In [42]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import calendar

# Load the overdose data
file_path = "/Users/hunterberberich/Desktop/Data/vis_df.csv"
df = pd.read_csv(file_path)
df['date'] = pd.to_datetime(df['date'])
df['month'] = df['date'].dt.month
df['year'] = df['date'].dt.year
```

In [43]:
```
print(df.dtypes)
df
```

```
date                       datetime64[ns]
tempmax                           float64
tempmin                           float64
temp                              float64
feelslikemax                      float64
feelslikemin                      float64
feelslike                         float64
dew                               float64
humidity                          float64
precip                            float64
precipcover                       float64
preciptype                         object
snow                              float64
snowdepth                         float64
cloudcover                        float64
uvindex                             int64
severerisk                        float64
day                                object
gender_desc                        object
race                               object
susp_od_drug_desc                  object
naloxone_administered              object
survive                            object
month                               int32
year                                int32
dtype: object
```

Out[43]:

	date	tempmax	tempmin	temp	feelslikemax	feelslikemin	feelslike	dew	humidity	p
0	2018-01-07	26.2	-4.2	10.1	18.1	-16.6	0.6	-3.8	57.2	
1	2018-01-09	35.8	28.0	32.5	34.7	24.1	26.8	26.6	78.9	
2	2018-01-14	15.3	2.5	9.2	14.6	-6.0	3.5	0.5	68.0	
3	2018-01-14	15.3	2.5	9.2	14.6	-6.0	3.5	0.5	68.0	
4	2018-01-14	15.3	2.5	9.2	14.6	-6.0	3.5	0.5	68.0	
...	...	...	...	...	...	...	...	...	...	
3679	2024-04-11	68.8	58.9	61.6	68.8	58.9	61.6	56.7	84.8	
3680	2024-04-12	59.4	46.8	50.8	59.4	39.8	46.5	46.3	84.5	
3681	2024-04-13	59.2	44.5	51.1	59.2	37.4	47.9	33.0	51.5	
3682	2024-04-14	81.1	45.0	64.1	79.9	39.9	62.9	39.5	42.6	
3683	2024-04-14	81.1	45.0	64.1	79.9	39.9	62.9	39.5	42.6	

3684 rows × 25 columns

In [44]:
```
num_columns = df.select_dtypes(include=['float64', 'int64']).columns
cat_columns = df.select_dtypes(include=['object']).columns
df2 = df.drop(columns=['date', 'month', 'year'])
```

In [46]:
```
key_variables = ['tempmax', 'tempmin', 'feelslike', 'humidity', 'precip', 'clou
```

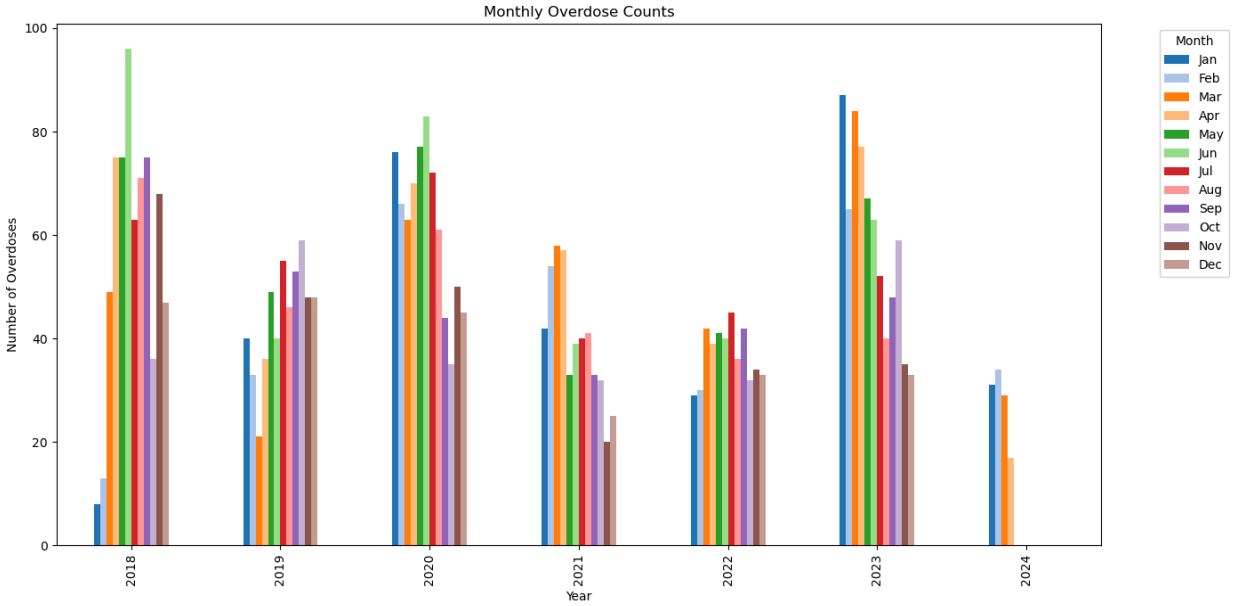
In [47]:
```
five_number_summary2 = df[key_variables].describe().loc[['min', '25%', '50%',
print(five_number_summary2)
```

```
     tempmax  tempmin  feelslike  humidity  precip  cloudcover
min     11.4   -5.000      -13.2    26.000  0.0000       0.000
25%     48.5   32.800       35.7    60.075  0.0000      30.175
50%     66.8   47.500       56.0    70.450  0.0050      55.900
75%     78.6   61.625       69.7    79.700  0.1105      80.700
max     93.7   75.500       87.2    99.200  3.9220     100.000
```

In [48]:
```
monthly_counts = df.groupby(['year', 'month']).size().unstack(fill_value=0)
monthly_counts.columns = [calendar.month_abbr[m] for m in monthly_counts.columns


plt.figure(figsize=(14, 7))
colors = plt.cm.tab20.colors  # Using tab20 colormap
monthly_counts.plot(kind='bar', stacked=False, figsize=(14, 7), color=colors)
plt.title('Monthly Overdose Counts')
plt.xlabel('Year')
plt.ylabel('Number of Overdoses')
```

```
plt.legend(title='Month', bbox_to_anchor=(1.05, 1), loc='upper left')
plt.tight_layout()
plt.show()
```

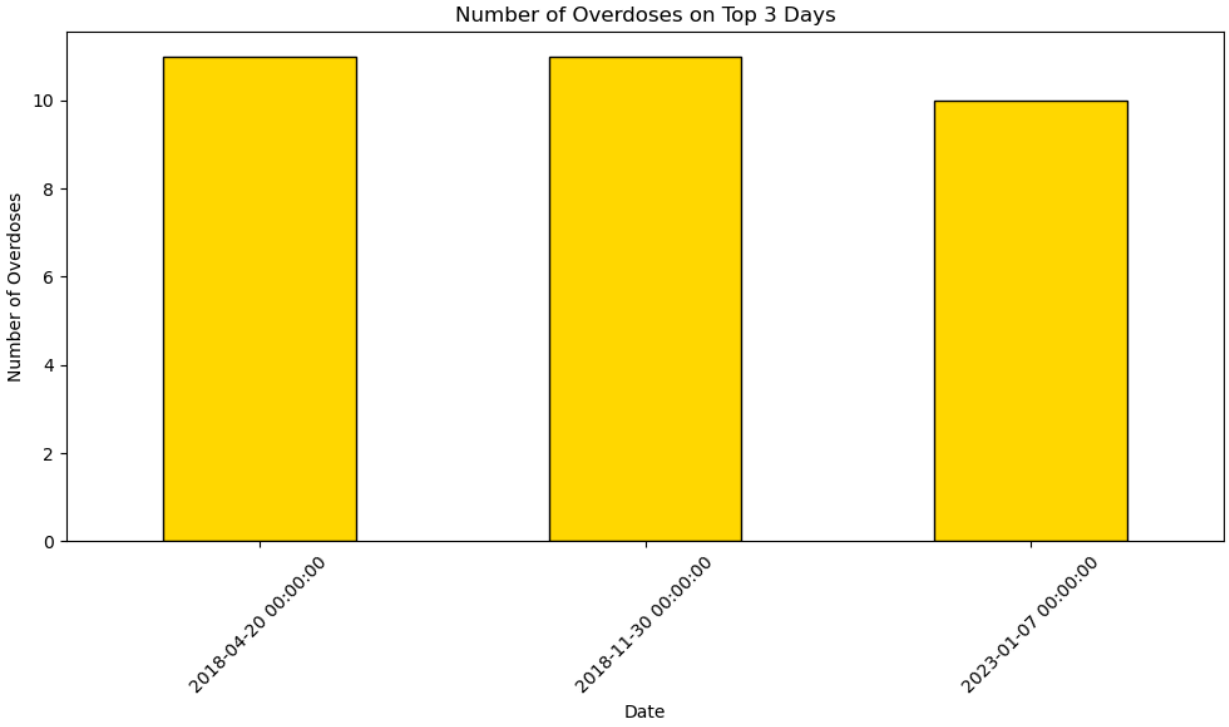
```
<Figure size 1400x700 with 0 Axes>
```



In [49]:
```
top_days = df['date'].value_counts().nlargest(3)

print(top_days)
```

```
date
2018-04-20    11
2018-11-30    11
2023-01-07    10
Name: count, dtype: int64
```

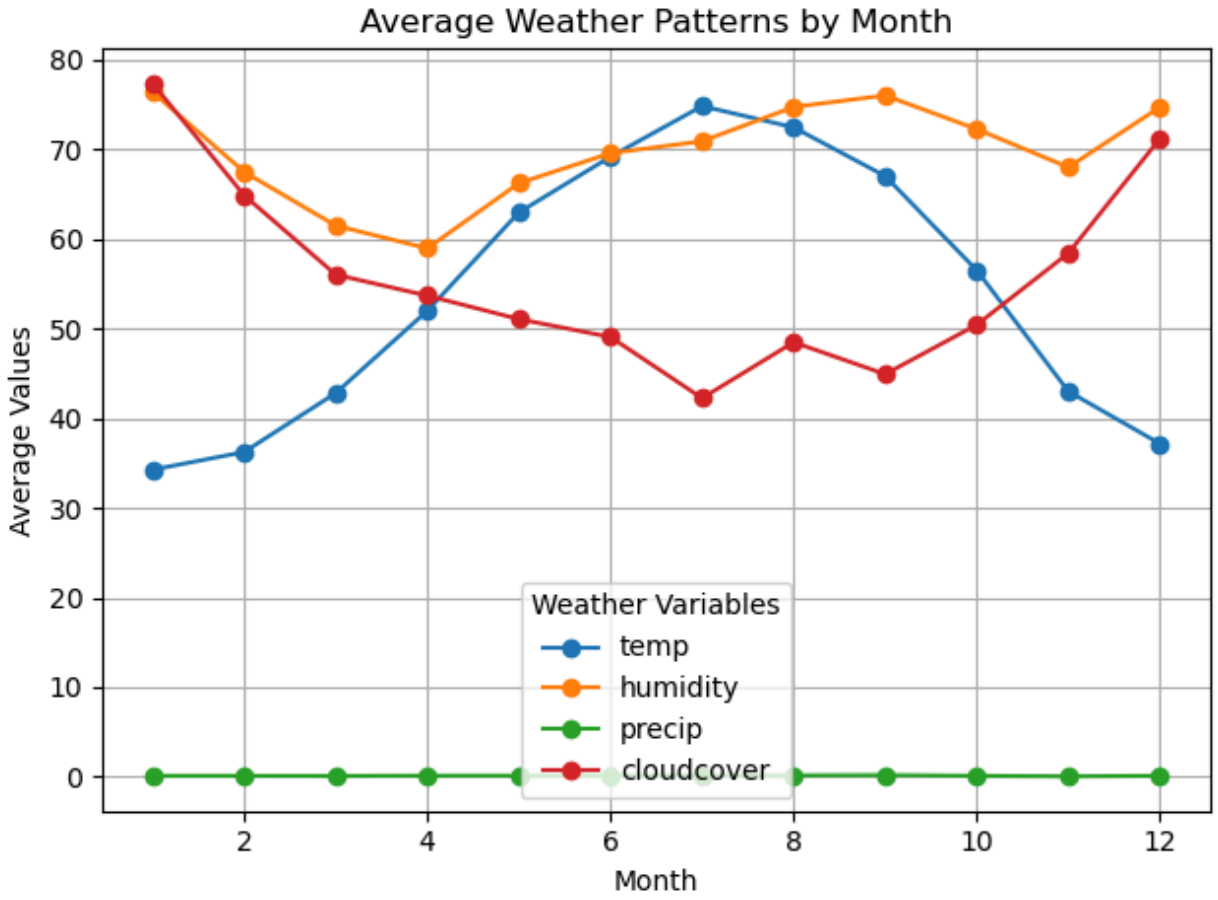
In [50]:
```
top_days_weather = df[df['date'].isin(top_days.index)][['date', 'tempmax', 'ter

# Display the weather conditions for these days
top_days_weather

plt.figure(figsize=(10, 6))
top_days.plot(kind='bar', color='gold', edgecolor='black')
plt.title('Number of Overdoses on Top 3 Days')
plt.xlabel('Date')
plt.ylabel('Number of Overdoses')
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```



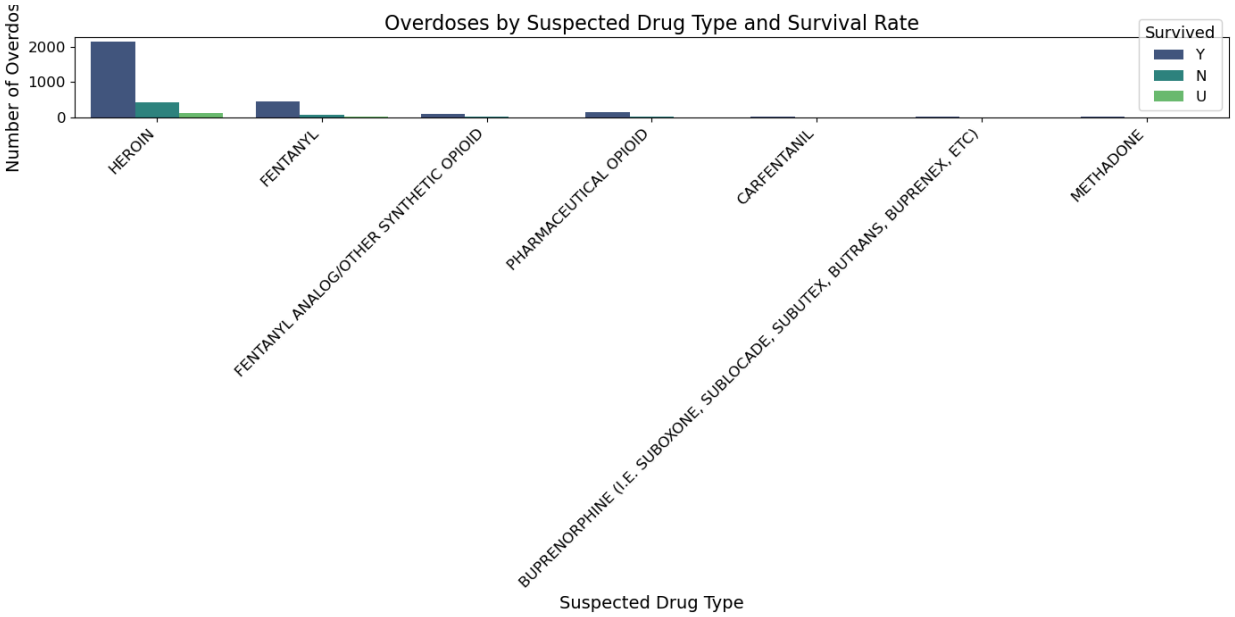
In [51]:
```
#The three days with the highest amount of OD were all on Friday and Saturday,
```

In [52]:
```
monthly_weather = df.groupby('month')[['temp', 'humidity', 'precip', 'cloudcov


plt.figure(figsize=(14, 7))
monthly_weather.plot(kind='line', marker='o')
plt.title('Average Weather Patterns by Month')
plt.xlabel('Month')
plt.ylabel('Average Values')
plt.legend(title='Weather Variables')
plt.grid(True)
plt.tight_layout()
plt.show()
```

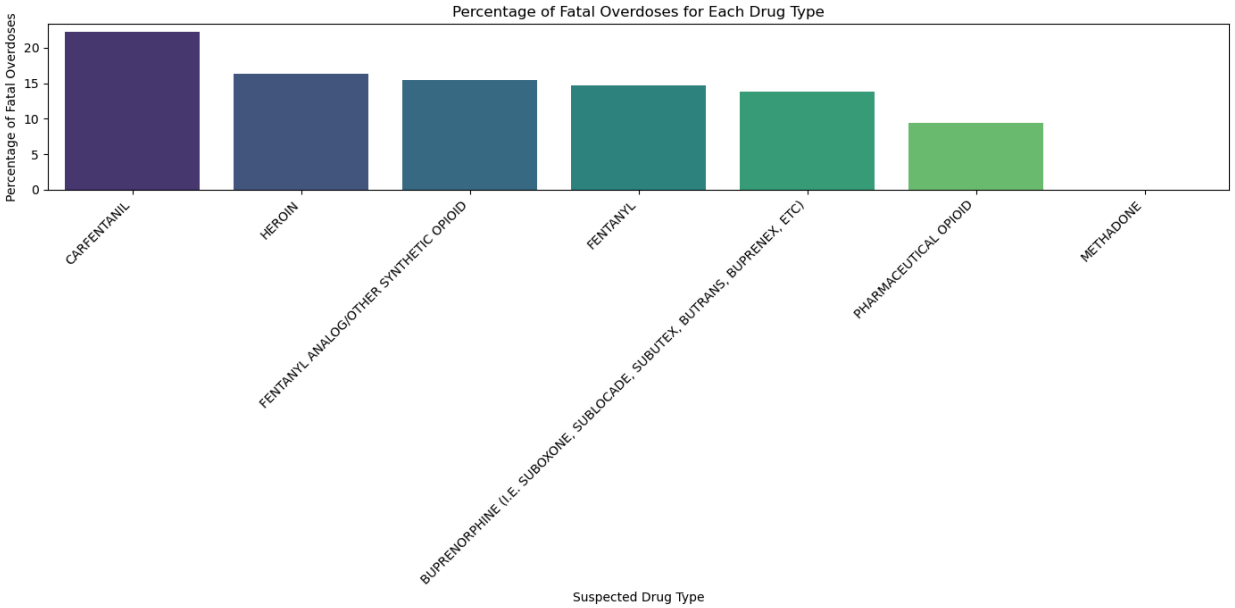
```
<Figure size 1400x700 with 0 Axes>
```



In [62]:
```
plt.figure(figsize=(14, 7))
sns.countplot(data=df, x='susp_od_drug_desc', hue='survive', palette='viridis'


plt.title('Overdoses by Suspected Drug Type and Survival Rate', fontsize=16)
plt.xlabel('Suspected Drug Type', fontsize=14)
plt.ylabel('Number of Overdoses', fontsize=14)
plt.legend(title='Survived', title_fontsize='13', fontsize='12')
plt.xticks(rotation=45, ha='right', fontsize=12)
plt.yticks(fontsize=12)


plt.tight_layout()
plt.show()
```

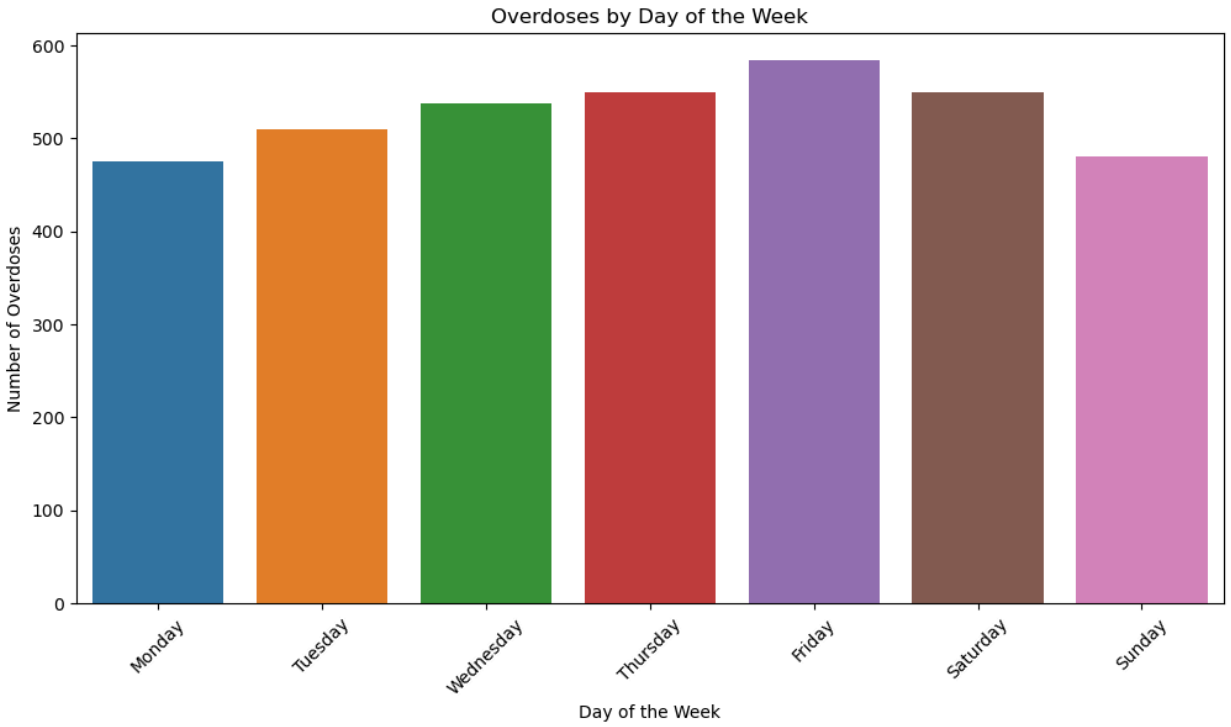


In [67]:
```
survival_counts = df.groupby('susp_od_drug_desc')['survive'].value_counts().uns
survival_counts['Fatal Overdose Rate'] = survival_counts['N'] / (survival_count


survival_counts = survival_counts.sort_values(by='Fatal Overdose Rate', ascend


plt.figure(figsize=(14, 7))
sns.barplot(x=survival_counts.index, y=survival_counts['Fatal Overdose Rate'],
plt.title('Percentage of Fatal Overdoses for Each Drug Type')
plt.xlabel('Suspected Drug Type')
plt.ylabel('Percentage of Fatal Overdoses')
plt.xticks(rotation=45, ha='right')
plt.tight_layout()
plt.show()
```

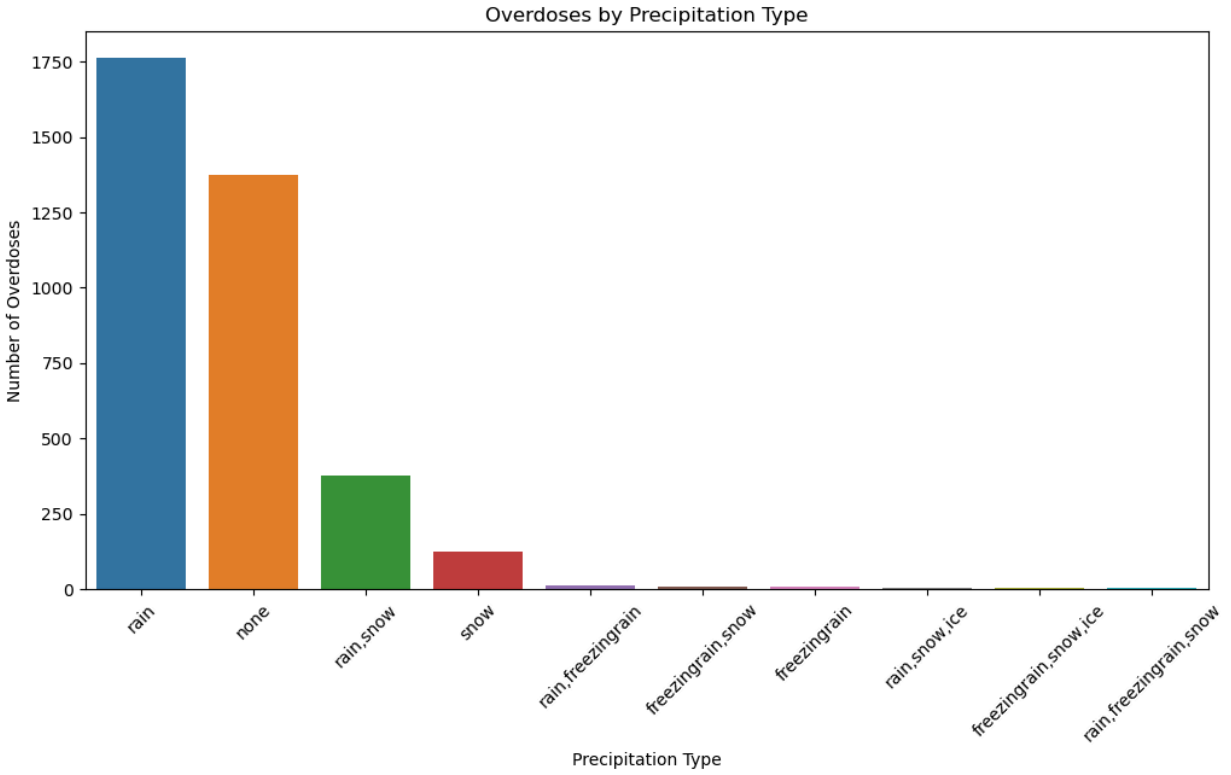


In [54]:
```
plt.figure(figsize=(12, 6))
sns.countplot(data=df, x='day', order=['Monday', 'Tuesday', 'Wednesday', 'Thurs
plt.title('Overdoses by Day of the Week')
plt.xlabel('Day of the Week')
```

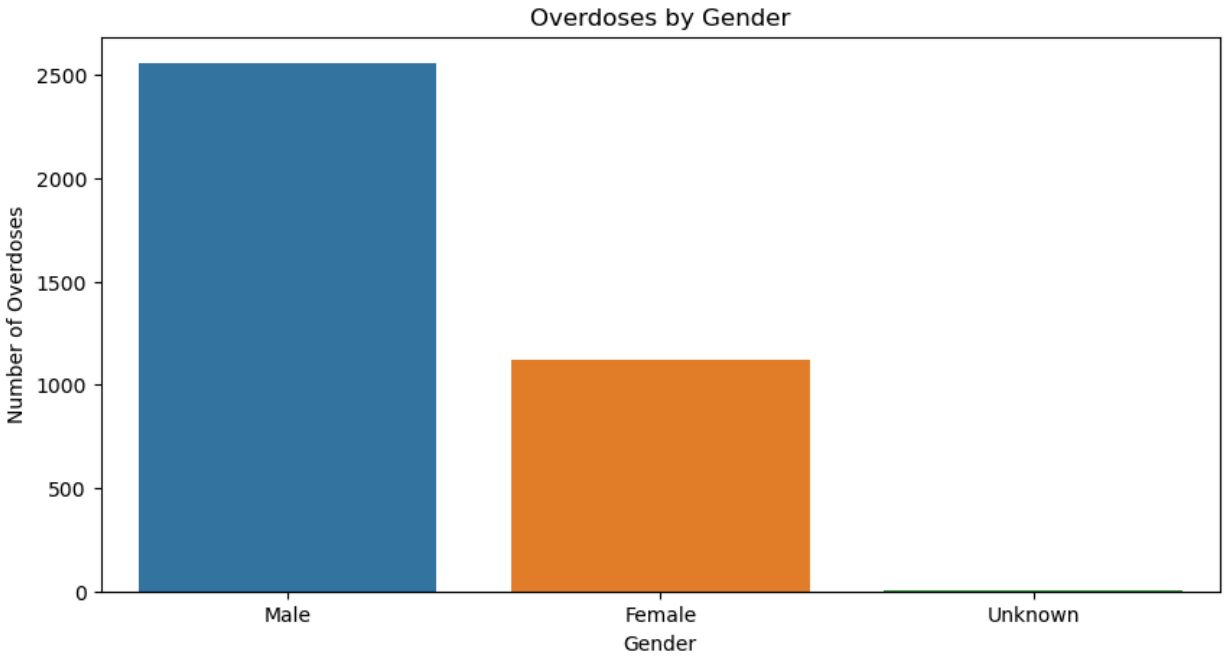
```
plt.ylabel('Number of Overdoses')
plt.xticks(rotation=45)
plt.show()
```

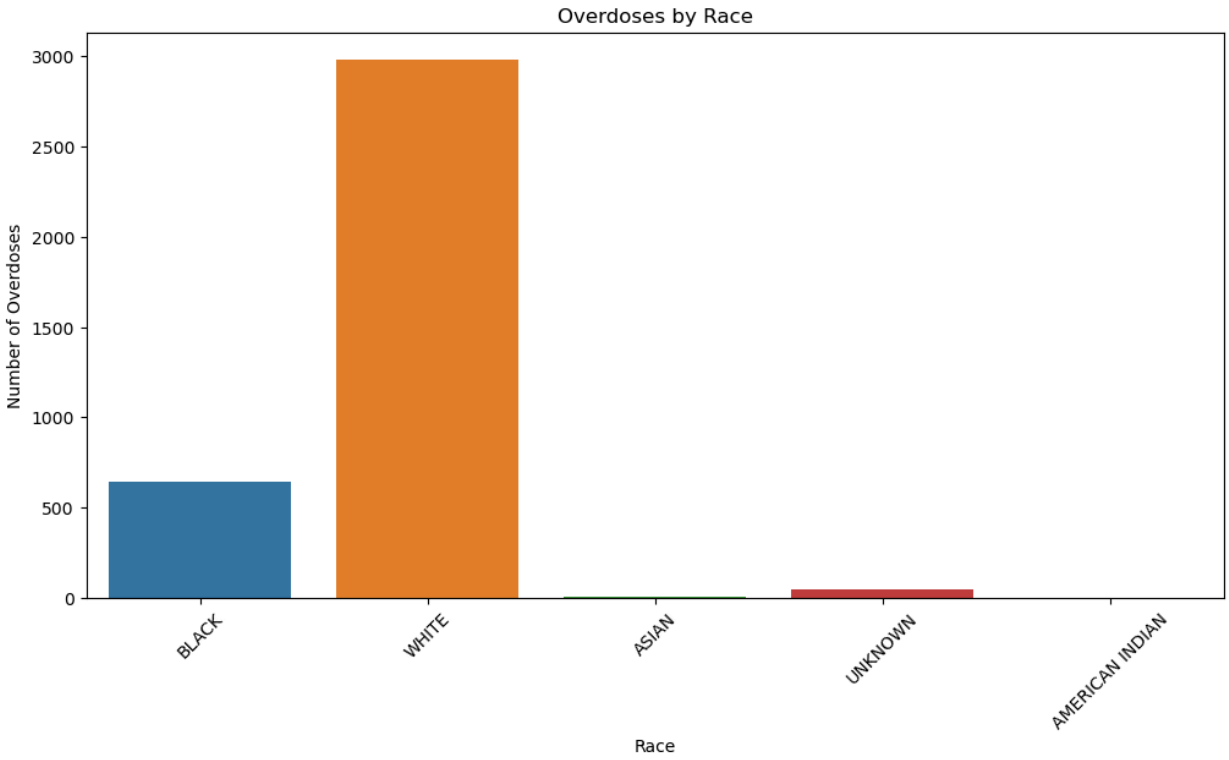


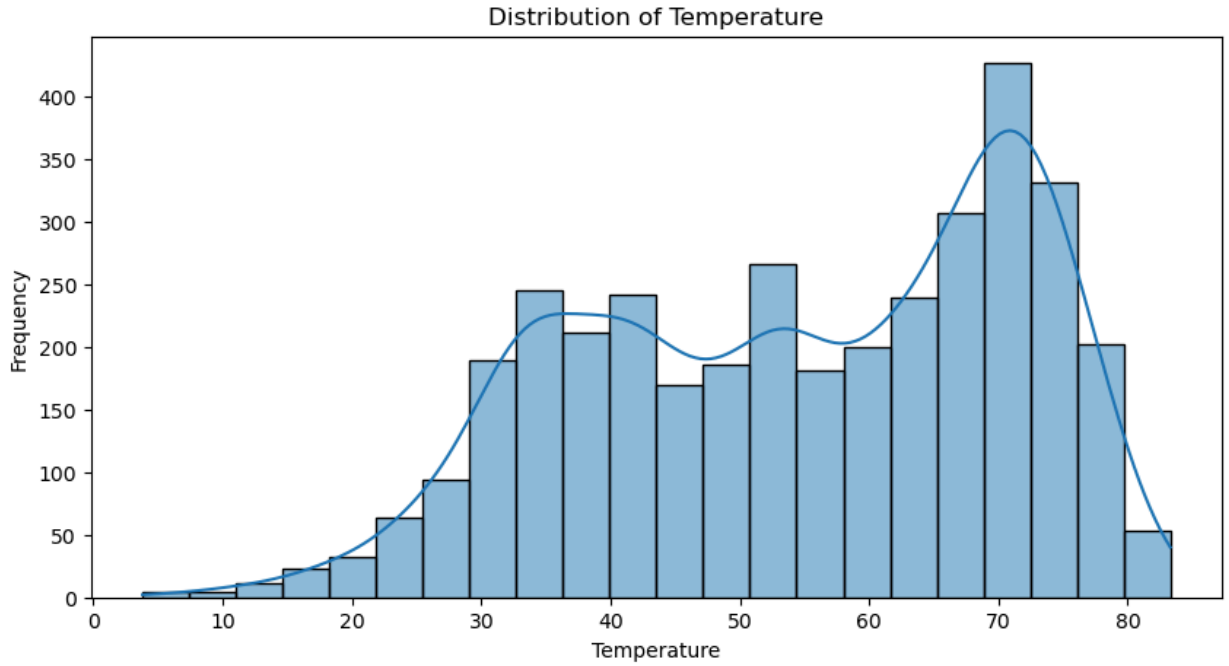
In [55]:
```
plt.figure(figsize=(12, 6))
sns.countplot(data=df, x='preciptype', order=df['preciptype'].value_counts().i
plt.title('Overdoses by Precipitation Type')
plt.xlabel('Precipitation Type')
plt.ylabel('Number of Overdoses')
plt.xticks(rotation=45)
plt.show()
```



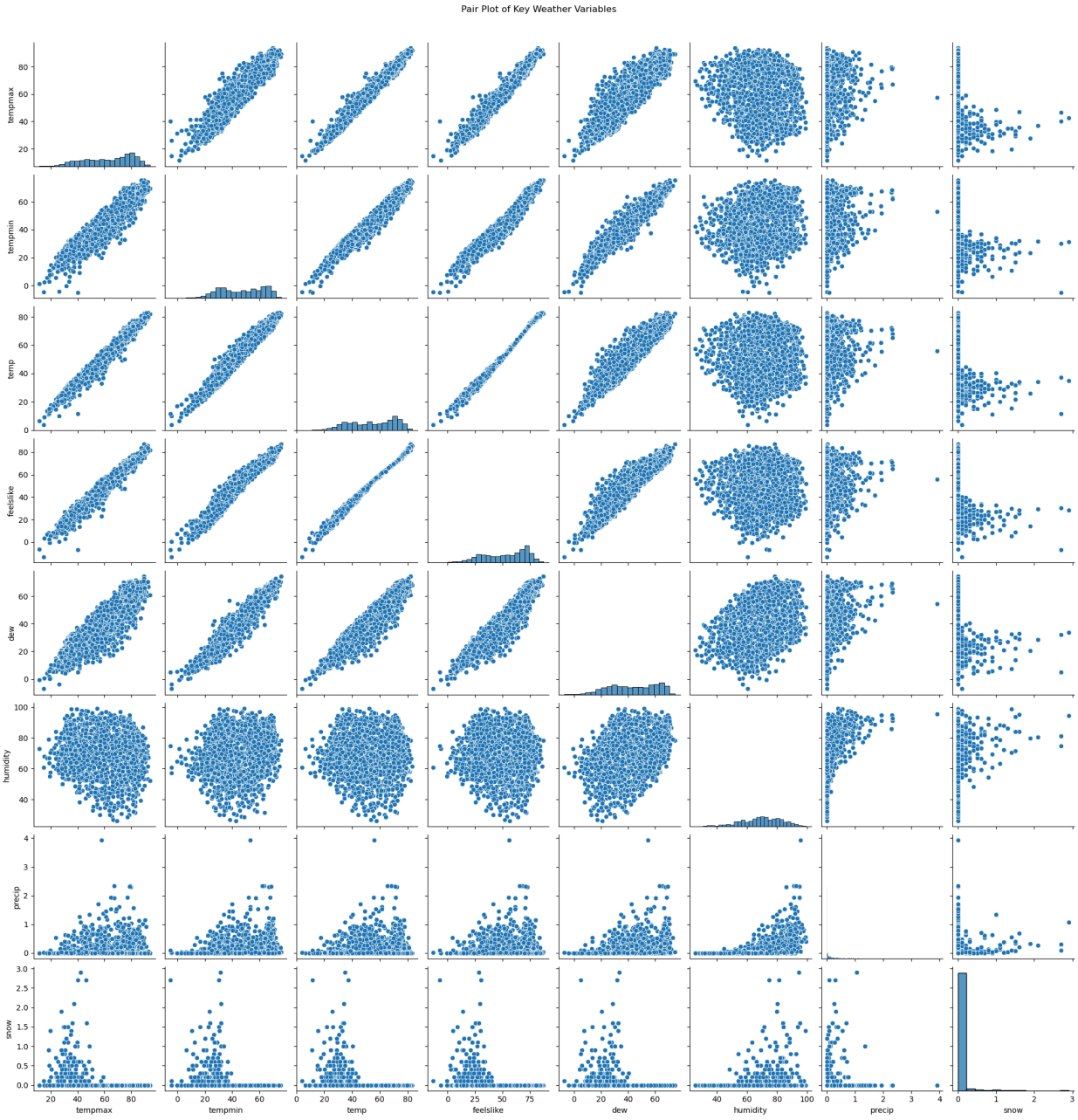
In [56]:
```
# Bar chart of overdoses by gender
plt.figure(figsize=(10, 5))
sns.countplot(data=df, x='gender_desc')
plt.title('Overdoses by Gender')
plt.xlabel('Gender')
plt.ylabel('Number of Overdoses')
plt.show()

# Bar chart of overdoses by race
plt.figure(figsize=(12, 6))
sns.countplot(data=df, x='race')
plt.title('Overdoses by Race')
plt.xlabel('Race')
plt.ylabel('Number of Overdoses')
plt.xticks(rotation=45)
plt.show()

# Distribution of temperature values
plt.figure(figsize=(10, 5))
sns.histplot(df['temp'], kde=True)
plt.title('Distribution of Temperature')
plt.xlabel('Temperature')
plt.ylabel('Frequency')
plt.show()

# Pair plot of key weather variables
sns.pairplot(df[['tempmax', 'tempmin', 'temp', 'feelslike', 'dew', 'humidity',
plt.suptitle('Pair Plot of Key Weather Variables', y=1.02)
plt.show()
```



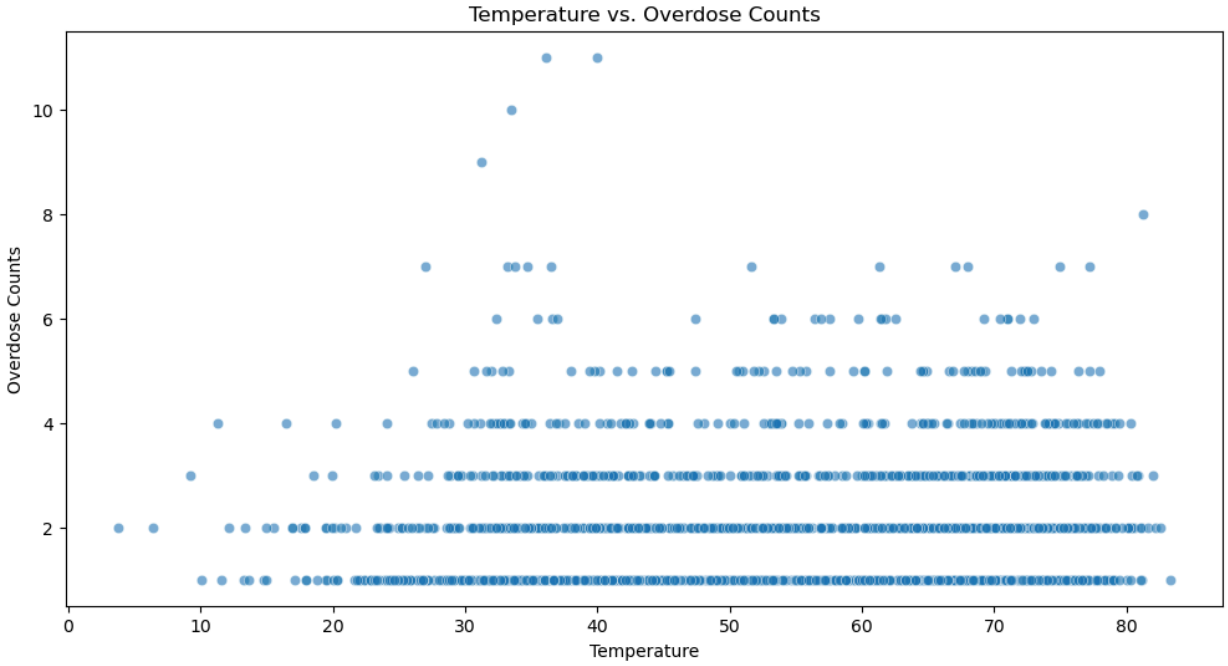




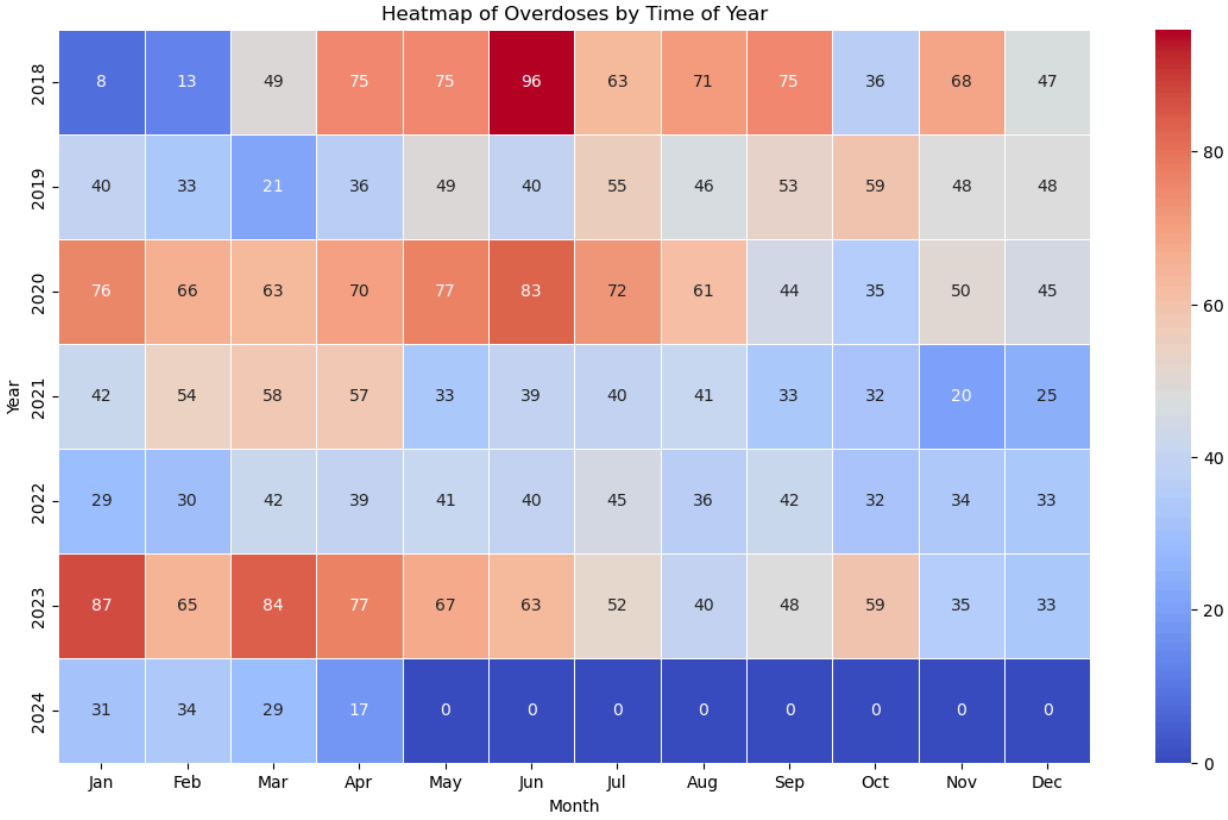

```
/Users/hunterberberich/anaconda3/lib/python3.11/site-packages/seaborn/axisgri
d.py:118: UserWarning: The figure layout has changed to tight
  self._figure.tight_layout(*args, **kwargs)
```



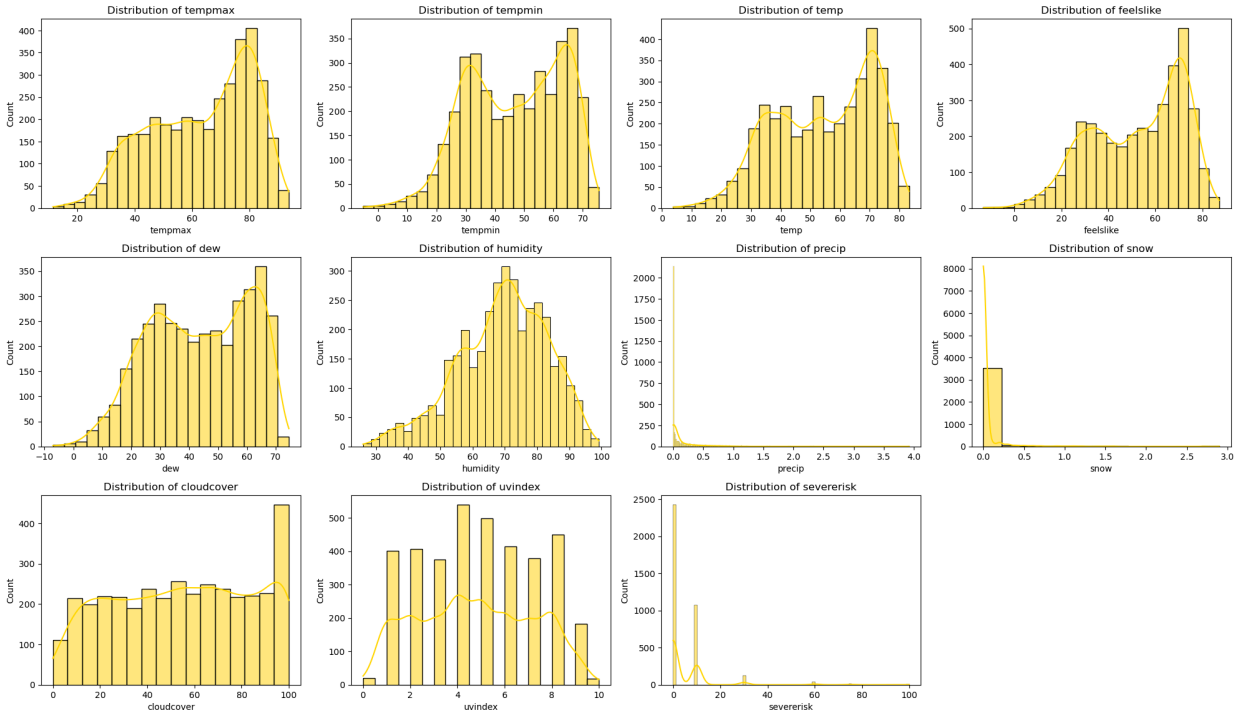
In [57]:
```
df_aggregated = df.groupby('date').size().reset_index(name='overdose_count')


df_merged = pd.merge(df_aggregated, df[['date', 'temp']], on='date', how='left

# Scatter plot of temperature vs. overdose counts
plt.figure(figsize=(12, 6))
sns.scatterplot(data=df_merged, x='temp', y='overdose_count', alpha=0.6)
plt.title('Temperature vs. Overdose Counts')
plt.xlabel('Temperature')
plt.ylabel('Overdose Counts')
plt.show()
```



In [58]:
```
monthly_overdoses = df.groupby(['year', 'month']).size().reset_index(name='ove


monthly_overdoses_pivot = monthly_overdoses.pivot(index='year', columns='month
monthly_overdoses_pivot.columns = [calendar.month_abbr[m] for m in monthly_ove


plt.figure(figsize=(14, 8))
sns.heatmap(monthly_overdoses_pivot, annot=True, fmt=".0f", cmap='coolwarm', l
plt.title('Heatmap of Overdoses by Time of Year')
plt.xlabel('Month')
plt.ylabel('Year')
plt.show()
```



In [59]:
```
# Select weather-related columns
weather_columns = ['tempmax', 'tempmin', 'temp', 'feelslike', 'dew', 'humidity
plt.figure(figsize=(20, 15))
for i, column in enumerate(weather_columns, 1):
    plt.subplot(4, 4, i)
    sns.histplot(df[column], kde=True, color='#FFD700', edgecolor='black')
    plt.title(f'Distribution of {column}')
plt.tight_layout()
plt.show()
```



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```
sus
```