

In [1]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [6]:

```
data_health_update = pd.read_csv('Health_Status_Updates.csv')
data_health_update.head()
```

Out[6]:

	STATUS_UPDATE_ID	PATIENT_ID	DATE_PROVIDED	FEELING_TODAY	IMPACT	INJECTION_SITE_SYMPTOMS	HIGHEST_TEMP	FEVERISH_TODAY	GENERAL_SYMPTOMS
0		1501	1000	03/11/2023	Good	{"IMPACT": ["Be unable to do normal activities"]}	Pain	104.9	Yes {"GENERAL_SYMPTOMS": ["Joint pains"]}
1		1601	1187	03/12/2023	Good	{"IMPACT": ["Be unable to do normal activities"...	Pain	104.5	Yes {"GENERAL_SYMPTOMS": ["Headache", "Rash near inj...
2		1701	1000	03/11/2023	Good	{"IMPACT": ["Be unable to get care from a healt...	Pain	103.0	Yes {"GENERAL_SYMPTOMS": ["Joint pains", "Rash near ...
3		1801	1187	03/14/2023	Good	{"IMPACT": ["Be unable to do normal activities"...	Pain	102.9	Yes {"GENERAL_SYMPTOMS": ["Fatigue or tiredness", "H...
4		1901	1000	03/10/2023	Good	{"IMPACT": ["Be unable to work"]}	Pain	101.4	Yes {"GENERAL_SYMPTOMS": ["Nausea"]}

In [7]:

```
data_health_update.shape
```

Out[7]:

```
(2500, 10)
```

In [11]:

```
data_states = pd.read_csv('Health_States.csv')
data_states.head()
```

Out[11]:

	STATE_ID	STATE	CODE	STATE_REGION	STATE_TYPE	POPULATION
0	10	Alabama	AL	Southeast	state	4921532
1	20	Alaska	AK	Pacific	state	731158
2	30	Arizona	AZ	Southwest	state	7421401
3	40	Arkansas	AR	Midwest	state	3030522
4	50	California	CA	Pacific	state	39368078

In [12]:

```
data_states.shape
```

Out[12]:

```
(58, 6)
```

In [14]:

```
data_patients = pd.read_csv('Health_Patients.csv')
data_patients.head()
```

Out[14]:

	PATIENT_ID	FIRST_NAME	LAST_NAME	UPPER_FIRST	UPPER_LAST	CELL_PHONE	EMAIL_ADDRESS	CITY	LONGITUDE	LATITUDE	STATE	POSTAL_COD
0	1122	Rosemarie	Stefanich	ROSEMARIE	STEFANICH	(473) 730-7859	Rosemarie.Stefanich@internalmail	Las Vegas	-115.12179	36.17289	Nevada	89101
1	1022	Suzann	Bears	SUZANN	BEARS	(912) 821-6461	Suzann.Bears@internalmail	Lincoln	-96.69390	40.78537	Nebraska	68501
2	1123	Graham	Chambers	GRAHAM	CHAMBERS	(207) 303-6984	Graham.Chambers@internalmail	Dayton	-84.20646	39.75831	Ohio	45401
3	1023	Paul	Kelcourse	PAUL	KELCOURSE	(641) 947-5887	Paul.Kelcourse@internalmail	Alta Vista	-96.48055	38.87263	Kansas	66801
4	1124	Daniela	Rick	DANIELA	RICK	(273) 279-8104	Daniela.Rick@internalmail	Layton	-111.92873	41.08312	Utah	84001

In [15]:

```
data_patients.shape
```

Out[15]:

```
(200, 19)
```

In [16]:

```
data_health_update.columns
```

Out[16]:

```
Index(['STATUS_UPDATE_ID', 'PATIENT_ID', 'DATE_PROVIDED', 'FEELING_TODAY',
      'IMPACT', 'INJECTION_SITE_SYMPTOMS', 'HIGHEST_TEMP', 'FEVERISH_TODAY',
      'GENERAL_SYMPTOMS', 'HEALTHCARE_VISIT'],
      dtype='object')
```

In [17]:

```
data_states.columns
```

Out[17]:

```
Index(['STATE_ID', 'STATE', 'CODE', 'STATE_REGION', 'STATE_TYPE',
      'POPULATION'],
      dtype='object')
```

In [18]:

```
data_patients.columns
```

Out[18]:

```
Index(['PATIENT_ID', 'FIRST_NAME', 'LAST_NAME', 'UPPER_FIRST', 'UPPER_LAST',
      'CELL_PHONE', 'EMAIL_ADDRESS', 'CITY', 'LONGITUDE', 'LATITUDE', 'STATE',
      'POSTAL_CODE', 'COUNTY', 'SEX', 'DOB', 'YEAR_OF_BIRTH', 'LAST_FEELING',
      'LAST_STATUS_UPDATE', 'CREATED'],
      dtype='object')
```

In [22]:

```
data_health_update.merge(data_patients, on='PATIENT_ID')
```

Out[22]:

	STATUS_UPDATE_ID	PATIENT_ID	DATE_PROVIDED	FEELING_TODAY	IMPACT	INJECTION_SITE_SYMPTOMS	HIGHEST_TEMP	FEVERISH_TODAY	GENERAL_SYMPTOMS
0		1501	1000	03/11/2023	Good	{"IMPACT": ["Be unable to do normal activities"]}	Pain	104.9	Yes {"GENERAL_SYMPTOMS": ["Joint pains"]}
1		1701	1000	03/11/2023	Good	{"IMPACT": ["Be unable to get care from a healt...	Pain	103.0	Yes {"GENERAL_SYMPTOMS": ["Joint pains", "Rash near inj...
2		1901	1000	03/10/2023	Good	{"IMPACT": ["Be unable to work"]}	Pain	101.4	Yes {"GENERAL_SYMPTOMS": ["Nausea"]}
3		2101	1000	03/06/2023	Good	{"IMPACT": ["Be unable to get care from a healt...	Pain	100.3	Yes {"GENERAL_SYMPTOMS": ["Fatigue or tiredness", "Joint pains"]}
4		2301	1000	03/07/2023	Good	{"IMPACT": ["Be unable to get care from a healt...	Pain	101.6	Yes {"GENERAL_SYMPTOMS": ["Diarrhea", "Rash near injection site"]}
...	
2495		1593	1040	03/14/2023	Good	{"IMPACT": ["Be unable to work"]}	Pain	101.0	Yes {"GENERAL_SYMPTOMS": ["Chills"]}
2496		1793	1040	03/06/2023	Good	{"IMPACT": ["Be unable to work"]}	Pain	102.3	Yes {"GENERAL_SYMPTOMS": ["Fatigue or tiredness", "Joint pains"]}
2497		1993	1040	03/15/2023	Good	{"IMPACT": ["Be unable to do normal activities"...	Pain	102.9	Yes {"GENERAL_SYMPTOMS": ["Chills", "Diarrhea"]}
2498		2193	1040	03/16/2023	Good	{"IMPACT": ["Be unable to do normal activities"]}	Pain	103.7	Yes {"GENERAL_SYMPTOMS": ["Muscle or body ache"]}
2499		2393	1040	03/07/2023	Good	{"IMPACT": ["Be unable to do normal activities"...	Pain	103.4	Yes {"GENERAL_SYMPTOMS": ["Diarrhea", "Headache", "Vomiting"]}

2500 rows × 28 columns

In [26]:

```
data_health_update.merge(data_patients, on='PATIENT_ID').merge(data_states, on='STATE')
```

Out[26]:

	STATUS_UPDATE_ID	PATIENT_ID	DATE_PROVIDED	FEELING_TODAY	IMPACT	INJECTION_SITE_SYMPTOMS	HIGHEST_TEMP	FEVERISH_TODAY	GENERAL_SYMPTOMS
0		1501	1000	03/11/2023	Good	{"IMPACT": ["Be unable to do normal activities"]}	Pain	104.9	Yes {"GENERAL_SYMPTOMS": ["Joint pains"]}
1		1701	1000	03/11/2023	Good	{"IMPACT": ["Be unable to get care from a healt...	Pain	103.0	Yes {"GENERAL_SYMPTOMS": ["Joint pains", "Rash near inj...
2		1901	1000	03/10/2023	Good	{"IMPACT": ["Be unable to work"]}	Pain	101.4	Yes {"GENERAL_SYMPTOMS": ["Nausea"]}
3		2101	1000	03/06/2023	Good	{"IMPACT": ["Be unable to get care from a healt...	Pain	100.3	Yes {"GENERAL_SYMPTOMS": ["Fatigue or tiredness", "Joint pains"]}
4		2301	1000	03/07/2023	Good	{"IMPACT": ["Be unable to get care from a healt...	Pain	101.6	Yes {"GENERAL_SYMPTOMS": ["Diarrhea", "Rash near injection site"]}
...	
2495		1693	1084	03/09/2023	Good	{"IMPACT": ["Be unable to work"]}	Pain	104.7	Yes {"GENERAL_SYMPTOMS": ["Vomiting"]}
2496		1893	1084	03/08/2023	Good	{"IMPACT": ["Be unable to do normal activities"...	Pain	103.4	Yes {"GENERAL_SYMPTOMS": ["Chills", "Nausea"]}
2497		2093	1084	03/15/2023	Good	{"IMPACT": ["Be unable to do normal activities"...	Pain	100.6	Yes {"GENERAL_SYMPTOMS": ["Fatigue or tiredness", "Vomiting"]}
2498		2293	1084	03/04/2023	Good	{"IMPACT": ["Be unable to work"]}	Pain	100.7	Yes {"GENERAL_SYMPTOMS": ["Nausea", "Rash near injection site"]}
2499		2493	1084	03/12/2023	Good	{"IMPACT": ["Be unable to do normal activities"]}	Pain	103.2	Yes {"GENERAL_SYMPTOMS": ["Chills"]}

2500 rows × 33 columns

In [28]:

```
data_health_update.merge(data_patients, on='PATIENT_ID').merge(data_states, on='STATE', suffixes=('_pat', '_sta'))
```

Out[28]:

	STATUS_UPDATE_ID	PATIENT_ID	DATE_PROVIDED	FEELING_TODAY	IMPACT	INJECTION_SITE_SYMPTOMS	HIGHEST_TEMP	FEVERISH_TODAY	GENERAL_SYMPTOMS
0		1501	1000	03/11/2023	Good	{"IMPACT": ["Be unable to do normal activities"]}	Pain	104.9	Yes {"GENERAL_SYMPTOMS": ["Joint pains"]}
1		1701	1000	03/11/2023	Good	{"IMPACT": ["Be unable to get care from a healt...	Pain	103.0	Yes {"GENERAL_SYMPTOMS": ["Joint pains", "Rash near inj...
2		1901	1000	03/10/2023	Good	{"IMPACT": ["Be unable to work"]}	Pain	101.4	Yes {"GENERAL_SYMPTOMS": ["Nausea"]}
3		2101	1000	03/06/2023	Good	{"IMPACT": ["Be unable to get care from a healt...	Pain	100.3	Yes {"GENERAL_SYMPTOMS": ["Fatigue or tiredness", "Joint pains"]}
4		2301	1000	03/07/2023	Good	{"IMPACT": ["Be unable to get care from a healt...	Pain	101.6	Yes {"GENERAL_SYMPTOMS": ["Diarrhea", "Rash near injection site"]}
...	
2495		1693	1084	03/09/2023	Good	{"IMPACT": ["Be unable to work"]}	Pain	104.7	Yes {"GENERAL_SYMPTOMS": ["Vomiting"]}
2496		1893	1084	03/08/2023	Good	{"IMPACT": ["Be unable to do normal activities"...	Pain	103.4	Yes {"GENERAL_SYMPTOMS": ["Chills", "Nausea"]}
2497		2093	1084	03/15/2023	Good	{"IMPACT": ["Be unable to do normal activities"...	Pain	100.6	Yes {"GENERAL_SYMPTOMS": ["Fatigue or tiredness", "Vomiting"]}
2498		2293	1084	03/04/2023	Good	{"IMPACT": ["Be unable to work"]}	Pain	100.7	Yes {"GENERAL_SYMPTOMS": ["Nausea", "Rash near injection site"]}
2499		2493	1084	03/12/2023	Good	{"IMPACT": ["Be unable to do normal activities"]}	Pain	103.2	Yes {"GENERAL_SYMPTOMS": ["Chills"]}

2500 rows × 33 columns

In []: