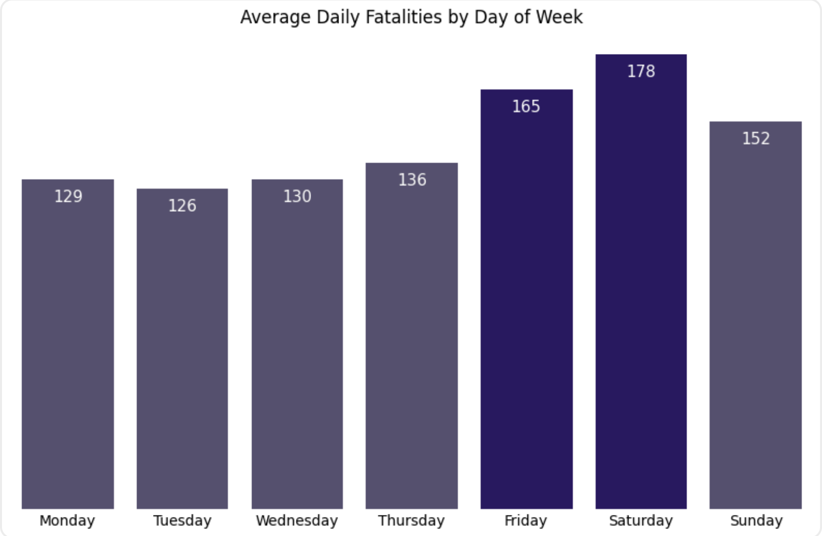
Blame the BBQ, Not the Bong: The Real Dates Driving Fatal Car Crashes

Fridays, Saturdays, and Holidays Like July 4 and Halloween Drive Higher Fatality Rates — Not 4/20

💡 An analysis of 25 years of U.S. traffic fatality data (1992–2016) finds no evidence that April 20th is associated with a spike in deadly car crashes. Instead, the most dangerous days on American roads tend to revolve around major holidays and weekends — particularly July 3–4, Halloween, and fall dates like August 6 and October 11. Fridays and Saturdays consistently lead in fatalities, highlighting the need for targeted road safety efforts during high-travel periods.

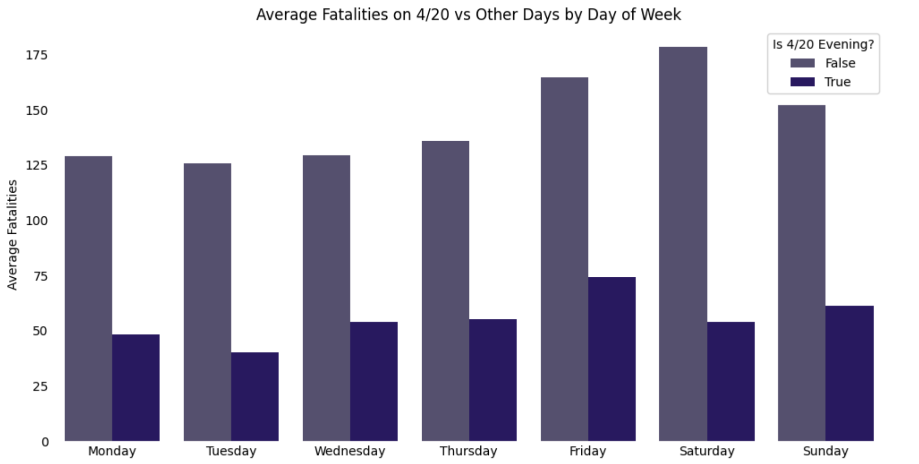
Weekend Warriors, Beware

Turns out the most dangerous thing about Friday night isn't forgetting your leftovers — it's getting behind the wheel. **Friday and Saturday lead the week in fatal crashes**, with Saturday peaking at 178 deaths on average. Weekdays? Far less deadly. So if you're planning a wild weekend, maybe Uber it home.



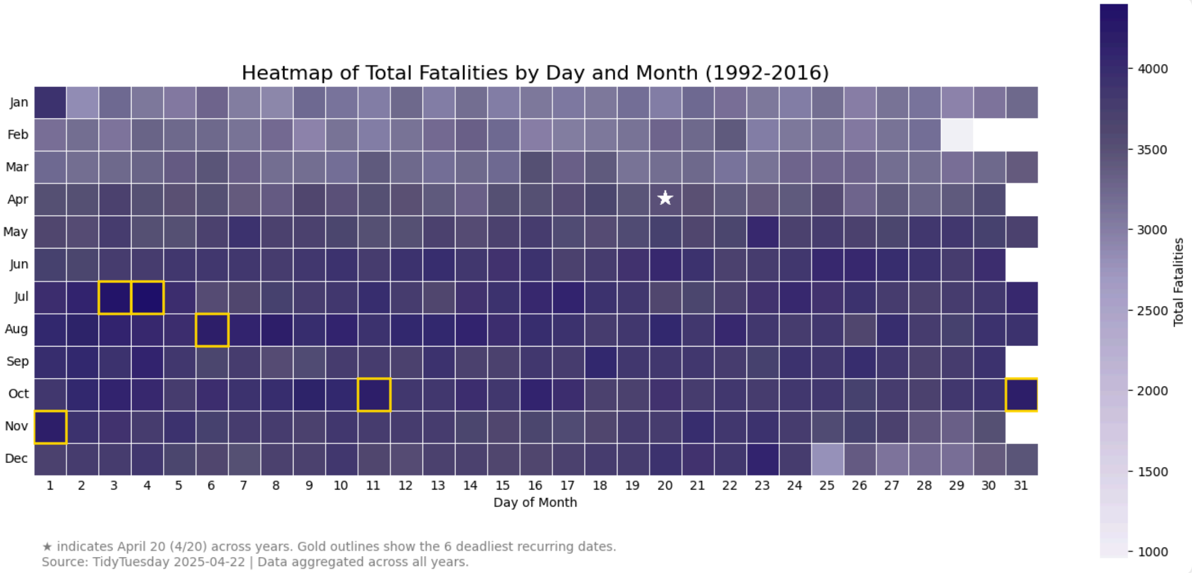
Munchies > Mayhem: 4/20 Isn't Driving the Data

Despite popular belief (and a few hazy headlines), **April 20 doesn't stand out for traffic fatalities** — even on weekends. As this chart shows, fatal crashes on 4/20 evenings are actually lower than typical for their day of the week. So while the snacks might disappear fast, drivers thankfully aren't.



Fireworks, Fall Leaves, and... Fatalities?

Your odds of a deadly car crash aren't highest on 4/20 — they're higher when you're headed to a backyard barbecue or trick-or-treating. This heatmap highlights the six deadliest *recurring* dates from 1992–2016: **July 3–4 (Independence Day), October 31–November 1 (Halloween), August 6**, and **October 11**. Summer holidays, back-to-school weekends, and major celebrations are far more dangerous than April 20 — which is marked here with a star for context, but doesn't even crack the top tier.



★ indicates April 20 (4/20) across years. Gold outlines show the 6 deadliest recurring dates.
Source: TidyTuesday 2025-04-22 | Data aggregated across all years.

Code

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

daily_accidents = pd.read_csv('https://raw.githubusercontent.com/rfordatascience/tidytuesday/main/data/2025/2025-04-22/daily_accidents.csv', parse_dates=['date'])
daily_accidents_420 = pd.read_csv('https://raw.githubusercontent.com/rfordatascience/tidytuesday/main/data/2025/2025-04-22/daily_accidents_420.csv', parse_dates=['date'])


daily_accidents_420.head() #check data
```

```
#add Day of the Week to data sets
daily_accidents["day_of_week"] = daily_accidents["date"].dt.day_name()
daily_accidents_420["day_of_week"] = daily_accidents_420["date"].dt.day_name()
daily_accidents_420.head() #check data
```

```
#ensure date is a datetime object
daily_accidents["date"] = pd.to_datetime(daily_accidents["date"])
```

```
#get min and max date
start_date = daily_accidents["date"].min()
end_date = daily_accidents["date"].max()

print("Date range:", start_date.date(), "to", end_date.date()) #confirm data date range
```

```
#build first bar graph

#average fatalities by day of the week
avg_by_day = (
    daily_accidents.groupby("day_of_week")["fatalities_count"]
    .mean()
    .reindex(["Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday",
"Sunday"])
)

#get the top 2 highest values (days) to highlight trend that weekends havethe highest
fatality rate
top_2_days = avg_by_day.sort_values(ascending=False).head(2).index.tolist()

#set custom colors: one for base, another for top 2
colors = [
    "#564f73" if day not in top_2_days else "#22116b"
    for day in avg_by_day.index
]

#plot figure
plt.figure(figsize=(10,6))
sns.barplot(x=avg_by_day.index, y=avg_by_day.values,
    palette=colors)
plt.title("Average Daily Fatalities by Day of Week")

#add values inside each bar
for i, (day, value) in enumerate(zip(avg_by_day.index, avg_by_day.values)):
    plt.text(
        i,                # x position (bar index)
        value - 7,        # y position (halfway up the bar)
        f"{value:.0f}",  # label (1 decimal place)
        ha='center',      # horizontal alignment
        va='center',      # vertical alignment
        color='white',    # text color
        fontsize=11
    )

#formatting
plt.xticks(rotation=0)
plt.xlabel("")
plt.tick_params(axis='x', length=0)  # Removes x-axis ticks
plt.tick_params(axis='y', length=0)  # Removes y-axis ticks
plt.gca().axes.get_yaxis().set_visible(False)
```

```
sns.despine(left=True, bottom=True)

plt.show()
```

```
#create second bar chart

#group by wether or not the accident took place on 4/20
grouped = (
    daily_accidents_420
    .groupby(["e420", "day_of_week"])["fatalities_count"]
    .mean()
    .reset_index()
)

#ensure days of week are in order and grouped
day_order = ["Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday",
"Sunday"]
grouped["day_of_week"] = pd.Categorical(grouped["day_of_week"], categories=day_order,
ordered=True)
grouped = grouped.sort_values(["e420", "day_of_week"])

#plot figure and formatting
plt.figure(figsize=(12, 6))
sns.barplot(
    data=grouped,
    x="day_of_week",
    y="fatalities_count",
    hue="e420",
    palette=["#564f73", "#22116b"]
)

plt.title("Average Fatalities on 4/20 vs Other Days by Day of Week")
plt.ylabel("Average Fatalities")
plt.xlabel("")  # remove x-axis label
plt.tick_params(axis='x', length=0)  # Removes x-axis ticks
plt.tick_params(axis='y', length=0)  # Removes y-axis ticks
plt.legend(title="Is 4/20 Evening?")
plt.xticks(rotation=0)
sns.despine(left=True, bottom=True)

plt.show()
```

```
#create heatmap

from matplotlib.colors import LinearSegmentedColormap
from matplotlib.patches import Rectangle

#set color pallette to match above graphs
custom_colors = ["#f3f0f9", "#d0c6e0", "#a49dc5", "#564f73", "#22116b"]
```

```
custom_cmap = LinearSegmentedColormap.from_list("fatality_palette", custom_colors)

#add month and day columns
df = daily_accidents.copy()
df["month"] = df["date"].dt.strftime('%b')       # abbreviated month name
df["day"] = df["date"].dt.day                    # numeric day (1-31)
df["month_order"] = df["date"].dt.month          # numeric month for sorting

#group by month and day
summary = df.groupby(["month", "month_order", "day"])
["fatalities_count"].sum().reset_index()

#pivot to get matrix: rows = month, cols = day
pivot = summary.pivot(index="month", columns="day", values="fatalities_count")

#sort months in calendar order
pivot = pivot.loc[["Jan", "Feb", "Mar", "Apr", "May", "Jun", "Jul", "Aug", "Sep", "Oct",
"Nov", "Dec"]]

#top 6 highest fatality days (across all years)
#was originally 5 but the top 6 days provided a clearer impact of crashes on the days
after a major holiday (inlcuded Nov 1)
top6_days = (
    df.groupby(["month", "day"])["fatalities_count"]
    .sum()
    .reset_index()
    .sort_values("fatalities_count", ascending=False)
    .head(6)
)


#April 20s (across years)
april_20s = df[(df["date"].dt.month == 4) & (df["date"].dt.day == 20)]

#plot figure
plt.figure(figsize=(18, 8))
ax=sns.heatmap(
    pivot,
    cmap=custom_cmap,
    linewidths=0.5,
    linecolor='white',
    cbar_kws={'label': 'Total Fatalities'},
    square=True
)

plt.title("Heatmap of Total Fatalities by Day and Month (1992-2016)", fontsize=16)
plt.xlabel("Day of Month")
plt.ylabel("")
plt.yticks(rotation=0)
plt.xticks(rotation=0)
plt.tick_params(axis='x', length=0)  # Removes x-axis ticks
plt.tick_params(axis='y', length=0)  # Removes y-axis ticks
```

```
#helper to get row (month) index in heatmap
month_lookup = {month: i for i, month in enumerate(pivot.index)}

#draw outlines around top 6 days
for _, row in top6_days.iterrows():
    month = row["month"]
    day = row["day"]
    row_i = month_lookup.get(month)
    col_j = day - 1  # adjust for 0-based indexing
    if pd.notnull(row_i):
        rect = Rectangle(
            (col_j, row_i), 1, 1,
            fill=False, edgecolor='gold', linewidth=2
        )
        ax.add_patch(rect)

#add star on April 20
for _, row in april_20s.iterrows():
    month = row["month"]
    day = row["day"]
    row_i = month_lookup.get(month)
    col_j = day - 1
    if pd.notnull(row_i):
        ax.text(
            col_j + 0.5, row_i + 0.5,
            "★",
            ha='center', va='center',
            fontsize=16,
            color='white',
            fontweight='bold'
        )

#add footnote
plt.figtext(
    .13, .1,
    "★ indicates April 20 (4/20) across years. Gold outlines show the 6 deadliest recurring dates.\nSource: TidyTuesday 2025-04-22 | Data aggregated across all years.",
    wrap=False,
    horizontalalignment='left',
    fontsize=10,
    color='gray'
)

plt.show()
```

```
#wasn't used in report, but helped me review top days for possible trends
top6_days = (
    df.groupby(["month", "day"])["fatalities_count"]
    .sum()
    .reset_index()
    .sort_values("fatalities_count", ascending=False)
    .head(6)
)
print(top6_days)
```

📊 About This Report

This analysis was created as part of #TidyTuesday, a weekly data project that encourages data enthusiasts to practice their skills through real-world datasets. Each week provides an opportunity to explore data through wrangling, visualization, and storytelling.

As part of my ongoing learning journey, I'm using TidyTuesday to expand my data science skillset, especially by exploring new ways to analyze data with Python and presenting findings in ways that are both informative and engaging.

🔗 Links & Sources

- **TidyTuesday Info:** github.com/rfordatascience/tidytuesday
- **Data:** Fatal Car Crashes on 4/20
- **Dataset Article:** The Annual Cannabis Holiday and Fatal Traffic Crashes
- **My Code & Visualization Practice:** *(Insert your GitHub or notebook link here)*

⚠ Disclaimer

This report was created for learning and practice. I did not conduct a comprehensive review of all factors influencing crash fatalities. The findings are based only on the available dataset and are intended to support skill-building, not draw definitive conclusions.