 41.0+ MB
```

	VAX_TYPE	VAX_MANU	RECVDATE	STATE	AGE_YRS	CAGE_YR	SEX	\
VAERS_ID								
1343801	COVID19	PFIZER\BIONTECH	05/24/2021	TX	34.0	34.0	F	
1731624	COVID19	PFIZER\BIONTECH	09/24/2021	WI	18.0	18.0	F	
1519755	COVID19	PFIZER\BIONTECH	08/02/2021	CT	60.0	60.0	M	
1704292	COVID19	JANSSEN	09/16/2021	WA	44.0	44.0	F	

997550	COVID19	MODERNA	02/03/2021	MA	54.0	54.0	F
--------	---------	---------	------------	----	------	------	---

VAERS_ID	RPT_DATE	DIED	DATEDIED	...	RECOVD	VAX_DATE	ONSET_DATE	NUMDAYS	\
1343801	NaN	NaN	NaN	...	U	03/20/2021	03/23/2021	3.0	
1731624	NaN	NaN	NaN	...	Y	09/23/2021	09/23/2021	0.0	
1519755	NaN	NaN	NaN	...	N	05/09/2021	05/11/2021	2.0	
1704292	NaN	NaN	NaN	...	N	04/12/2021	04/19/2021	7.0	
997550	NaN	NaN	NaN	...	N	01/27/2021	01/30/2021	3.0	

VAERS_ID	OTHER_MEDS	\
1343801	NP Thyroid 60mcg 2x per day, Vitamin D, Vitami...	
1731624	dupilumab, Symbicort 160 2p BID, albuterol MDI...	
1519755	Metforman 500 MG 2 x day	
1704292	Levothyroxine	
997550	verapamil-for vertigo off label usage fish oil...	

VAERS_ID	CUR_ILL	\
1343801	None	
1731624	no acute URI/COVID19 infections prior; recurre...	
1519755	diabetes COPD	
1704292	Hyperthyroid, anxiety	
997550	none	

VAERS_ID	HISTORY	PRIOR_VAX	\
1343801	Hashimotos Hypothyroidism	NaN	
1731624	brittle, treatment refractory idiopathic anaph...	NaN	
1519755		NaN	
1704292	Hyperthyroid, anxiety	NaN	
997550	Chronic dry eye Vertigo	NaN	

VAERS_ID	ALLERGIES	\
1343801	None	
1731624	latex (suspect IgE mediated), dupilumab, omali...	
1519755	Prednisone itraconazole sporanox	
1704292	Sulfa antibiotics, nitrofurtoin	
997550	Penicillin	

VAERS_ID	Allsymptoms
----------	-------------

```
1343801 5-hydroxyindolacetic acidBlood catecholaminesB...
1731624 5-hydroxyindolacetic acidBiopsy bone marrow no...
1519755 5-hydroxyindolacetic acid in urineAbdominal pa...
1704292 5-hydroxyindolacetic acid in urineActivated pa...
997550 Abdomen crushingAbdominal distensionAxillary p...
```

[5 rows x 21 columns]

In [355...]

```
#Look at content of the DIED column
df["DIED"].describe()
```

Out[355...]

```
count      6986
unique        1
top          Y
freq      6986
Name: DIED, dtype: object
```

In [356...]

```
#Determine number of unique values in DIED column
len(df.DIED.unique())
```

Out[356...]

```
2
```

In [357...]

```
print(df["DIED"])
```

```
VAERS_ID
1343801    NaN
1731624    NaN
1519755    NaN
1704292    NaN
997550     NaN
...
1591843    NaN
1591843    NaN
1142665    NaN
1179026    NaN
1179026    NaN
Name: DIED, Length: 298127, dtype: object
```

In [358...]

```
#Subset out the people who died by filtering the row where DIED = y
died=dfsmall.query("DIED == 'Y'")
```

In [359...]

```
print(died.head())
```

	VAX_TYPE	VAX_MANU	RECVDATE	STATE	AGE_YRS	CAGE_YR	SEX	\
VAERS_ID								
1151636	COVID19	PFIZER\BIONTECH	03/31/2021	PA	85.0	85.0	M	
1045635	COVID19	PFIZER\BIONTECH	02/22/2021	MO	74.0	NaN	M	
1068308	COVID19	PFIZER\BIONTECH	03/03/2021	MO	75.0	NaN	M	
1136479	COVID19	PFIZER\BIONTECH	03/26/2021	OH	68.0	68.0	M	
1154152	COVID19	PFIZER\BIONTECH	04/01/2021	NaN	72.0	71.0	M	
	RPT_DATE	DIED	DATEDIED	...	RECOVD	VAX_DATE	ONSET_DATE	\
VAERS_ID								
1151636	NaN	Y	03/14/2021	...	N	02/03/2021	02/12/2021	
1045635	NaN	Y	02/11/2021	...	N	02/04/2021	02/09/2021	
1068308	NaN	Y	02/21/2021	...	N	02/03/2021	02/13/2021	
1136479	NaN	Y	03/23/2021	...	N	03/19/2021	03/23/2021	
1154152	NaN	Y	02/26/2021	...	N	02/16/2021	02/26/2021	
	NUMDAYS					OTHER_MEDS	\	
VAERS_ID								
1151636	9.0		Rosuvastatin, Metoprolol, St Joesph aspirin					
1045635	5.0					NaN		
1068308	10.0		AMITRIPTYLINE HYDROCHLORIDE; ATORVASTATIN; DUT...					
1136479	4.0					unknown		
1154152	10.0					NaN		
	CUR_ILL						\	
VAERS_ID								
1151636						NaN		
1045635	Chronic kidney disease stage 4; Kidney disorder							
1068308						NaN		
1136479						None		
1154152						NaN		
	HISTORY	PRIOR_VAX					\	
VAERS_ID								
1151636				CLL, CKD		NaN		
1045635	Medical History/Concurrent Conditions: Pacemak...					NaN		
1068308	Medical History/Concurrent Conditions: Type 2 ...					NaN		
1136479				None		NaN		
1154152					NaN	NaN		

ALLERGIES		Allsymptoms
VAERS_ID		
1151636	sulfa	Abdomen scanAstheniaBacterial infectionBilevel...
1045635	NaN	Abdominal discomfortAstheniaBody temperatureCo...
1068308	NaN	Abdominal discomfortCardiac arrestComputerised...
1136479	unknown	Abdominal discomfortBack painLoss of conscious...
1154152	NaN	Abdominal discomfortAcute kidney injuryAgitati...

[5 rows x 21 columns]

In [360...]

```
#Subsetting out those without underlying conditions
list1=["NONE","None","none","","","0","-","zero","No","Comments","NAME?","denies","unknown","unsure"]
Nounderlying=died[died['HISTORY'].isin(list1)]
```

In [361...]

Nounderlying.info()

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 236 entries, 1136479 to 1306869
Data columns (total 21 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   VAX_TYPE    236 non-null    object  
 1   VAX_MANU    236 non-null    object  
 2   RECVDATE   236 non-null    object  
 3   STATE       226 non-null    object  
 4   AGE_YRS     236 non-null    float64 
 5   CAGE_YR     236 non-null    float64 
 6   SEX          236 non-null    object  
 7   RPT_DATE    0 non-null     object  
 8   DIED         236 non-null    object  
 9   DATEDIED    228 non-null    object  
 10  HOSPDAYS   83 non-null    float64 
 11  RECOVD      230 non-null    object  
 12  VAX_DATE    236 non-null    object  
 13  ONSET_DATE  235 non-null    object  
 14  NUMDAYS     235 non-null    float64 
 15  OTHER_MEDS  223 non-null    object  
 16  CUR_ILL     231 non-null    object  
 17  HISTORY     236 non-null    object  
 18  PRIOR_VAX   2 non-null     object  
 19  ALLERGIES   231 non-null    object  
 20  Allsymptoms 236 non-null    object
```

```
dtypes: float64(4), object(17)
memory usage: 40.6+ KB
```

In [362]:

```
#use of itterows
for index, rows in Nounderlying.iterrows():
    print(index, ': ', 'The Patient was', rows["AGE_YRS"], 'and their allergy condition was ', rows["ALLERGIES"], '.')
```

1136479 :	The Patient was 68.0 and their allergy condition was	unknown .
1221329 :	The Patient was 62.0 and their allergy condition was	none .
1221329 :	The Patient was 62.0 and their allergy condition was	none .
1719415 :	The Patient was 69.0 and their allergy condition was	none known .
1362539 :	The Patient was 44.0 and their allergy condition was	none .
1737230 :	The Patient was 76.0 and their allergy condition was	Nka .
1737230 :	The Patient was 76.0 and their allergy condition was	Nka .
1343266 :	The Patient was 55.0 and their allergy condition was	Cipro .
1414988 :	The Patient was 52.0 and their allergy condition was	not that report source is aware of .
1414988 :	The Patient was 52.0 and their allergy condition was	not that report source is aware of .
1736473 :	The Patient was 88.0 and their allergy condition was	None .
1334527 :	The Patient was 28.0 and their allergy condition was	Seasonal allergies only .
1512493 :	The Patient was 35.0 and their allergy condition was	None known .
1306869 :	The Patient was 67.0 and their allergy condition was	unknown .
1006168 :	The Patient was 58.0 and their allergy condition was	penicillin .
1659476 :	The Patient was 83.0 and their allergy condition was	None .
1151915 :	The Patient was 66.0 and their allergy condition was	No known allergies .
1337755 :	The Patient was 74.0 and their allergy condition was	unknown .
1337755 :	The Patient was 74.0 and their allergy condition was	unknown .
1361035 :	The Patient was 71.0 and their allergy condition was	PCN .
1180051 :	The Patient was 70.0 and their allergy condition was	unknown .
1180051 :	The Patient was 70.0 and their allergy condition was	unknown .
1830620 :	The Patient was 34.0 and their allergy condition was	None .
1026671 :	The Patient was 95.0 and their allergy condition was	none .
1077236 :	The Patient was 94.0 and their allergy condition was	unknown .
1122080 :	The Patient was 46.0 and their allergy condition was	Augmentin-itching .
1374720 :	The Patient was 40.0 and their allergy condition was	phenothiazines .
1374720 :	The Patient was 40.0 and their allergy condition was	phenothiazines .
1624319 :	The Patient was 20.0 and their allergy condition was	NKDA .
1297282 :	The Patient was 90.0 and their allergy condition was	No .
1454883 :	The Patient was 78.0 and their allergy condition was	No .
1159535 :	The Patient was 29.0 and their allergy condition was	none .
1696875 :	The Patient was 62.0 and their allergy condition was	Shellfish containing products .
1465600 :	The Patient was 78.0 and their allergy condition was	Sulfa medications .
1465600 :	The Patient was 78.0 and their allergy condition was	Sulfa medications .
1531963 :	The Patient was 68.0 and their allergy condition was	None .

1121695 : The Patient was 21.0 and their allergy condition was None .
1737079 : The Patient was 55.0 and their allergy condition was Penicillin .
1347148 : The Patient was 65.0 and their allergy condition was None .
1797997 : The Patient was 44.0 and their allergy condition was none .
1122643 : The Patient was 86.0 and their allergy condition was None .
1526275 : The Patient was 97.0 and their allergy condition was Sulfa, highly sensitive to many meds. .
1431289 : The Patient was 13.0 and their allergy condition was none .
1515162 : The Patient was 38.0 and their allergy condition was None .
1828901 : The Patient was 17.0 and their allergy condition was none .
1700774 : The Patient was 26.0 and their allergy condition was NKDA .
1205036 : The Patient was 65.0 and their allergy condition was None .
1213306 : The Patient was 64.0 and their allergy condition was None .
1213306 : The Patient was 64.0 and their allergy condition was None .
1274722 : The Patient was 45.0 and their allergy condition was nan .
1301096 : The Patient was 61.0 and their allergy condition was no .
1391864 : The Patient was 48.0 and their allergy condition was none .
1044420 : The Patient was 36.0 and their allergy condition was none .
1044420 : The Patient was 36.0 and their allergy condition was none .
1290128 : The Patient was 36.0 and their allergy condition was None .
1509660 : The Patient was 54.0 and their allergy condition was nan .
1281552 : The Patient was 62.0 and their allergy condition was nan .
1582987 : The Patient was 25.0 and their allergy condition was No .
1104384 : The Patient was 69.0 and their allergy condition was None .
1209906 : The Patient was 75.0 and their allergy condition was none .
1267350 : The Patient was 69.0 and their allergy condition was None .
1354898 : The Patient was 45.0 and their allergy condition was None .
1430291 : The Patient was 43.0 and their allergy condition was NKDA .
1430291 : The Patient was 43.0 and their allergy condition was NKDA .
1670758 : The Patient was 81.0 and their allergy condition was Zithromax .
1764974 : The Patient was 15.0 and their allergy condition was None .
1225829 : The Patient was 61.0 and their allergy condition was None .
1246110 : The Patient was 67.0 and their allergy condition was None .
1267587 : The Patient was 98.0 and their allergy condition was KNDA .
1376953 : The Patient was 94.0 and their allergy condition was None .
1401971 : The Patient was 62.0 and their allergy condition was none .
1732186 : The Patient was 23.0 and their allergy condition was none .
1069009 : The Patient was 94.0 and their allergy condition was None .
1175492 : The Patient was 87.0 and their allergy condition was unknown .
1004811 : The Patient was 62.0 and their allergy condition was None .
1095435 : The Patient was 51.0 and their allergy condition was nan .
1133712 : The Patient was 47.0 and their allergy condition was only reported allergy was to black walnuts .
1145526 : The Patient was 38.0 and their allergy condition was Unknown .
1240207 : The Patient was 49.0 and their allergy condition was None known .
1322484 : The Patient was 37.0 and their allergy condition was No .

1365485	:	The Patient was 30.0 and their allergy condition was	None .
1365485	:	The Patient was 30.0 and their allergy condition was	None .
1400337	:	The Patient was 41.0 and their allergy condition was	No known allergies to food or other products .
1400337	:	The Patient was 41.0 and their allergy condition was	No known allergies to food or other products .
1617585	:	The Patient was 44.0 and their allergy condition was	none .
1617585	:	The Patient was 44.0 and their allergy condition was	none .
1654078	:	The Patient was 67.0 and their allergy condition was	None .
1654078	:	The Patient was 67.0 and their allergy condition was	None .
1764890	:	The Patient was 44.0 and their allergy condition was	None .
933846	:	The Patient was 91.0 and their allergy condition was	NKDA .
1273487	:	The Patient was 78.0 and their allergy condition was	sulfa .
1283733	:	The Patient was 60.0 and their allergy condition was	none .
1194540	:	The Patient was 64.0 and their allergy condition was	PCN and Codeine .
1101884	:	The Patient was 30.0 and their allergy condition was	None .
1700774	:	The Patient was 26.0 and their allergy condition was	NKDA .
1121695	:	The Patient was 21.0 and their allergy condition was	None .
1486852	:	The Patient was 21.0 and their allergy condition was	none .
1700415	:	The Patient was 69.0 and their allergy condition was	NONE .
1713499	:	The Patient was 76.0 and their allergy condition was	None .
1700774	:	The Patient was 26.0 and their allergy condition was	NKDA .
1336767	:	The Patient was 19.0 and their allergy condition was	None .
1374169	:	The Patient was 47.0 and their allergy condition was	No .
1147793	:	The Patient was 79.0 and their allergy condition was	none .
1431289	:	The Patient was 13.0 and their allergy condition was	none .
1085478	:	The Patient was 44.0 and their allergy condition was	PCN .
1205684	:	The Patient was 58.0 and their allergy condition was	None .
1624319	:	The Patient was 20.0 and their allergy condition was	NKDA .
943397	:	The Patient was 28.0 and their allergy condition was	Ceclor, Penicillin, Sulfa .
1308207	:	The Patient was 40.0 and their allergy condition was	nka .
1670340	:	The Patient was 27.0 and their allergy condition was	nkda .
1321140	:	The Patient was 78.0 and their allergy condition was	none .
1700774	:	The Patient was 26.0 and their allergy condition was	NKDA .
1060190	:	The Patient was 70.0 and their allergy condition was	unknown .
1159535	:	The Patient was 29.0 and their allergy condition was	none .
1214640	:	The Patient was 46.0 and their allergy condition was	None .
1244990	:	The Patient was 38.0 and their allergy condition was	None .
1306869	:	The Patient was 67.0 and their allergy condition was	unknown .
1259030	:	The Patient was 70.0 and their allergy condition was	None .
1549114	:	The Patient was 75.0 and their allergy condition was	Penicillin Aspirin Tylenol .
1679277	:	The Patient was 95.0 and their allergy condition was	None .
1061434	:	The Patient was 97.0 and their allergy condition was	None .
1821282	:	The Patient was 93.0 and their allergy condition was	NKDA .
1775828	:	The Patient was 49.0 and their allergy condition was	NONE .
1828901	:	The Patient was 17.0 and their allergy condition was	none .

1833119 : The Patient was 49.0 and their allergy condition was None .
1205863 : The Patient was 73.0 and their allergy condition was None .
1466685 : The Patient was 35.0 and their allergy condition was NONE .
1330319 : The Patient was 70.0 and their allergy condition was none .
1531963 : The Patient was 68.0 and their allergy condition was None .
1723124 : The Patient was 72.0 and their allergy condition was Unknown allergies .
1723124 : The Patient was 72.0 and their allergy condition was Unknown allergies .
1415733 : The Patient was 53.0 and their allergy condition was No allergies .
1455120 : The Patient was 81.0 and their allergy condition was None .
1455120 : The Patient was 81.0 and their allergy condition was None .
1821256 : The Patient was 89.0 and their allergy condition was none .
1582941 : The Patient was 85.0 and their allergy condition was Penicillin, some statins .
1122080 : The Patient was 46.0 and their allergy condition was Augmentin-itching .
1213306 : The Patient was 64.0 and their allergy condition was None .
1213306 : The Patient was 64.0 and their allergy condition was None .
1430291 : The Patient was 43.0 and their allergy condition was NKDA .
1430291 : The Patient was 43.0 and their allergy condition was NKDA .
1159535 : The Patient was 29.0 and their allergy condition was none .
1535217 : The Patient was 64.0 and their allergy condition was none .
1679277 : The Patient was 95.0 and their allergy condition was None .
1301096 : The Patient was 61.0 and their allergy condition was no .
1024067 : The Patient was 54.0 and their allergy condition was No .
1114822 : The Patient was 51.0 and their allergy condition was none .
1808117 : The Patient was 80.0 and their allergy condition was unknown .
1044420 : The Patient was 36.0 and their allergy condition was none .
1044420 : The Patient was 36.0 and their allergy condition was none .
1241805 : The Patient was 45.0 and their allergy condition was none .
1029374 : The Patient was 81.0 and their allergy condition was none .
1052049 : The Patient was 67.0 and their allergy condition was None known .
1069728 : The Patient was 47.0 and their allergy condition was None .
1103970 : The Patient was 66.0 and their allergy condition was no .
1104384 : The Patient was 69.0 and their allergy condition was None .
1159101 : The Patient was 84.0 and their allergy condition was None .
1207687 : The Patient was 70.0 and their allergy condition was none .
1218422 : The Patient was 67.0 and their allergy condition was none .
1218422 : The Patient was 67.0 and their allergy condition was none .
1273487 : The Patient was 78.0 and their allergy condition was sulfa .
1273940 : The Patient was 47.0 and their allergy condition was None .
1290128 : The Patient was 36.0 and their allergy condition was None .
1327525 : The Patient was 82.0 and their allergy condition was none known .
1334527 : The Patient was 28.0 and their allergy condition was Seasonal allergies only .
1376795 : The Patient was 45.0 and their allergy condition was None .
1431289 : The Patient was 13.0 and their allergy condition was none .
1526275 : The Patient was 97.0 and their allergy condition was Sulfa, highly sensitive to many meds. .

1657576 : The Patient was 87.0 and their allergy condition was 0 .
1723584 : The Patient was 68.0 and their allergy condition was None .
1830620 : The Patient was 34.0 and their allergy condition was None .
1700415 : The Patient was 69.0 and their allergy condition was NONE .
1209906 : The Patient was 75.0 and their allergy condition was none .
1122080 : The Patient was 46.0 and their allergy condition was Augmentin-itching .
1401971 : The Patient was 62.0 and their allergy condition was none .
1670340 : The Patient was 27.0 and their allergy condition was nkda .
1362539 : The Patient was 44.0 and their allergy condition was none .
1151915 : The Patient was 66.0 and their allergy condition was No known allergies .
1486852 : The Patient was 21.0 and their allergy condition was none .
1828901 : The Patient was 17.0 and their allergy condition was none .
1430291 : The Patient was 43.0 and their allergy condition was NKDA .
1430291 : The Patient was 43.0 and their allergy condition was NKDA .
1515162 : The Patient was 38.0 and their allergy condition was None .
1700774 : The Patient was 26.0 and their allergy condition was NKDA .
1797997 : The Patient was 44.0 and their allergy condition was none .
1194540 : The Patient was 64.0 and their allergy condition was PCN and Codeine .
1278019 : The Patient was 86.0 and their allergy condition was none .
1085478 : The Patient was 44.0 and their allergy condition was PCN .
1180051 : The Patient was 70.0 and their allergy condition was unknown .
1180051 : The Patient was 70.0 and their allergy condition was unknown .
1736473 : The Patient was 88.0 and their allergy condition was None .
1535217 : The Patient was 64.0 and their allergy condition was none .
1159535 : The Patient was 29.0 and their allergy condition was none .
1700415 : The Patient was 69.0 and their allergy condition was NONE .
1455120 : The Patient was 81.0 and their allergy condition was None .
1455120 : The Patient was 81.0 and their allergy condition was None .
1274722 : The Patient was 45.0 and their allergy condition was nan .
1004811 : The Patient was 62.0 and their allergy condition was None .
1145526 : The Patient was 38.0 and their allergy condition was Unknown .
1205036 : The Patient was 65.0 and their allergy condition was None .
1700774 : The Patient was 26.0 and their allergy condition was NKDA .
1006168 : The Patient was 58.0 and their allergy condition was penicillin .
1431289 : The Patient was 13.0 and their allergy condition was none .
1159535 : The Patient was 29.0 and their allergy condition was none .
1670758 : The Patient was 81.0 and their allergy condition was Zithromax .
1334527 : The Patient was 28.0 and their allergy condition was Seasonal allergies only .
1322484 : The Patient was 37.0 and their allergy condition was No .
1306869 : The Patient was 67.0 and their allergy condition was unknown .
1374169 : The Patient was 47.0 and their allergy condition was No .
1401971 : The Patient was 62.0 and their allergy condition was none .
1828901 : The Patient was 17.0 and their allergy condition was none .
1121695 : The Patient was 21.0 and their allergy condition was None .

```
1624319 : The Patient was 20.0 and their allergy condition was NKDA .
1122080 : The Patient was 46.0 and their allergy condition was Augmentin-itching .
1515162 : The Patient was 38.0 and their allergy condition was None .
1209906 : The Patient was 75.0 and their allergy condition was none .
1044420 : The Patient was 36.0 and their allergy condition was none .
1044420 : The Patient was 36.0 and their allergy condition was none .
1159535 : The Patient was 29.0 and their allergy condition was none .
1321140 : The Patient was 78.0 and their allergy condition was none .
1764974 : The Patient was 15.0 and their allergy condition was None .
1101884 : The Patient was 30.0 and their allergy condition was None .
1330319 : The Patient was 70.0 and their allergy condition was none .
1830620 : The Patient was 34.0 and their allergy condition was None .
1700774 : The Patient was 26.0 and their allergy condition was NKDA .
1430291 : The Patient was 43.0 and their allergy condition was NKDA .
1430291 : The Patient was 43.0 and their allergy condition was NKDA .
1180051 : The Patient was 70.0 and their allergy condition was unknown .
1180051 : The Patient was 70.0 and their allergy condition was unknown .
1122080 : The Patient was 46.0 and their allergy condition was Augmentin-itching .
1085478 : The Patient was 44.0 and their allergy condition was PCN .
1122080 : The Patient was 46.0 and their allergy condition was Augmentin-itching .
1151915 : The Patient was 66.0 and their allergy condition was No known allergies .
1044420 : The Patient was 36.0 and their allergy condition was none .
1044420 : The Patient was 36.0 and their allergy condition was none .
1306869 : The Patient was 67.0 and their allergy condition was unknown .
```

In [363...]

```
#Average age of death post vaccine
died["AGE_YRS"].mean()
```

Out[363...]

71.77741196679072

In [364...]

```
#Average age of death with no underlying symptoms
Nounderlying["AGE_YRS"].mean()
```

Out[364...]

54.44915254237288

In [365...]

```
list2=["PFIZER\BIONTECH","MODERNA"]
mRNA=df[df['VAX_MANU'].isin(list2)]
mRNA["VAX_MANU"].describe()
```

Out[365...]

count 267835

```
unique      2
top        MODERNA
freq     134634
Name: VAX_MANU, dtype: object
```

In [366...]

```
mRNA.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 267835 entries, 1343801 to 1179026
Data columns (total 52 columns):
 #   Column           Non-Null Count  Dtype  
--- 
 0   SYMPTOM1         267835 non-null   object 
 1   SYMPTOMVERSION1  267835 non-null   float64
 2   SYMPTOM2         267835 non-null   object 
 3   SYMPTOMVERSION2  267835 non-null   float64
 4   SYMPTOM3         267835 non-null   object 
 5   SYMPTOMVERSION3  267835 non-null   float64
 6   SYMPTOM4         267835 non-null   object 
 7   SYMPTOMVERSION4  267835 non-null   float64
 8   SYMPTOM5         267835 non-null   object 
 9   SYMPTOMVERSION5  267835 non-null   float64
 10  VAX_TYPE         267835 non-null   object 
 11  VAX_MANU         267835 non-null   object 
 12  VAX_LOT          200599 non-null   object 
 13  VAX_DOSE_SERIES  267656 non-null   object 
 14  VAX_ROUTE        219522 non-null   object 
 15  VAX_SITE         225970 non-null   object 
 16  VAX_NAME         267835 non-null   object 
 17  RECVDATE         267835 non-null   object 
 18  STATE            253118 non-null   object 
 19  AGE_YRS          267835 non-null   float64
 20  CAGE_YR          235707 non-null   float64
 21  CAGE_MO          196 non-null    float64
 22  SEX              267835 non-null   object 
 23  RPT_DATE         62 non-null    object 
 24  SYMPTOM_TEXT     267835 non-null   object 
 25  DIED             6279 non-null   object 
 26  DATEDIED        6071 non-null   object 
 27  L_THREAT          11794 non-null   object 
 28  ER_VISIT         15 non-null    object 
 29  HOSPITAL         44637 non-null   object 
 30  HOSPDAYS         267835 non-null   float64
```

```

31 X_STAY           298 non-null   object
32 DISABLE          11419 non-null  object
33 RECOVD          255251 non-null  object
34 VAX_DATE         266242 non-null  object
35 ONSET_DATE       262762 non-null  object
36 NUMDAYS          256558 non-null  float64
37 LAB_DATA         169638 non-null  object
38 V_ADMINBY        267835 non-null  object
39 V_FUNDBY         64 non-null    object
40 OTHER_MEDS       205290 non-null  object
41 CUR_ILL          159319 non-null  object
42 HISTORY          209101 non-null  object
43 PRIOR_VAX        19997 non-null   object
44 SPLTTYPE         61465 non-null  object
45 FORM_VERS        267835 non-null  int64
46 TODAYS_DATE      266232 non-null  object
47 BIRTH_DEFECT     283 non-null    object
48 OFC_VISIT        81618 non-null  object
49 ER_ED_VISIT      67233 non-null  object
50 ALLERGIES         180254 non-null  object
51 Allsymptoms      267835 non-null  object
dtypes: float64(10), int64(1), object(41)
memory usage: 108.3+ MB

```

In [367...]

```

list3=["JANSSEN"]
nonmRNA=df[df['VAX_MANU'].isin(list3)]
nonmRNA["VAX_MANU"].describe()

```

Out[367...]

count	29647
unique	1
top	JANSSEN
freq	29647
Name:	VAX_MANU, dtype: object

In [368...]

```

df_all_Manus = pd.concat([mRNA, nonmRNA], ignore_index=True)
df_all_Manus.drop_duplicates(subset="Allsymptoms", keep='first', inplace=False, ignore_index=False)
df_all_Manus["VAX_MANU"].describe()

```

Out[368...]

count	297482
unique	3
top	MODERNA

```
freq      134634
Name: VAX_MANU, dtype: object
```

In [369...]

```
#use of iloc for indexing
dfsmaller=df.iloc[:,[12,13,14]]
dfextra=df.iloc[:,[15,16,17]]
```

In [370...]

```
#examine the split dataframes
dfsmaller.head()
dfsmaller.shape
dfextra.head()
dfextra.shape
```

Out[370...]

(298127, 3)

In [371...]

```
#merging dataframes
recombineddf=pd.concat([dfsmaller, dfextra], axis=1)
```

In [372...]

```
#examine the remerged dataframes
recombineddf.head()
recombineddf.shape
```

Out[372...]

(298127, 6)

In [373...]

```
Nounderlying.sort_values(by="VAX_DATE")
```

Out[373...]

	VAX_TYPE	VAX_MANU	RECVDATE	STATE	AGE_YRS	CAGE_YR	SEX	RPT_DATE	DIED	DATEDIED	...	RECOVD	VAX_DATE	ONSET_DATE
VAERS_ID														
933846	COVID19	MODERNA	01/11/2021	WV	91.0	91.0	F	NaN	Y	01/04/2021	...	N	01/02/2021	01/02/2021
1026671	COVID19	MODERNA	02/12/2021	TN	95.0	95.0	F	NaN	Y	01/08/2021	...	N	01/06/2021	01/07/2021

VAX_TYPE	VAX_MANU	RECVDATE	STATE	AGE_YRS	CAGE_YR	SEX	RPT_DATE	DIED	DATEDIED	...	RECOVD	VAX_DATE	ONSET_DATI
VAERS_ID													
1180051	COVID19	MODERNA	04/08/2021	KY	70.0	70.0	F	NaN	Y	03/31/2021	...	N	01/07/2021
1180051	COVID19	MODERNA	04/08/2021	KY	70.0	70.0	F	NaN	Y	03/31/2021	...	N	01/07/2021
1180051	COVID19	MODERNA	04/08/2021	KY	70.0	70.0	F	NaN	Y	03/31/2021	...	N	01/07/2021
...
1821282	COVID19	PFIZER\BIONTECH	10/27/2021	IA	93.0	93.0	F	NaN	Y	10/06/2021	...	N	09/28/2021
943397	COVID19	PFIZER\BIONTECH	01/14/2021	NJ	28.0	28.0	M	NaN	Y	01/11/2021	...	N	12/23/2020
1737230	COVID19	MODERNA	09/27/2021	MO	76.0	76.0	M	NaN	Y	06/09/2021	...	N	12/30/2020
1737230	COVID19	MODERNA	09/27/2021	MO	76.0	76.0	M	NaN	Y	06/09/2021	...	N	12/30/2020
1114822	COVID19	MODERNA	03/19/2021	LA	51.0	51.0	F	NaN	Y	01/31/2021	...	N	12/30/2020

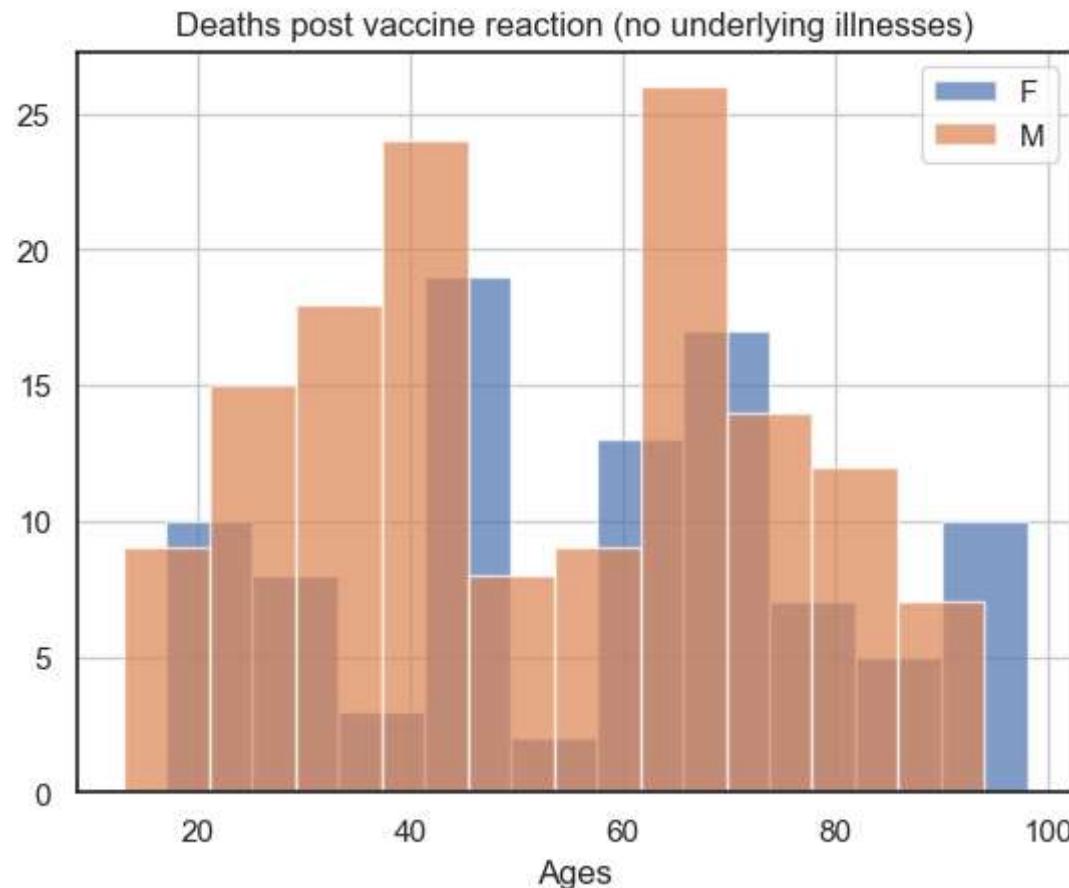
236 rows × 21 columns



In [559...]

```
#add in x axis
Nounderlying[Nounderlying["SEX"]=="F"]["AGE_YRS"].hist(alpha=.7)
Nounderlying[Nounderlying["SEX"]=="M"]["AGE_YRS"].hist(alpha=.7)
plt.legend(["F", "M"])
plt.title("Deaths post vaccine reaction (no underlying illnesses)")
```

```
plt.xlabel("Ages")
fig1=plt.gcf()
fig1.savefig('Histogram.png', dpi=300)
```



In [554...]
plt.show()

In [645...]
import numpy as np
import pandas as pd
deaths_by_vaccine=Nounderlying.pivot_table(values="AGE_YRS",index="VAX_MANU",aggfunc=[np.mean,np.median,'count'])
deaths_vaccine=deaths_by_vaccine.to_clipboard(excel=True, sep=None)
print(deaths_by_vaccine)

```
      mean   median   count
      AGE_YRS  AGE_YRS  AGE_YRS
VAX_MANU
JANSSEN      59.20000    60.0     25
MODERNA      59.87619    65.0    105
PFIZER\BIONTECH  47.95283    43.0    106
```

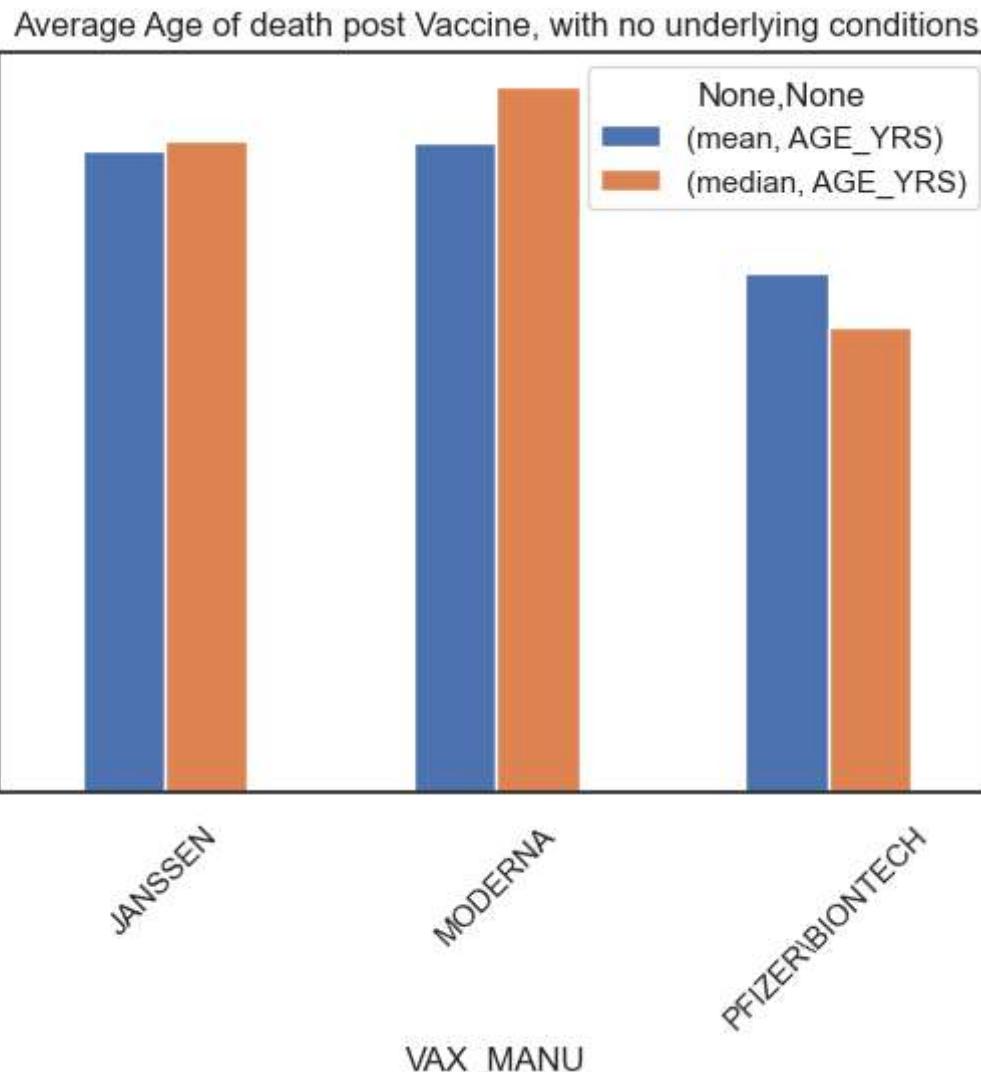
In [646...]

```
vaccine_record_count = df.pivot_table(values="Allsymptoms",index=["VAX_MANU","SEX"],aggfunc=['count'])
vax_count=vaccine_record_count.to_clipboard(excel=True, sep=None)
print(vaccine_record_count)
```

```
          count
          Allsymptoms
VAX_MANU      SEX
JANSSEN        F    21552
               M    10128
               U     914
MODERNA        F    105233
               M    32879
               U    1073
PFIZER\BIONTECH  F    99286
               M    38352
               U    1396
UNKNOWN MANUFACTURER F     455
                       M    239
                       U     9
```

In [563...]

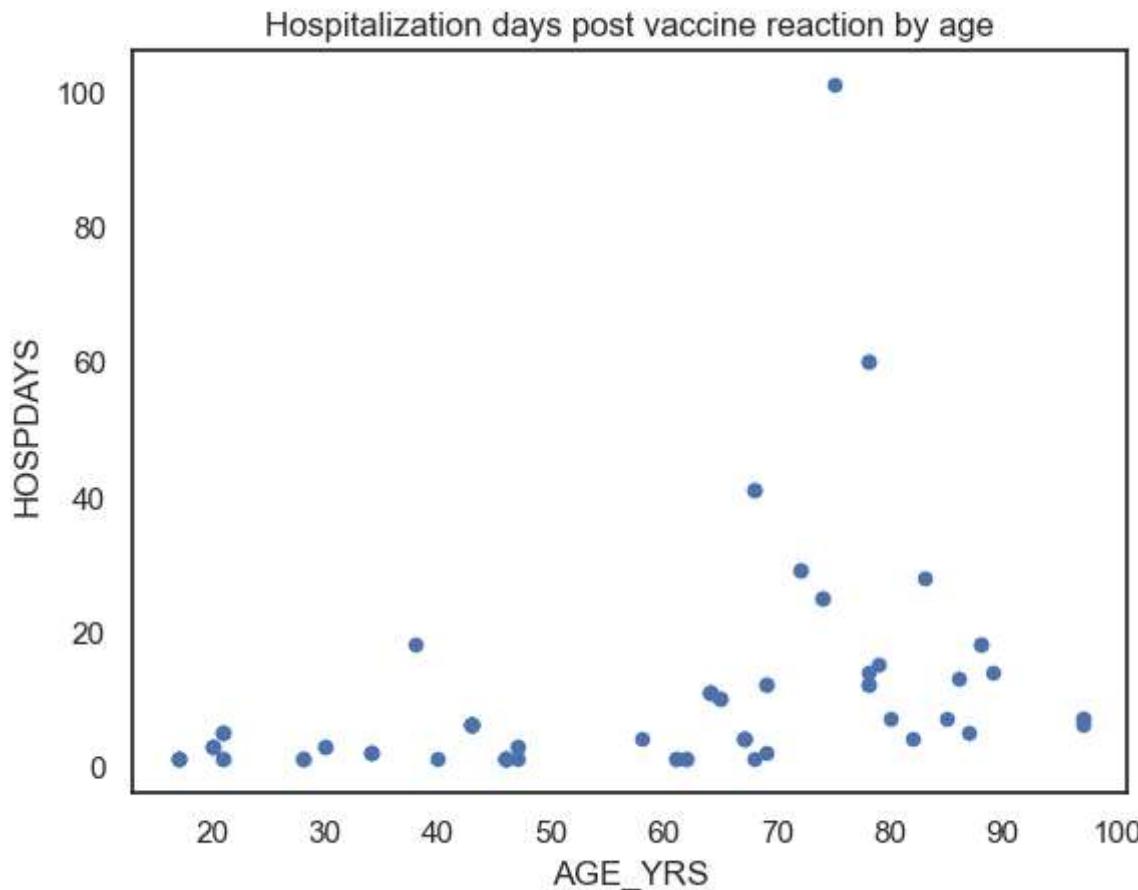
```
deaths_by_vaccine.plot(kind="bar",title="Average Age of death post Vaccine, with no underlying conditions")
plt.xticks(rotation=45)
fig1=plt.gcf()
fig1.savefig('Age_Vax_Death_Bar.png', dpi=150, bbox_inches ="tight")
plt.show()
```



In [569]:

```
Nounderlying.plot(kind="scatter",x="AGE_YRS",y="HOSPDAYS", color="C0",title="Hospitalization days post vaccine reaction by age")
fig1=plt.gcf()
fig1.savefig('Age_Hospdays.png', dpi=150, bbox_inches ="tight")

plt.show()
```



In [382...]

```
dfsmall_heart=dfsmall[dfsmall['Allsymptoms'].str.contains('cardi|heart|arrest')==True]
dfsmall_heart.describe()
```

Out[382...]

	AGE_YRS	CAGE_YR	HOSPDAYS	NUMDAYS
count	24393.000000	22911.000000	8246.000000	23724.000000
mean	48.433321	48.193968	28.638855	27.31799
std	19.776962	19.841429	1557.206522	454.49261
min	0.000000	0.000000	1.000000	0.00000
25%	33.000000	33.000000	2.000000	0.00000

	AGE_YRS	CAGE_YR	HOSPDAYS	NUMDAYS
50%	48.000000	48.000000	3.000000	2.00000
75%	64.000000	64.000000	5.000000	14.00000
max	115.000000	105.000000	99999.000000	36533.00000

In [384...]: `dfsmall_heart["AGE_YRS"].mean()`

Out[384...]: 48.43332103472308

In [588...]: `Heart_reactions = dfsmall_heart.pivot_table(values=["AGE_YRS"], index=["VAX_MANU", "SEX"], aggfunc=['count', np.median])`

`print(Heart_reactions)`

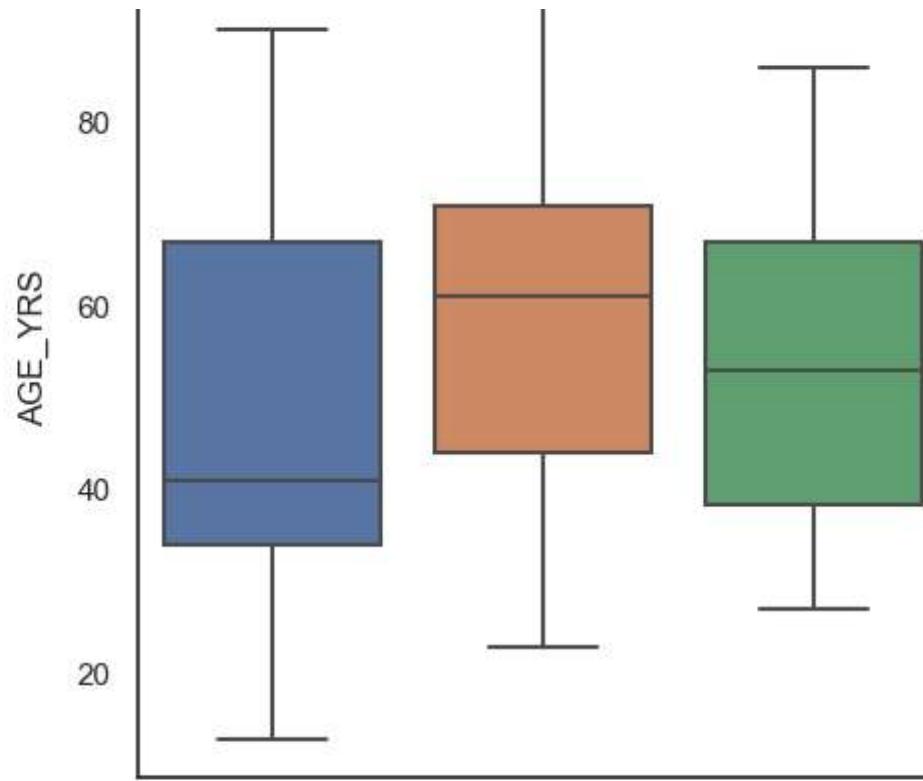
VAX_MANU	SEX	count median	
		AGE_YRS	AGE_YRS
JANSSEN	F	1289	48.0
	M	916	48.0
	U	4	36.5
MODERNA	F	5540	52.0
	M	3664	54.0
	U	31	64.0
PFIZER\BIONTECH	F	7482	48.0
	M	5346	39.0
	U	45	62.0
UNKNOWN MANUFACTURER	F	40	49.0
	M	36	50.0

<Figure size 640x480 with 0 Axes>

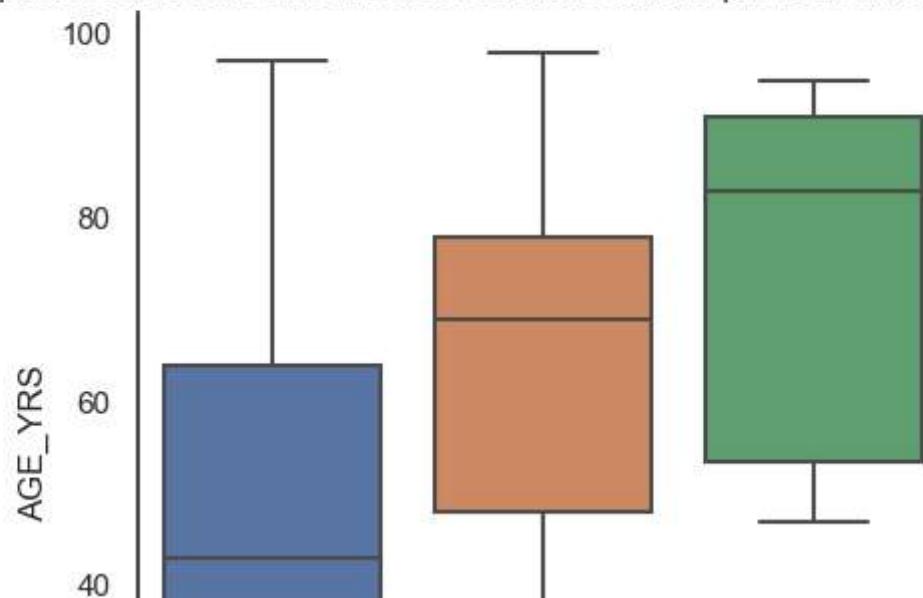
In [572...]: `sns.catplot(x="VAX_MANU", y="AGE_YRS", row="SEX", data=Nounderlying, kind="box", whis=[0,100]).set(title="Age at death post recorded v
plt.savefig('Age of death post vaccing reaction.png', dpi=500, bbox_inches = "tight")`

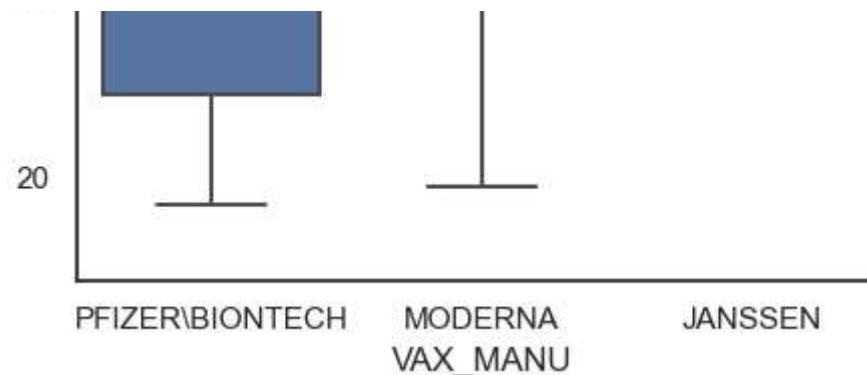
Age at death post recorded vaccine adverse reactions with no previous known underlying conditions.





Age at death post recorded vaccine adverse reactions with no previous known underlying conditions.

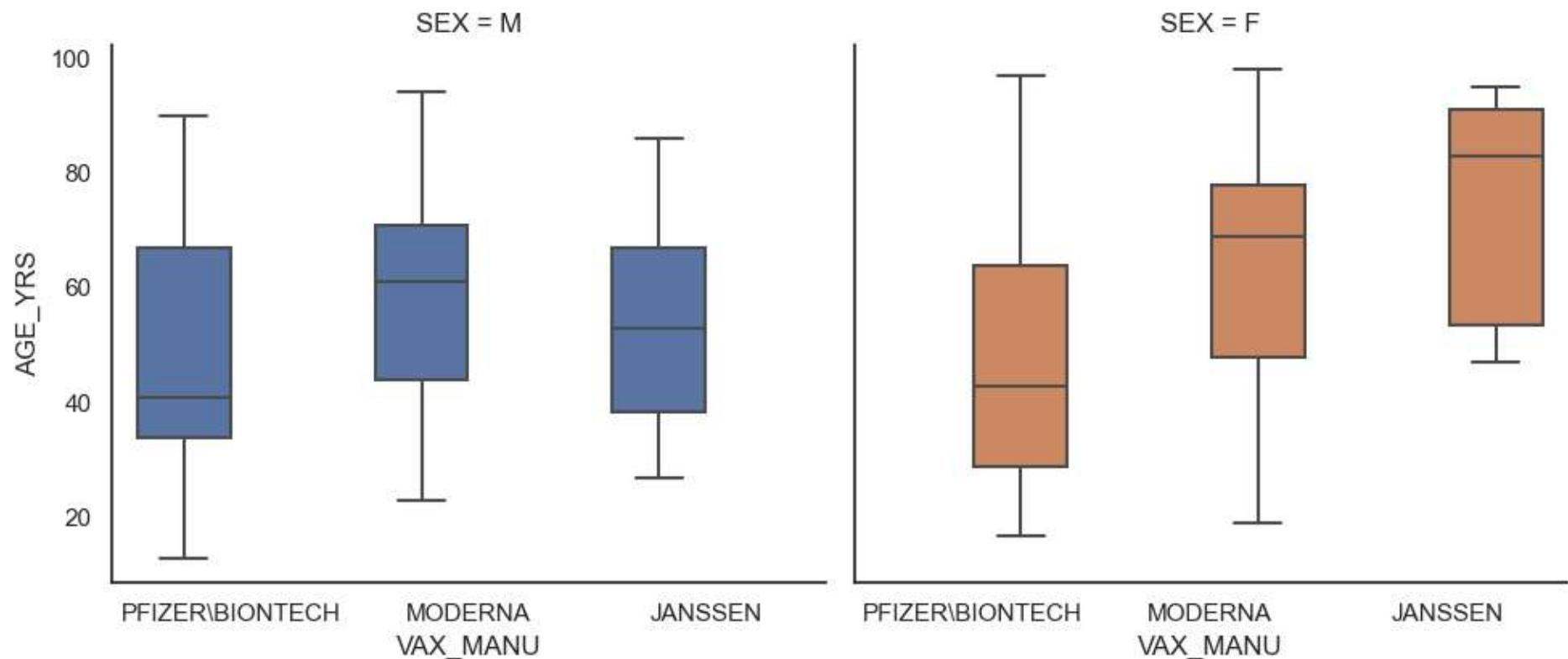




In [574...]

```
cat=sns.catplot(x="VAX_MANU",y="AGE_YRS",data=Nounderlying,kind="box", whis=[0,100], col="SEX", hue="SEX")
cat.fig.subplots_adjust(top=.8)
cat.fig.suptitle('Deaths without underlying illness by vaccine and sex')
plt.savefig('Age of death post vaccing reaction1.png', dpi=170,bbox_inches ="tight")
```

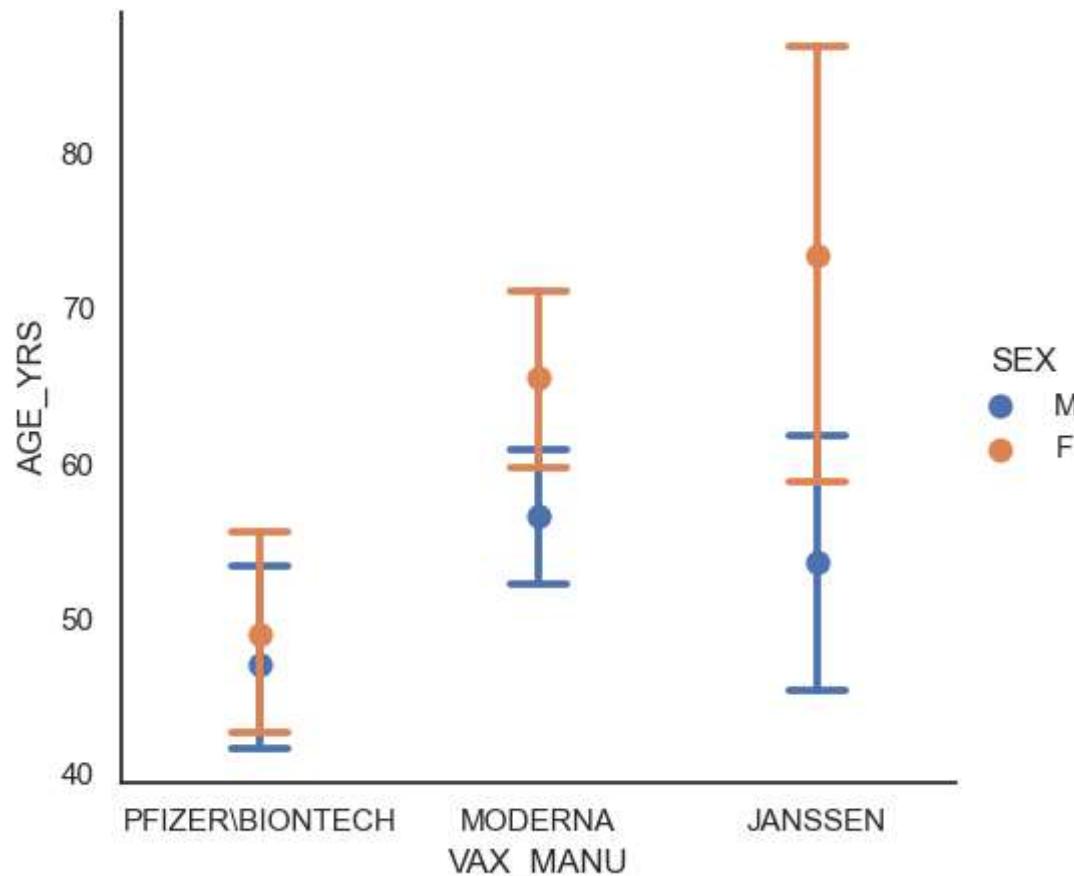
Deaths without underlying illness by vaccine and sex



In [575...]

```
cat1=sns.catplot(x="VAX_MANU",y="AGE_YRS",data=Nounderlying,kind="point", whis=[0,100], hue="SEX", join=False, capsized=0.2)
cat1.fig.subplots_adjust(top=.9)
cat1.fig.suptitle('Deaths without underlying condition by vaccine and sex')
plt.savefig('Age of death post vaccing reaction2.png', dpi=170,bbox_inches ="tight")
```

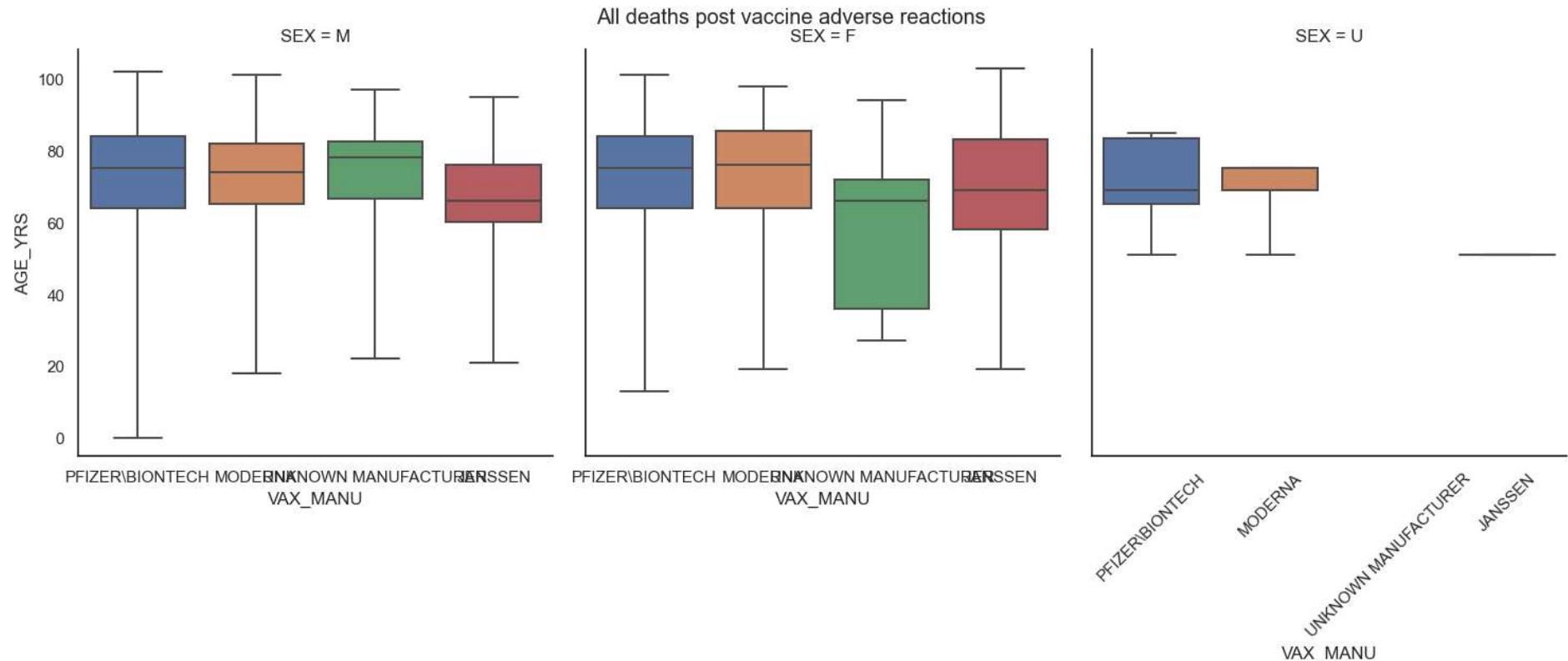
Deaths without underlying condition by vaccine and sex



In [579]:

```
cat2=sns.catplot(x="VAX_MANU",y="AGE_YRS",data=died,kind="box", whis=[0,100], col="SEX")
plt.xticks(rotation=45)
cat2.fig.subplots_adjust(top=.9)
cat2.fig.suptitle('All deaths post vaccine adverse reactions')

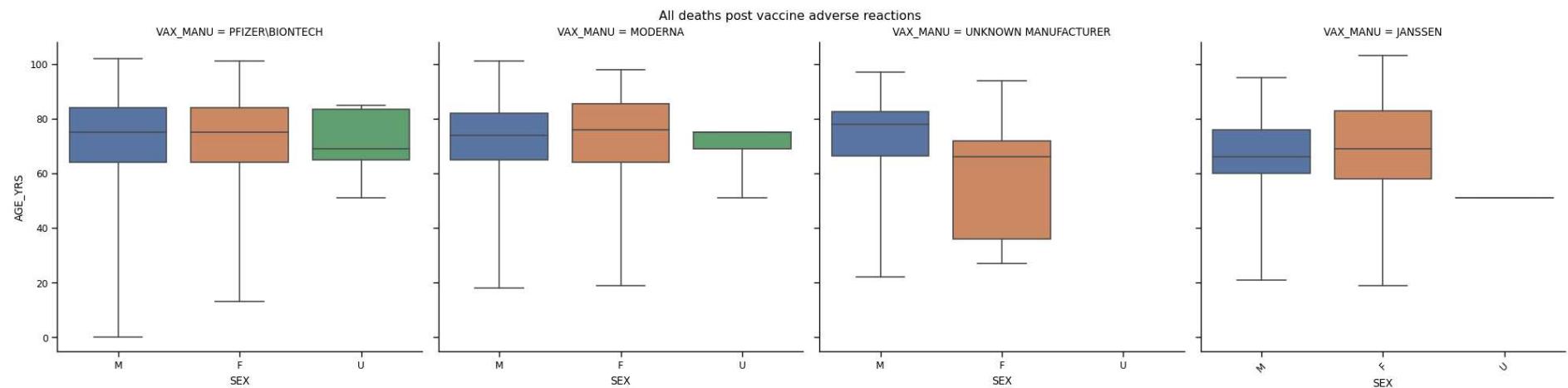
plt.savefig('Age of death post vaccing reaction3.png', dpi=170,bbox_inches ="tight")
```



In [446...]

```
cat2=sns.catplot(x="SEX",y="AGE_YRS",data=died,kind="box", whis=[0,100], col="VAX_MANU")
cat2.fig.subplots_adjust(top=.9)
cat2.fig.suptitle('All deaths post vaccine adverse reactions')
plt.xticks(rotation=45)
```

Out[446...]



In [606...]

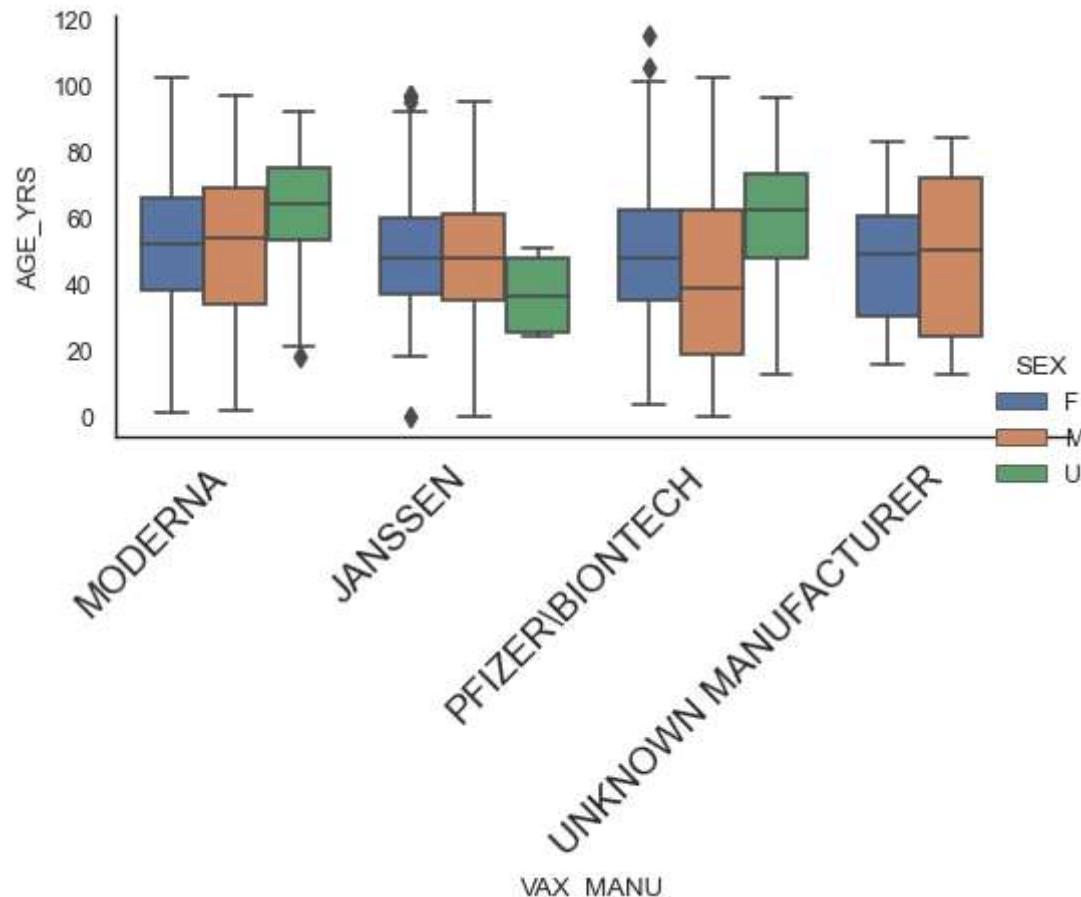
```

import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
sns.set_context("paper")
sns.set_palette("deep")
cat4=sns.catplot(x="VAX_MANU",y="AGE_YRS",data=dfsmall_heart,kind="box", hue="SEX")
cat4.fig.suptitle('Heart Conditions post vaccine adverse reactions')
plt.xticks(
    rotation=45,
    horizontalalignment='right',
    fontweight='light',
    fontsize='x-large'
)
plt.tight_layout()

plt.savefig('Heart conditions post vaccine.png', dpi=170,bbox_inches ="tight")

```

Heart Conditions post vaccine adverse reactions



In [391]:

```
PfizerBiontech=dfsmall.query("VAX_MANU == 'PFIZER\\BIONTECH'")
PfizerBiontech["VAX_MANU"].describe()
PfizerBiontech.head()
```

Out[391]:

	VAX_TYPE	VAX_MANU	RECVDATE	STATE	AGE_YRS	CAGE_YR	SEX	RPT_DATE	DIED	DATEDIED	...	RECOVD	VAX_DATE	ONSET_DATE
VAERS_ID														

VAERS_ID	VAX_TYPE	VAX_MANU	RECVDATE	STATE	AGE_YRS	CAGE_YR	SEX	RPT_DATE	DIED	DATEDIED	...	RECOVD	VAX_DATE	ONSET_DATI	
1343801	COVID19	PFIZER\BIONTECH	05/24/2021	TX	34.0	34.0	F		NaN	NaN	NaN	...	U	03/20/2021	03/23/2021
1731624	COVID19	PFIZER\BIONTECH	09/24/2021	WI	18.0	18.0	F		NaN	NaN	NaN	...	Y	09/23/2021	09/23/2021
1519755	COVID19	PFIZER\BIONTECH	08/02/2021	CT	60.0	60.0	M		NaN	NaN	NaN	...	N	05/09/2021	05/11/2021
1151636	COVID19	PFIZER\BIONTECH	03/31/2021	PA	85.0	85.0	M		NaN	Y	03/14/2021	...	N	02/03/2021	02/12/2021
1158678	COVID19	PFIZER\BIONTECH	04/02/2021	VT	74.0	NaN	F		NaN	NaN	NaN	...	N	03/05/2021	03/10/2021

5 rows × 21 columns

◀	▶
---	---

In [392...]

```
MODERNA=dfsmall.query("VAX_MANU == 'MODERNA'")  
MODERNA["AGE_YRS"]
```

Out[392...]

VAERS_ID	AGE_YRS
997550	54.0
1112292	71.0
1359013	70.0
1415517	26.0
1420601	65.0
...	
922715	38.0
1413778	31.0

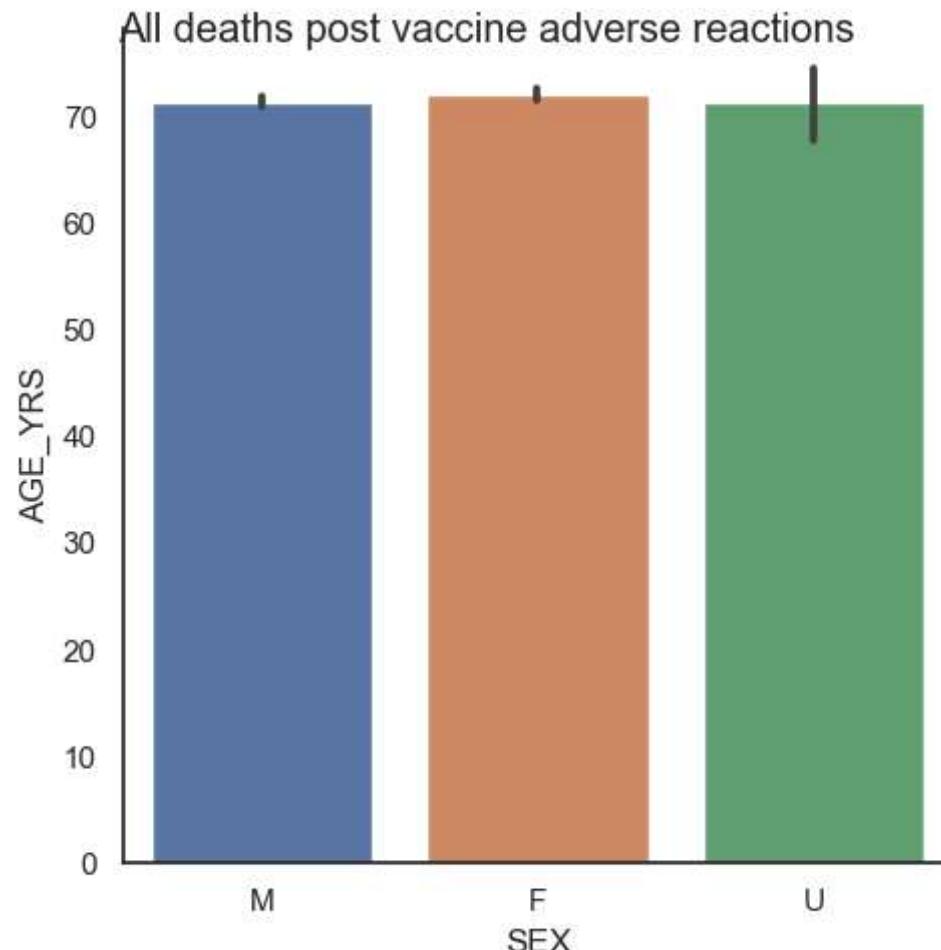
```
1591843    23.0
1591843    23.0
1142665    36.0
Name: AGE_YRS, Length: 134634, dtype: float64
```

```
In [393...]: JANSSEN=dfsmall.query("VAX_MANU == 'JANSSEN'")
```

```
In [394...]: print(deaths_by_vaccine.head())
```

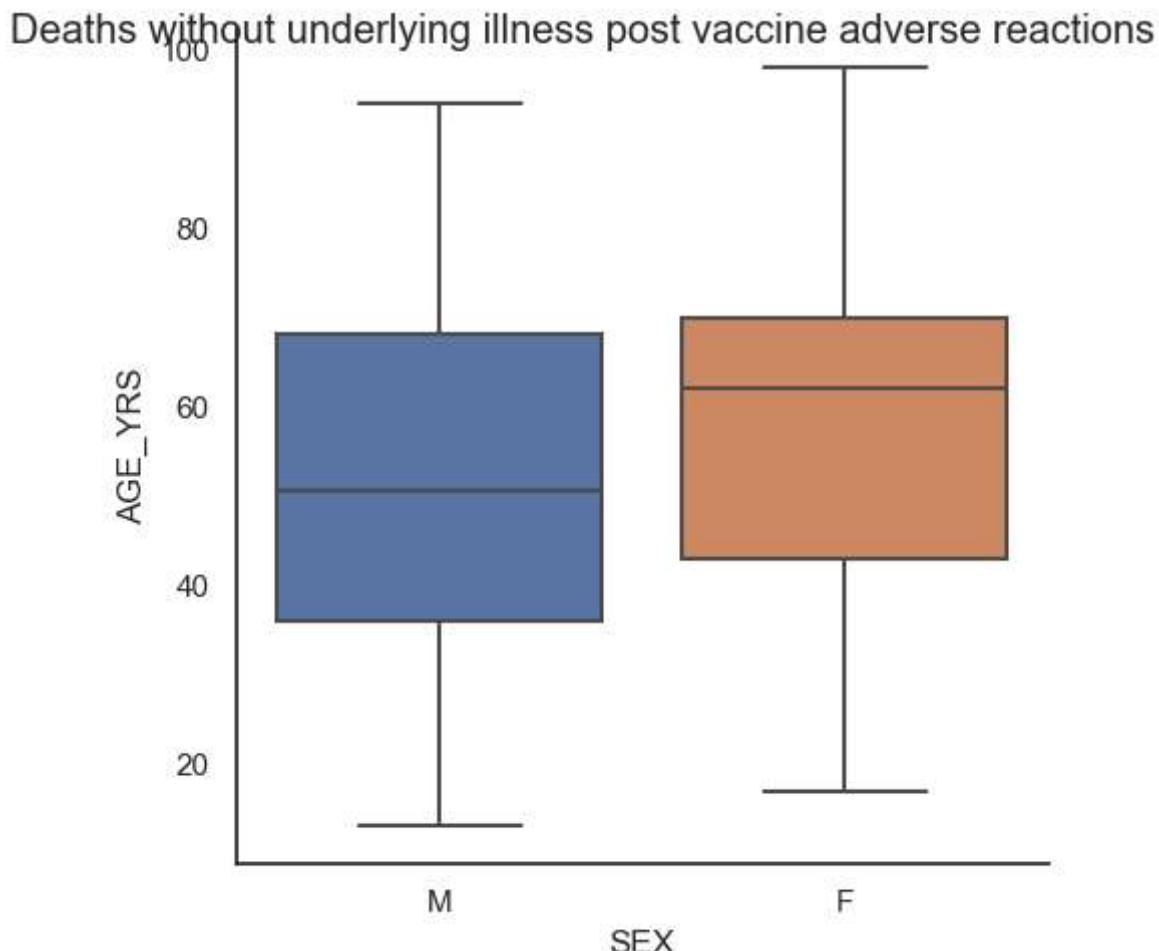
	mean	median
AGE_YRS	AGE_YRS	AGE_YRS
VAX_MANU		
JANSSEN	59.20000	60.0
MODERNA	59.87619	65.0
PFIZER\BIONTECH	47.95283	43.0

```
In [585...]: import seaborn as sns
cat3=sns.catplot(x="SEX",y="AGE_YRS",data=died,kind="bar")
cat3.fig.suptitle('All deaths post vaccine adverse reactions')
plt.savefig('All_deaths.png', dpi=170,bbox_inches ="tight")
```



In [586...]

```
cat4=sns.catplot(x="SEX",y="AGE_YRS",data=Nounderlying,kind="box", whis=[0,100])
cat4.fig.suptitle('Deaths without underlying illness post vaccine adverse reactions')
plt.savefig('Deaths_noill.png', dpi=170,bbox_inches ="tight")
```

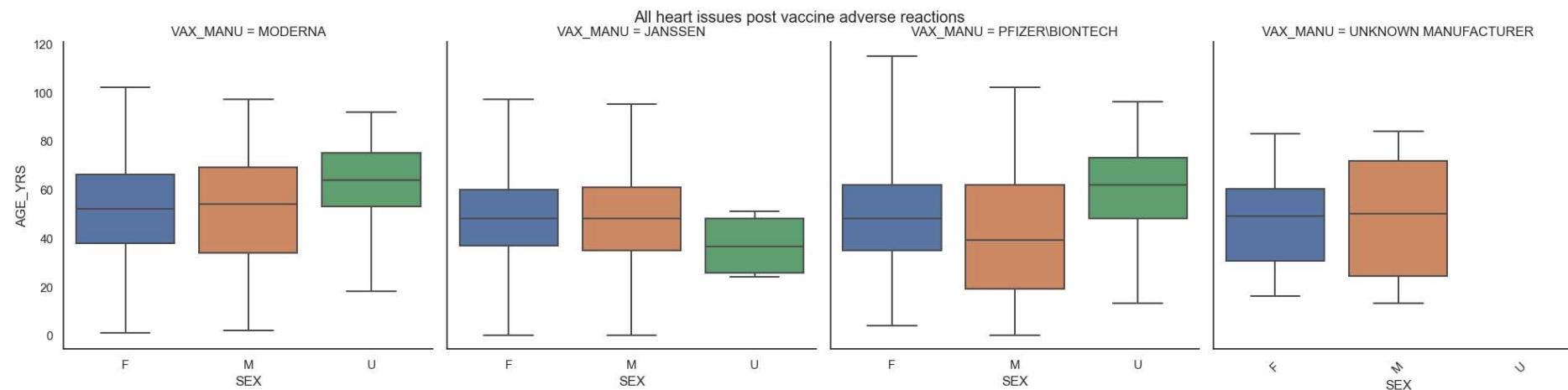


In [577...]

```
cat2=sns.catplot(x="SEX",y="AGE_YRS",data=dfsmall_heart,kind="box", whis=[0,100], col="VAX_MANU")
cat2.fig.subplots_adjust(top=.9)
cat2.fig.suptitle('All heart issues post vaccine adverse reactions')
plt.xticks(rotation=45)
```

Out[577...]

```
(array([0, 1, 2]), [Text(0, 0, 'F'), Text(1, 0, 'M'), Text(2, 0, 'U')])
```



In [467...]

```
# Function to convert Celsius to Fahrenheit using function

def convertTemp(c): #user-defined function
    # find temperature in Fahrenheit
    f = (c * 1.8) + 32
    return f

# take inputs
cel = 15

# calling function and display result
fahr = convertTemp(cel)
print('%0.1f degrees Celsius is equivalent to %0.1f degrees Fahrenheit' %(cel, fahr))
```

15.0 degrees Celsius is equivalent to 59.0 degrees Fahrenheit

In [484...]

```
# Import package using JSON
import requests

# Assign URL to variable: url
url = 'https://prodapi.metweb.ie/observations/cork/yesterday'

# Package the request, send the request and catch the response: r
r=requests.get(url)

# Decode the JSON data into a dictionary: json_data
json_data=r.json()
```

```
# Print each key-value pair in json_data
dfjson = pd.DataFrame({'col':json_data})
print (dfjson.head())
```

```
          col
0  {'name': 'Cork', 'temperature': '8', 'symbol':...}
1  {'name': 'Cork', 'temperature': '8', 'symbol':...}
2  {'name': 'Cork', 'temperature': '8', 'symbol':...}
3  {'name': 'Cork', 'temperature': '8', 'symbol':...}
4  {'name': 'Cork', 'temperature': '8', 'symbol':...}
Out[484... RangeIndex(start=0, stop=24, step=1)
```

In [479... dfjson.info()

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 24 entries, 0 to 23
Data columns (total 1 columns):
 #   Column  Non-Null Count  Dtype  
---  -- 
 0   col      24 non-null    object 
dtypes: object(1)
memory usage: 320.0+ bytes
```

In [535... #import weather data for function example
weathercork=pd.read_csv("cork-yesterday.csv",low_memory=False)
weathercork.head()

	Time	Report	Temperature °C	Wind Speed km/h	Wind Gust km/h	Wind Direction °	Rainfall mm/h	Pressure hPa
0	00:00	"Mist"	8	22	-	135	0.0	1026
1	01:00	"Mist"	8	20	-	135	0.0	1025
2	02:00	"Mist"	8	20	-	135	0.0	1025
3	03:00	"Mist"	8	20	-	90	0.0	1024
4	04:00	"Mist"	8	20	-	135	0.0	1024

In [536... import pandas as pd

```
import ssl
ssl._create_default_https_context = ssl._create_unverified_context
cork = pd.read_csv('https://www.met.ie/latest-reports/observations/download/cork/yesterday')
cork
```

Out[536...]

	Time	Report	Temperature °C	Wind Speed km/h	Wind Gust km/h	Wind Direction °	Rainfall mm/h	Pressure hPa
0	00:00	"Mist"	8	22	-	135	0.0	1026
1	01:00	"Mist"	8	20	-	135	0.0	1025
2	02:00	"Mist"	8	20	-	135	0.0	1025
3	03:00	"Mist"	8	20	-	90	0.0	1024
4	04:00	"Mist"	8	20	-	135	0.0	1024
5	05:00	"Mist"	8	19	-	135	0.0	1023
6	06:00	"Mist"	8	19	-	135	0.0	1023
7	07:00	"Mist"	8	19	-	135	0.0	1023
8	08:00	"Mist"	8	19	-	135	0.0	1023
9	09:00	"Mist"	9	19	-	135	0.0	1023
10	10:00	"Mist"	9	19	-	135	0.0	1023
11	11:00	"Mist"	9	26	-	135	0.0	1023
12	12:00	"Mist"	9	22	-	135	0.0	1023
13	13:00	"Mist"	9	24	-	135	0.0	1023
14	14:00	"Cloudy"	9	22	-	135	0.0	1022
15	15:00	"Cloudy"	9	20	-	135	0.0	1022
16	16:00	"Cloudy"	9	19	-	135	0.0	1022
17	17:00	"Cloudy"	9	19	-	135	0.0	1022
18	18:00	"Cloudy"	8	20	-	135	0.0	1022
19	19:00	"Cloudy"	8	17	-	135	0.0	1022
20	20:00	"Cloudy"	8	17	-	135	0.0	1023

Time	Report	Temperature °C	Wind Speed km/h	Wind Gust km/h	Wind Direction °	Rainfall mm/h	Pressure hPa	
21	21:00	"Mist"	8	15	-	135	0.0	1023
22	22:00	"Mist"	8	13	-	135	0.0	1023
23	23:00	"Mist"	8	17	-	135	0.0	1023

In [537...]

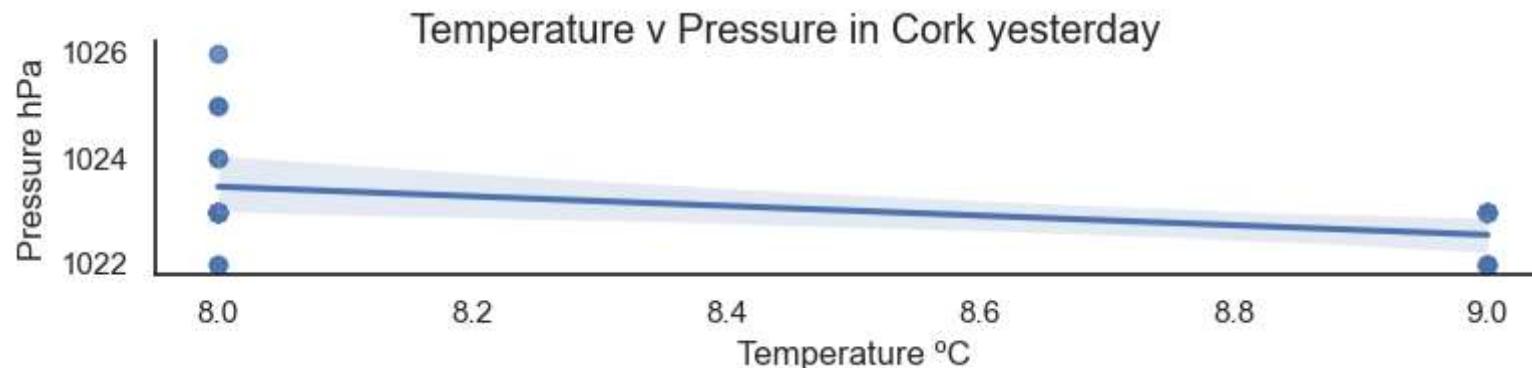
```
#apply the function to the temperature in C to add a column for temperature in F
cork["Temperature F"] = convertTemp(cork["Temperature °C"])
print(cork.head())
```

Time	Report	Temperature °C	Wind Speed km/h	Wind Gust km/h	Wind Direction °	Rainfall mm/h	Pressure hPa	Temperature F
0 00:00	"Mist"	8	22	-	135	0.0	1026	46.4
1 01:00	"Mist"	8	20	-	135	0.0	1025	46.4
2 02:00	"Mist"	8	20	-	135	0.0	1025	46.4
3 03:00	"Mist"	8	20	-	90	0.0	1024	46.4
4 04:00	"Mist"	8	20	-	135	0.0	1024	46.4

In [587...]

```
sns.set_theme(style="white")

# Plot temperature against pressure with other semantics
cork1=sns.lmplot(x ='Temperature °C', y ='Pressure hPa', height = 2, aspect = 4, data = cork)
cork1.fig.suptitle('Temperature v Pressure in Cork yesterday')
plt.savefig('weather.png', dpi=170,bbox_inches ="tight")
```



In [529...]

```
import pandas as pd
import ssl
ssl._create_default_https_context = ssl._create_unverified_context
weathercork = pd.read_csv('https://www.met.ie/latest-reports/observations/download/cork/yesterday')
```

In [531...]

```
weathercork
```

Out[531...]

	Time	Report	Temperature °C	Wind Speed km/h	Wind Gust km/h	Wind Direction °	Rainfall mm/h	Pressure hPa
0	00:00	"Mist"	8	22	-	135	0.0	1026
1	01:00	"Mist"	8	20	-	135	0.0	1025
2	02:00	"Mist"	8	20	-	135	0.0	1025
3	03:00	"Mist"	8	20	-	90	0.0	1024
4	04:00	"Mist"	8	20	-	135	0.0	1024
5	05:00	"Mist"	8	19	-	135	0.0	1023
6	06:00	"Mist"	8	19	-	135	0.0	1023
7	07:00	"Mist"	8	19	-	135	0.0	1023
8	08:00	"Mist"	8	19	-	135	0.0	1023
9	09:00	"Mist"	9	19	-	135	0.0	1023
10	10:00	"Mist"	9	19	-	135	0.0	1023

	Time	Report	Temperature °C	Wind Speed km/h	Wind Gust km/h	Wind Direction °	Rainfall mm/h	Pressure hPa
11	11:00	"Mist"	9	26	-	135	0.0	1023
12	12:00	"Mist"	9	22	-	135	0.0	1023
13	13:00	"Mist"	9	24	-	135	0.0	1023
14	14:00	"Cloudy"	9	22	-	135	0.0	1022
15	15:00	"Cloudy"	9	20	-	135	0.0	1022
16	16:00	"Cloudy"	9	19	-	135	0.0	1022
17	17:00	"Cloudy"	9	19	-	135	0.0	1022
18	18:00	"Cloudy"	8	20	-	135	0.0	1022
19	19:00	"Cloudy"	8	17	-	135	0.0	1022
20	20:00	"Cloudy"	8	17	-	135	0.0	1023
21	21:00	"Mist"	8	15	-	135	0.0	1023
22	22:00	"Mist"	8	13	-	135	0.0	1023
23	23:00	"Mist"	8	17	-	135	0.0	1023

In []: