

In [491...]

```
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[491...]

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 [492...]

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 890836 entries, 1343801 to 1598989
Data columns (total 51 columns):
```

#	Column	Non-Null Count	Dtype
0	SYMPTOM1	890836	non-null object
1	SYMPTOMVERSION1	890836	non-null float64
2	SYMPTOM2	700014	non-null object
3	SYMPTOMVERSION2	700014	non-null float64
4	SYMPTOM3	542889	non-null object
5	SYMPTOMVERSION3	542889	non-null float64
6	SYMPTOM4	414887	non-null object
7	SYMPTOMVERSION4	414887	non-null float64
8	SYMPTOM5	311516	non-null object
9	SYMPTOMVERSION5	311516	non-null float64
10	VAX_TYPE	890836	non-null object
11	VAX_MANU	890836	non-null object
12	VAX_LOT	630257	non-null object
13	VAX_DOSE_SERIES	887049	non-null object
14	VAX_ROUTE	690043	non-null object
15	VAX_SITE	677970	non-null object
16	VAX_NAME	890836	non-null object
17	RECVDATE	890836	non-null object
18	STATE	795250	non-null object
19	AGE_YRS	819268	non-null float64
20	CAGE_YR	728957	non-null float64
21	CAGE_MO	1327	non-null float64
22	SEX	890836	non-null object
23	RPT_DATE	316	non-null object
24	SYMPTOM_TEXT	890683	non-null object
25	DIED	15824	non-null object
26	DATEDIED	14610	non-null object
27	L_THREAT	22564	non-null object
28	ER_VISIT	51	non-null object
29	HOSPITAL	89924	non-null object
30	HOSPDAYS	65176	non-null float64
31	X_STAY	638	non-null object
32	DISABLE	21952	non-null object
33	RECOVD	817819	non-null object
34	VAX_DATE	840719	non-null object
35	ONSET_DATE	834734	non-null object
36	NUMDAYS	799488	non-null float64
37	LAB_DATA	417483	non-null object
38	V_ADMINBY	890836	non-null object
39	V_FUNDBY	366	non-null object
40	OTHER_MEDS	560472	non-null object
41	CUR_ILL	440894	non-null object

```

42 HISTORY      594736 non-null object
43 PRIOR_VAX   47684 non-null object
44 SPLTTYPE    246408 non-null object
45 FORM_VERS   890836 non-null int64
46 TODAYS_DATE 884605 non-null object
47 BIRTH_DEFECT 691 non-null object
48 OFC_VISIT   203696 non-null object
49 ER_ED_VISIT 148301 non-null object
50 ALLERGIES    493804 non-null object
dtypes: float64(10), int64(1), object(40)
memory usage: 353.4+ MB

```

In [343...]

```
df.describe()
```

Out[343...]

	SYMPTOMVERSION1	SYMPTOMVERSION2	SYMPTOMVERSION3	SYMPTOMVERSION4	SYMPTOMVERSION5	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	AGE_YRS
1343801	34.0
1731624	18.0
1519755	60.0
1704292	44.0

```
997550      54.0
Name: AGE_YRS, dtype: float64
```

In [345...]

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

In [346...]

```
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...
997550 Abdomen crushingAbdominal distensionAxillary p...
...
1502300
1565069
1633155
1662491
1598989
Name: Allsymptoms, Length: 819268, 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 [351...]

```
#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 [352...]

```
dfsmall.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 298127 entries, 1343801 to 1179026
Data columns (total 21 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   VAX_TYPE    298127 non-null   object 
 1   VAX_MANU    298127 non-null   object 
 2   RECVDATE   298127 non-null   object 
 3   STATE       282050 non-null   object 
 4   AGE_YRS    298127 non-null   float64
```

```
5   CAGE_YR      262590 non-null  float64
6   SEX          298127 non-null  object
7   RPT_DATE     62 non-null    object
8   DIED         6986 non-null  object
9   DATEDIED    6759 non-null  object
10  HOSPDAYS    39340 non-null  float64
11  RECOVD       284247 non-null  object
12  VAX_DATE     293214 non-null  object
13  ONSET_DATE   292912 non-null  object
14  NUMDAYS      283400 non-null  float64
15  OTHER_MEDS   228641 non-null  object
16  CUR_ILL      179868 non-null  object
17  HISTORY      233953 non-null  object
18  PRIOR_VAX   22032 non-null  object
19  ALLERGIES    202540 non-null  object
20  Allsymptoms  298127 non-null  object
dtypes: float64(4), object(17)
memory usage: 50.0+ 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	

	RPT_DATE	DIED	DATEDIED	...	RECOVD	VAX_DATE	ONSET_DATE	NUMDAYS	\
VAERS_ID									
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	

	OTHER_MEDS	\
VAERS_ID		
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...	

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

	HISTORY	PRIOR_VAX	\
VAERS_ID			
1343801	Hashimotos Hypothyroidism	NaN	

1731624	brittle, treatment refractory idiopathic anaph...	NaN
1519755		NaN
1704292	Hyperthyroid, anxiety	NaN
997550	Chronic dry eye Vertigo	NaN

ALLERGIES \

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

Allsymptoms

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	DIED
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		

```

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...
1068308  Medical History/Concurrent Conditions: Type 2 ...
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
--	----------	----------	----------	-------	---------	---------	-----	----------	------	----------	-----	--------	----------	------------

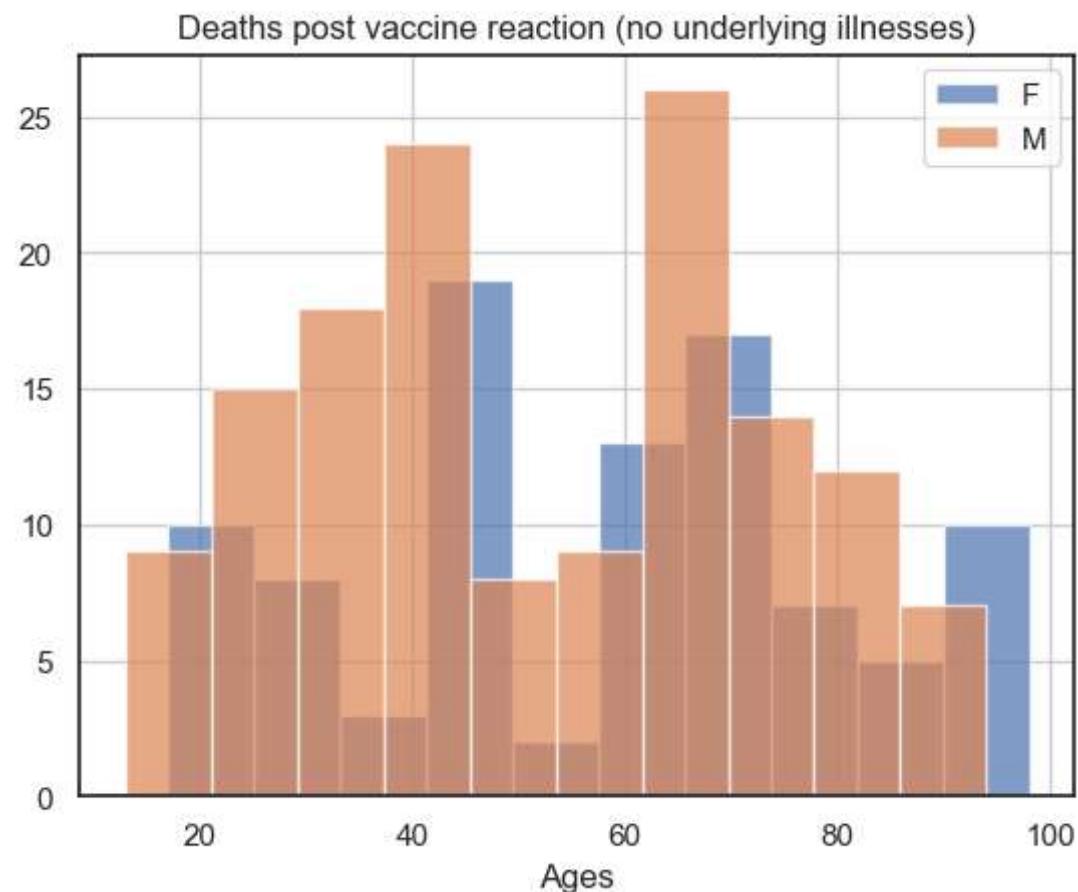
VAERS_ID

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
1180051	COVID19	MODERNA	04/08/2021	KY	70.0	70.0	F	NaN	Y	03/31/2021	...	N	01/07/2021	03/31/2021
1180051	COVID19	MODERNA	04/08/2021	KY	70.0	70.0	F	NaN	Y	03/31/2021	...	N	01/07/2021	03/31/2021
1180051	COVID19	MODERNA	04/08/2021	KY	70.0	70.0	F	NaN	Y	03/31/2021	...	N	01/07/2021	03/31/2021
...
1821282	COVID19	PFIZER\BIONTECH	10/27/2021	IA	93.0	93.0	F	NaN	Y	10/06/2021	...	N	09/28/2021	09/30/2021
943397	COVID19	PFIZER\BIONTECH	01/14/2021	NJ	28.0	28.0	M	NaN	Y	01/11/2021	...	N	12/23/2020	01/11/2021
1737230	COVID19	MODERNA	09/27/2021	MO	76.0	76.0	M	NaN	Y	06/09/2021	...	N	12/30/2020	06/02/2021
1737230	COVID19	MODERNA	09/27/2021	MO	76.0	76.0	M	NaN	Y	06/09/2021	...	N	12/30/2020	06/02/2021
1114822	COVID19	MODERNA	03/19/2021	LA	51.0	51.0	F	NaN	Y	01/31/2021	...	N	12/30/2020	12/31/2020

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 [543...]
```

```
In [379...]
```

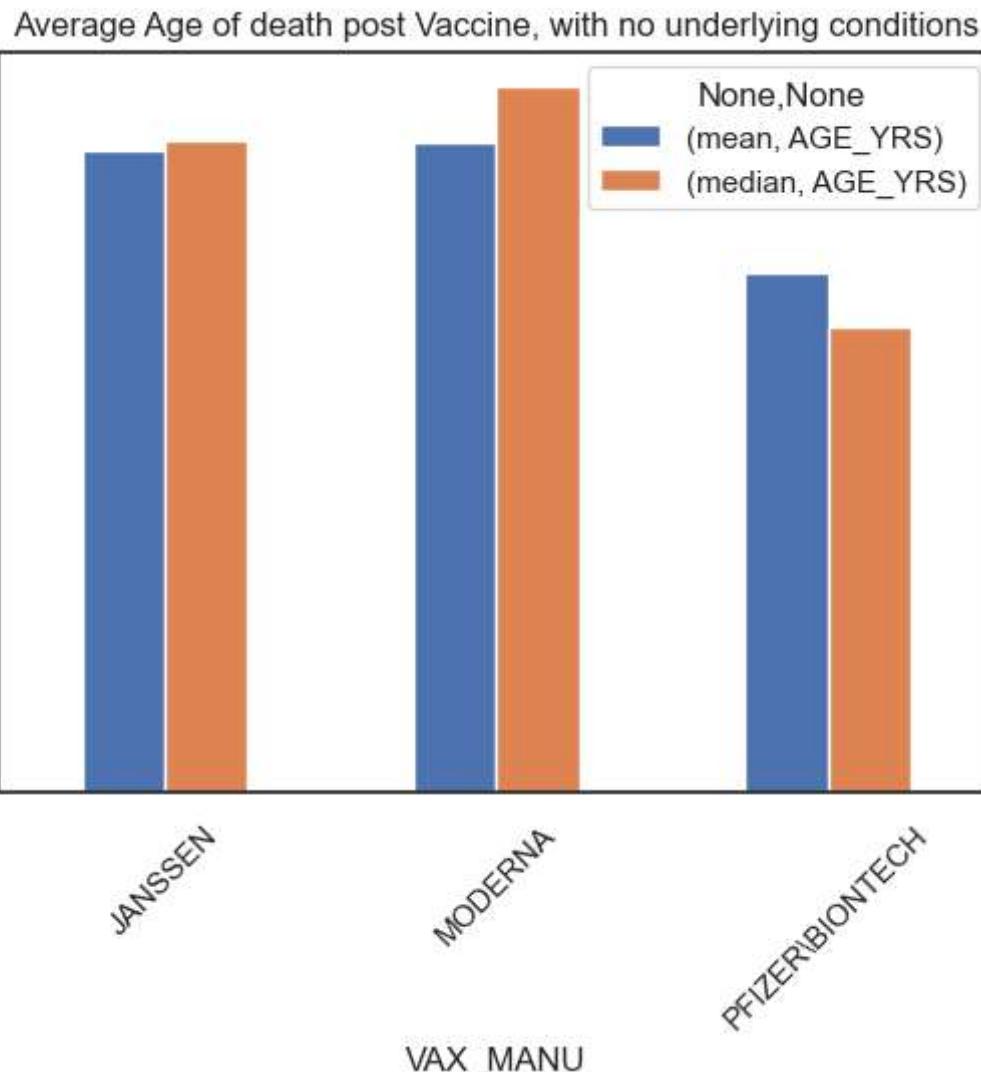
```
import numpy as np
deaths_by_vaccine = Nounderlying.pivot_table(values="AGE_YRS", index="VAX_MANU", aggfunc=[np.mean,np.median])
print(deaths_by_vaccine)
```

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

```
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")

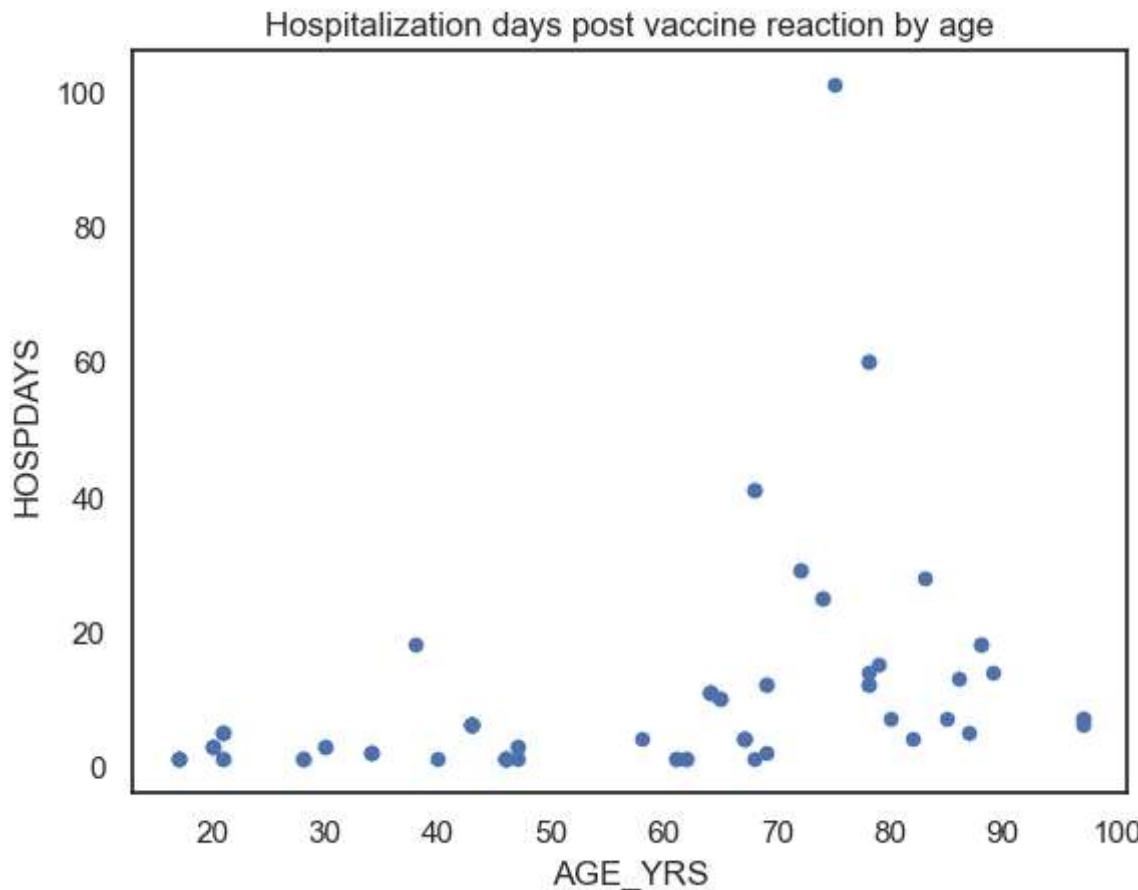
plt.show()
```



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)`

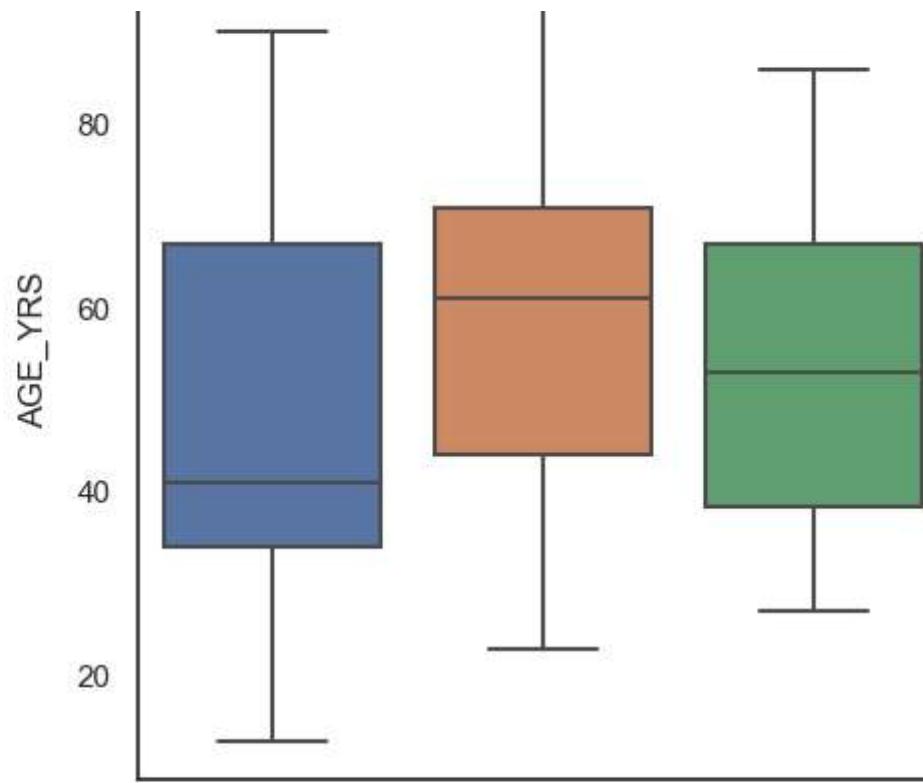
VAX_MANU	SEX	count	median
		AGE_YRS	AGE_YRS
JANSSEN	F	1289	48.0
	M	916	48.0
	U	4	36.5
MODERNA	F	5540	52.0
	M	3664	54.0
	U	31	64.0
PFIZER\BIONTECH	F	7482	48.0
	M	5346	39.0
	U	45	62.0
UNKNOWN MANUFACTURER	F	40	49.0
	M	36	50.0

<Figure size 640x480 with 0 Axes>

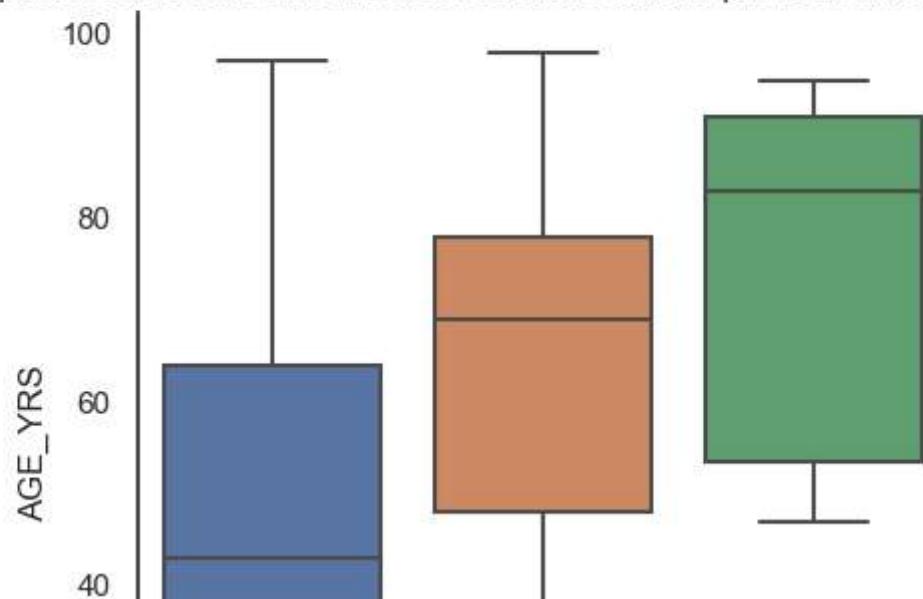
In [572...]: `sns.catplot(x="VAX_MANU", y="AGE_YRS", row="SEX", data=Nounderlying, kind="box", whis=[0,100]).set(title="Age at death post recorded v
plt.savefig('Age of death post vaccing reaction.png', dpi=500, bbox_inches = "tight")`

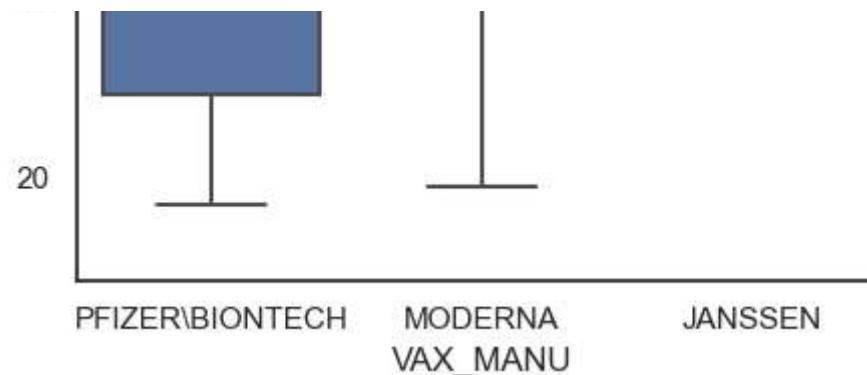
Age at death post recorded vaccine adverse reactions with no previous known underlying conditions.





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

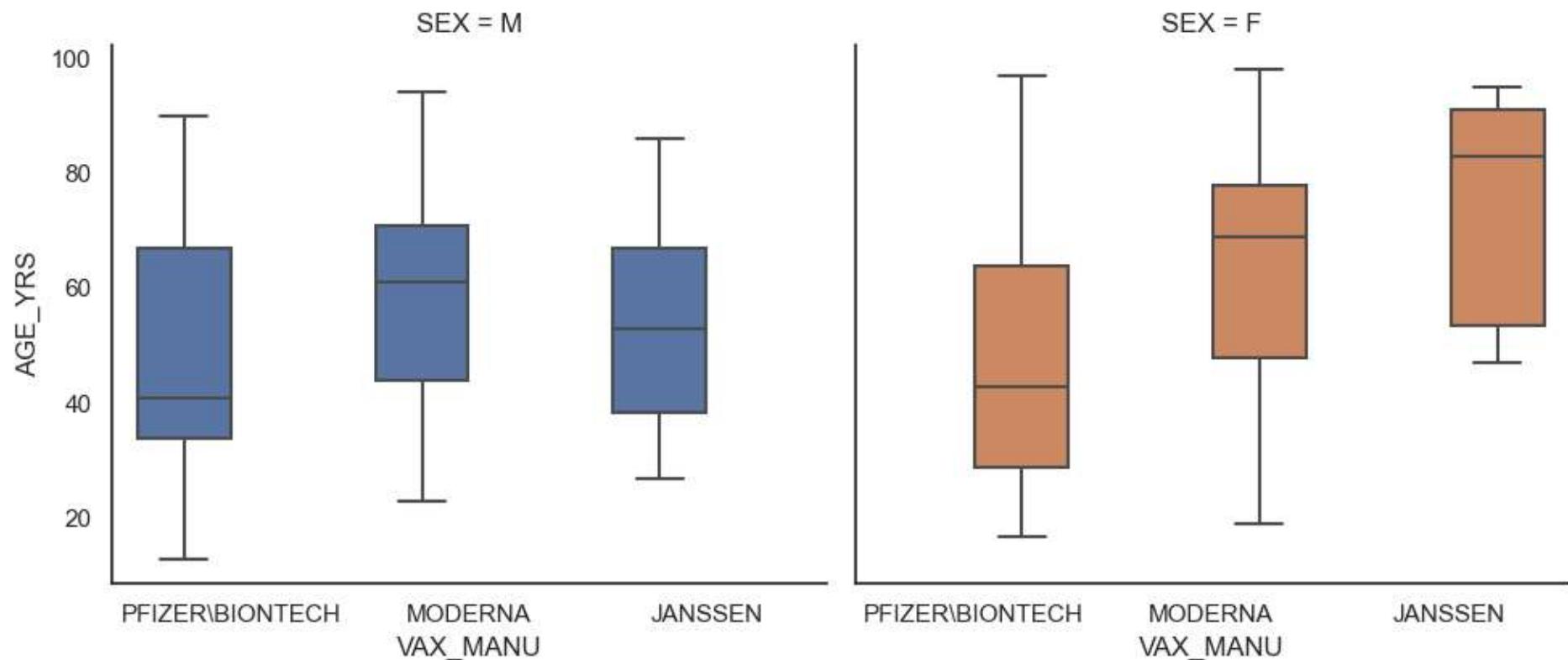




In [574]:

```
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")
```

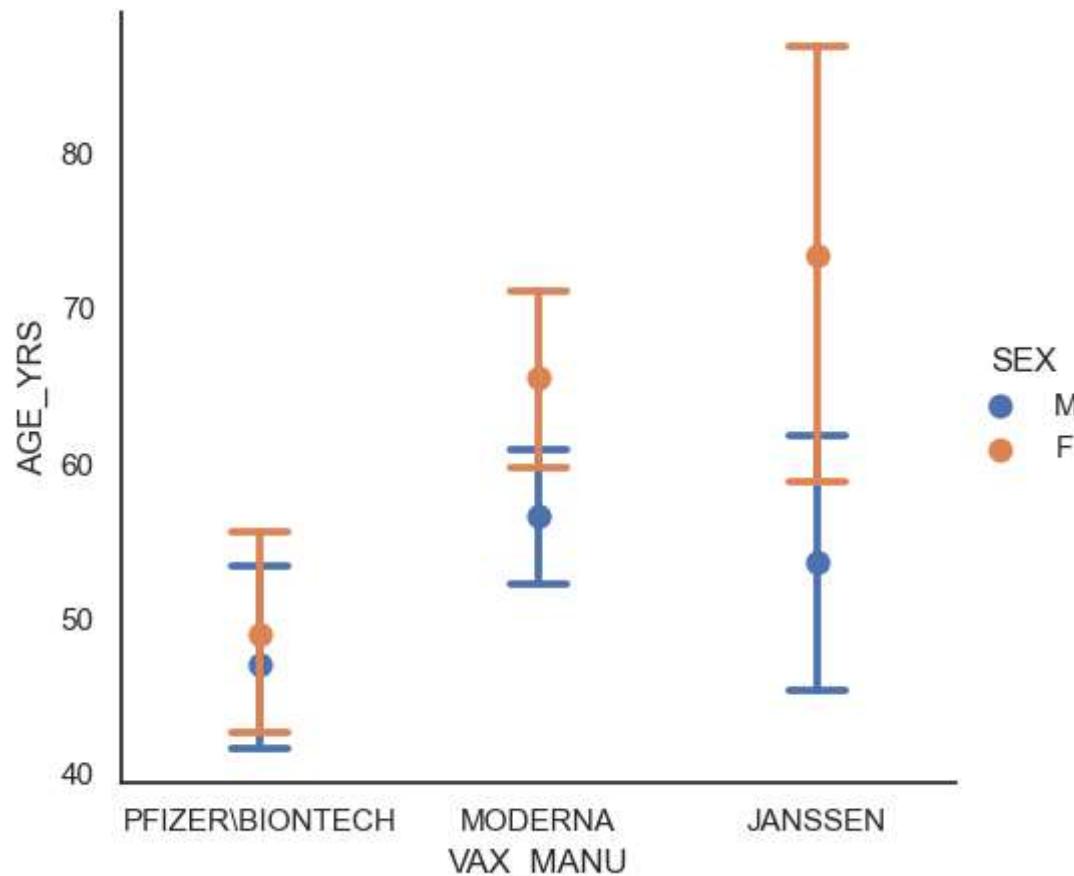
Deaths without underlying illness by vaccine and sex



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")
```

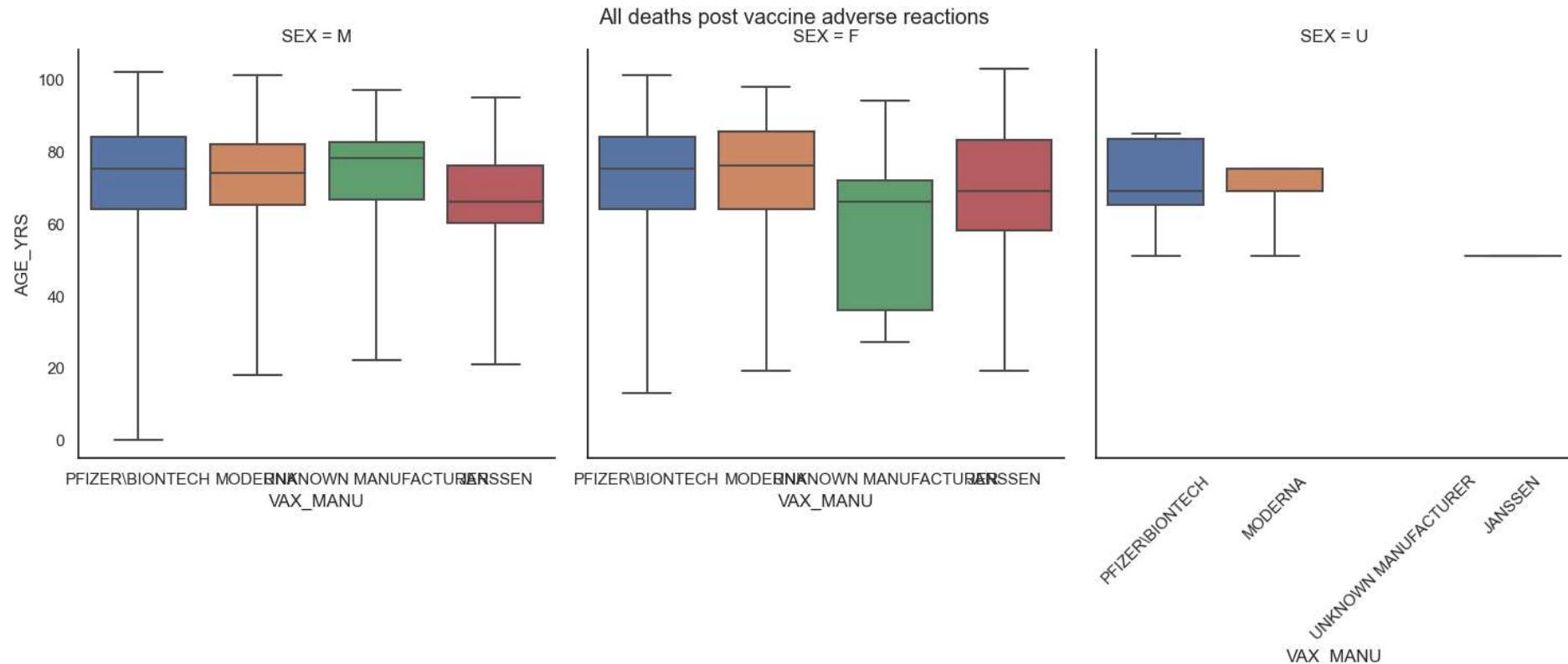
Deaths without underlying condition by vaccine and sex



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')

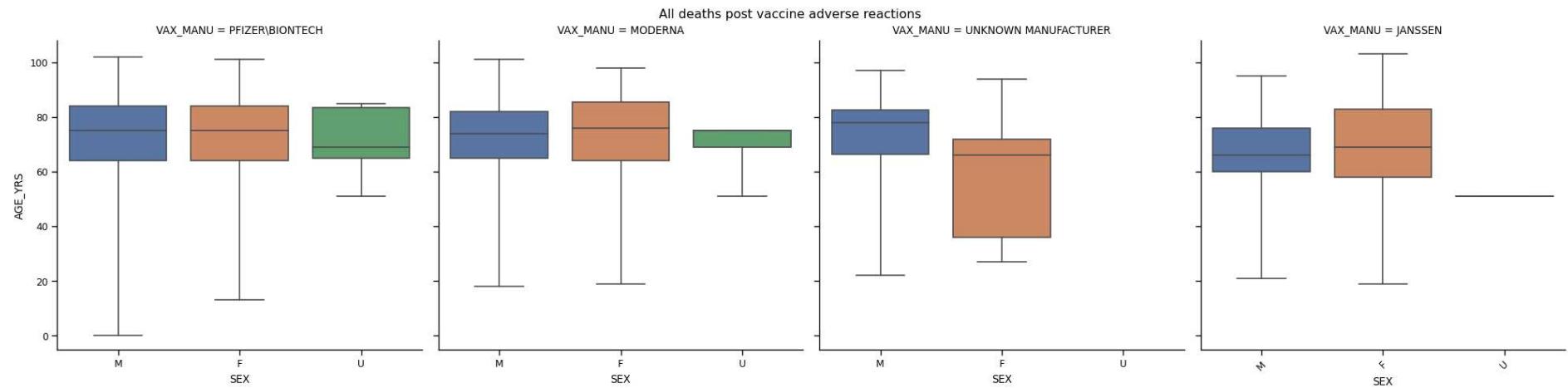
plt.savefig('Age of death post vaccing reaction3.png', dpi=170,bbox_inches ="tight")
```



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...]

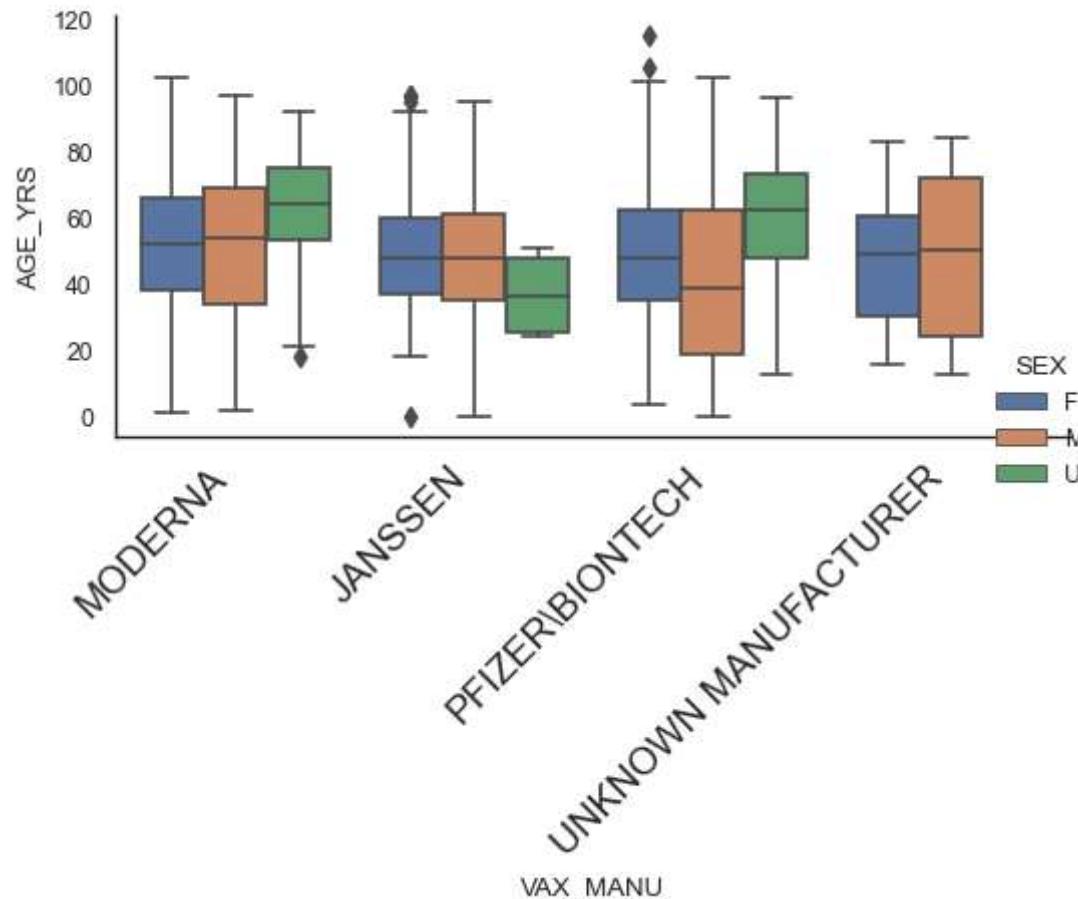
```

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

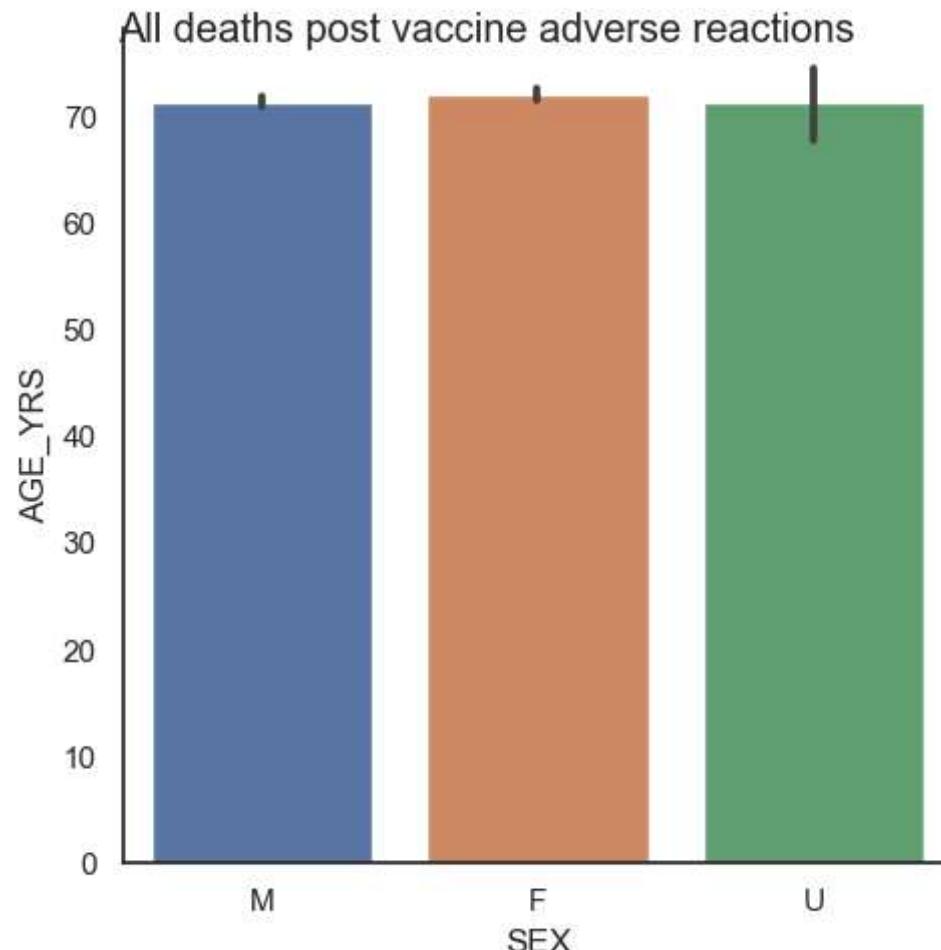
```
1591843    23.0
1591843    23.0
1142665    36.0
Name: AGE_YRS, Length: 134634, dtype: float64
```

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

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

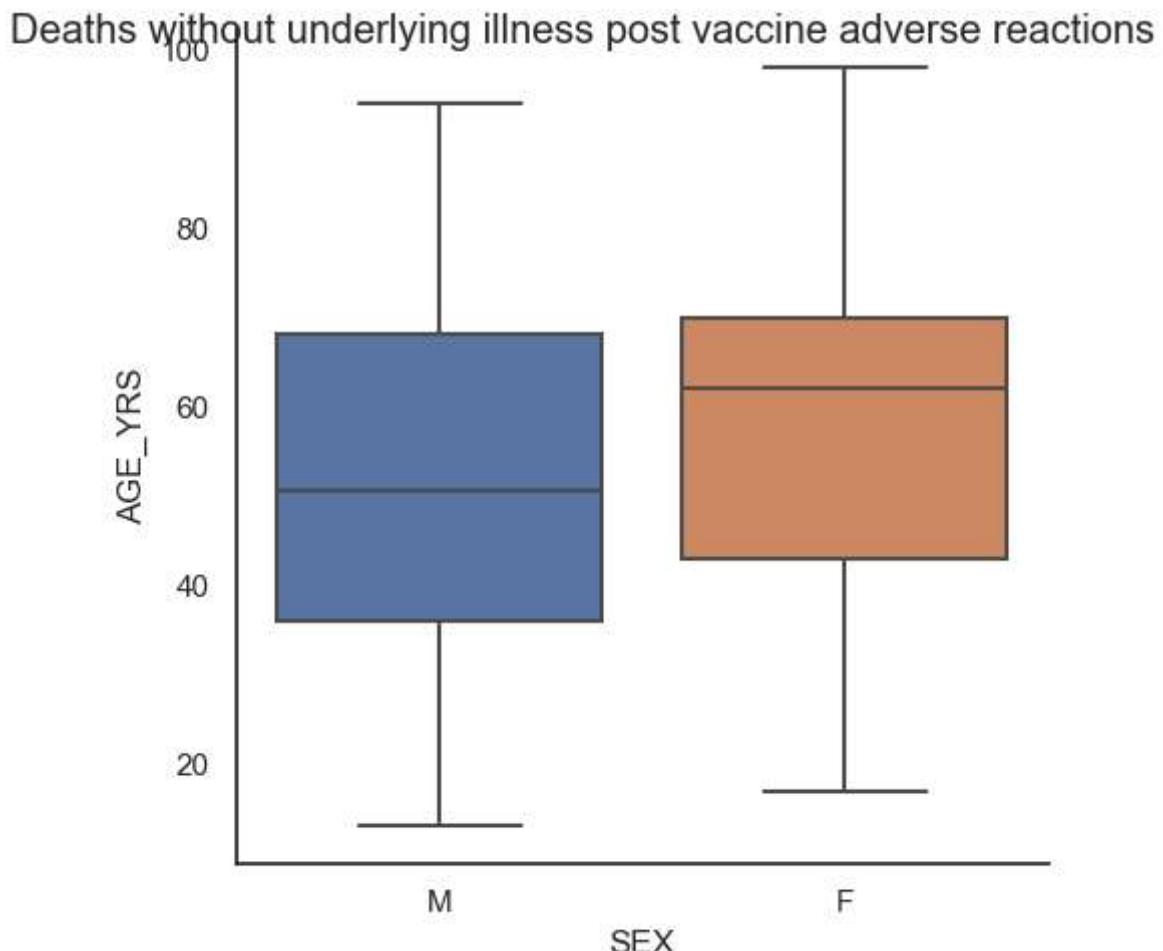
	mean	median
AGE_YRS	AGE_YRS	AGE_YRS
VAX_MANU		
JANSSEN	59.20000	60.0
MODERNA	59.87619	65.0
PFIZER\BIONTECH	47.95283	43.0

```
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")
```

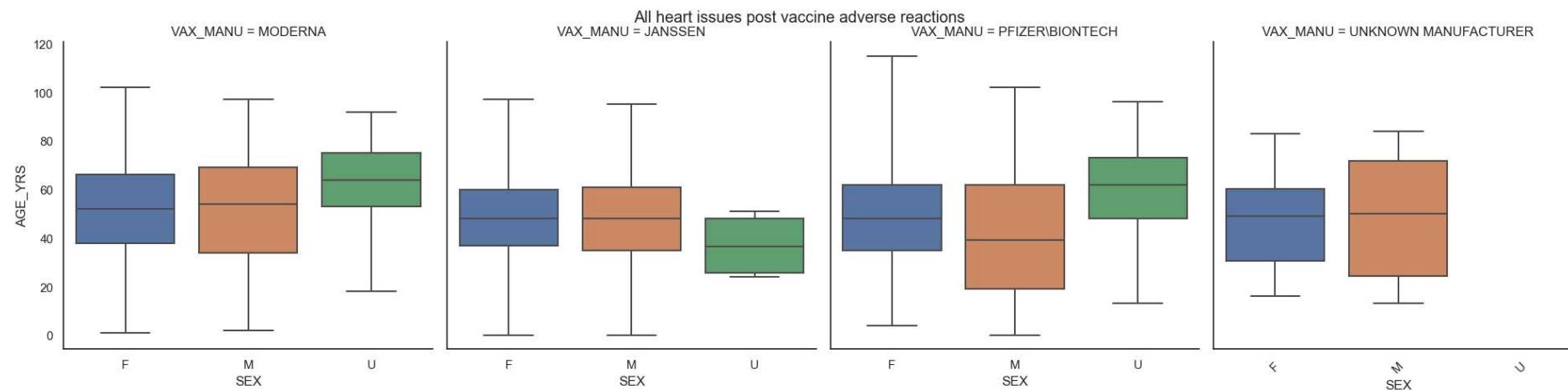


In [577...]

```
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...]

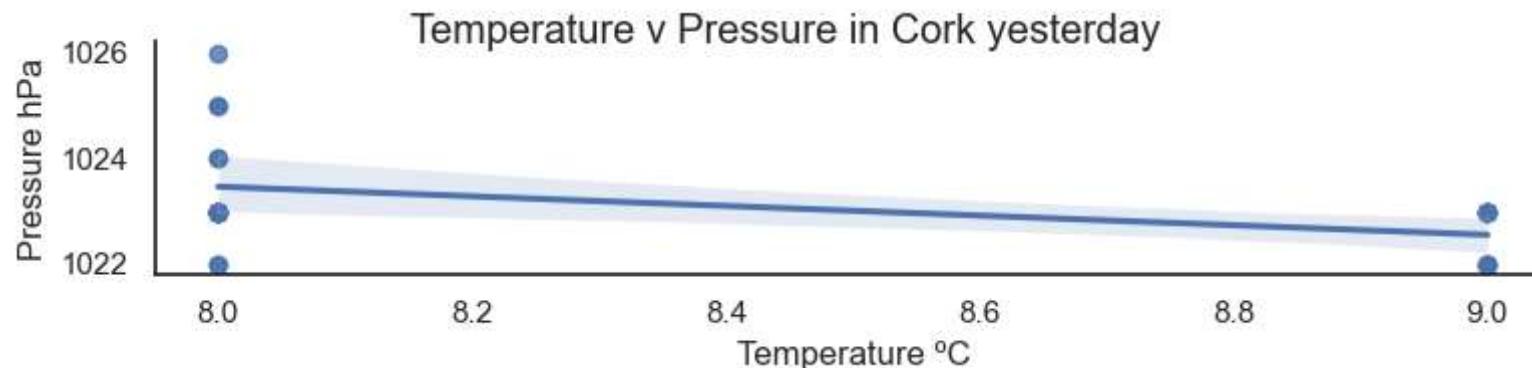
```
#apply the function to the temperature in C to add a column for temperature in F
cork["Temperature F"] = convertTemp(cork["Temperature °C"])
print(cork.head())
```

	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 []: