ACCIDENTS ANALYSIS IN MASSACHUSETTS

Blinding Light: Unveiling the Daylight Dilemma in Road Safety

A Presentation by Desi Huskies

WHO ARE WE

We are the dedicated Data Analytics Team at **VisionSafe Road Safety Alliance**, a non-profit organization committed to enhancing public safety and well-being. Leveraging cutting-edge data analysis and research methodologies, we aim to uncover insights that drive impactful change and policy improvements.

Our Goal:
In partnership with the Road Safety Department of Massachusetts, we aim to present a detailed analysis of traffic accident trends, with a focus on identifying high-risk periods and conditions. Our goal is to support the Department in crafting targeted, effective strategies to reduce traffic accidents and enhance road safety for all.

01
Research Problem
What is the research problem and why is this important ?

02
Data and Methodology
Where was the data collected from?

03
Visualizations
What do the visualizations tell us?

04
Key Takeaways
Conclusions and solutions

01 RESEARCH PROBLEM

This project aims to investigate the temporal trends of traffic accidents in Massachusetts, focusing on identifying the specific times of day, months, and seasonal patterns during which these incidents most frequently occur.

Furthermore, it seeks to analyze the interplay between light and weather conditions at the time of these accidents, aiming to uncover significant correlations that could inform more effective road safety strategies and interventions.
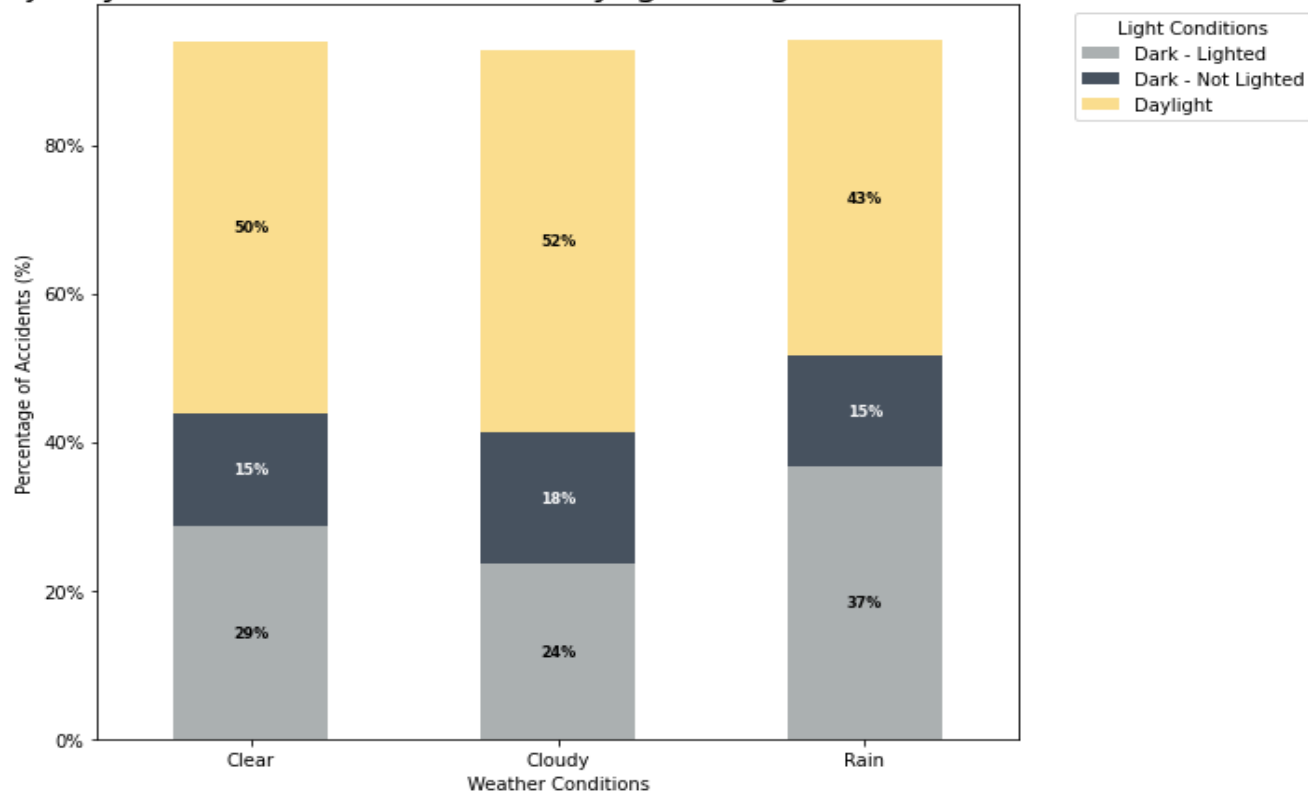
02 DATA AND METHODOLOGY

- The dataset from the Fatality Analysis Reporting System (FARS), provided by the National Highway Traffic Safety Administration (NHTSA), encompasses comprehensive information regarding fatal traffic accidents across the United States.
- **Time Frame:** 2018-2022
- Rigorous data cleaning and preparation was done to ensure accuracy, including handling missing values and standardizing formats.

- **Key Variables Considered:**
- **Time of Day:** Hourly data to assess when accidents are most likely.
- **Months :** To identify seasonal fluctuations in accident rates.
- **Light Conditions:** Including daylight, dusk, dawn, and dark conditions, to evaluate the impact of visibility.
- **Weather Conditions:** Spanning clear, rainy, snowy, and foggy scenarios to gauge environmental effects.

- **Visualizations:** Employed stacked bar charts to reveal complex temporal patterns, allowing for a clear comparison across different times of day, months, and seasons in relation to accident frequencies.
- Applied line graphs to track year-over-year trends and identify any rising or falling patterns in accident occurrences.

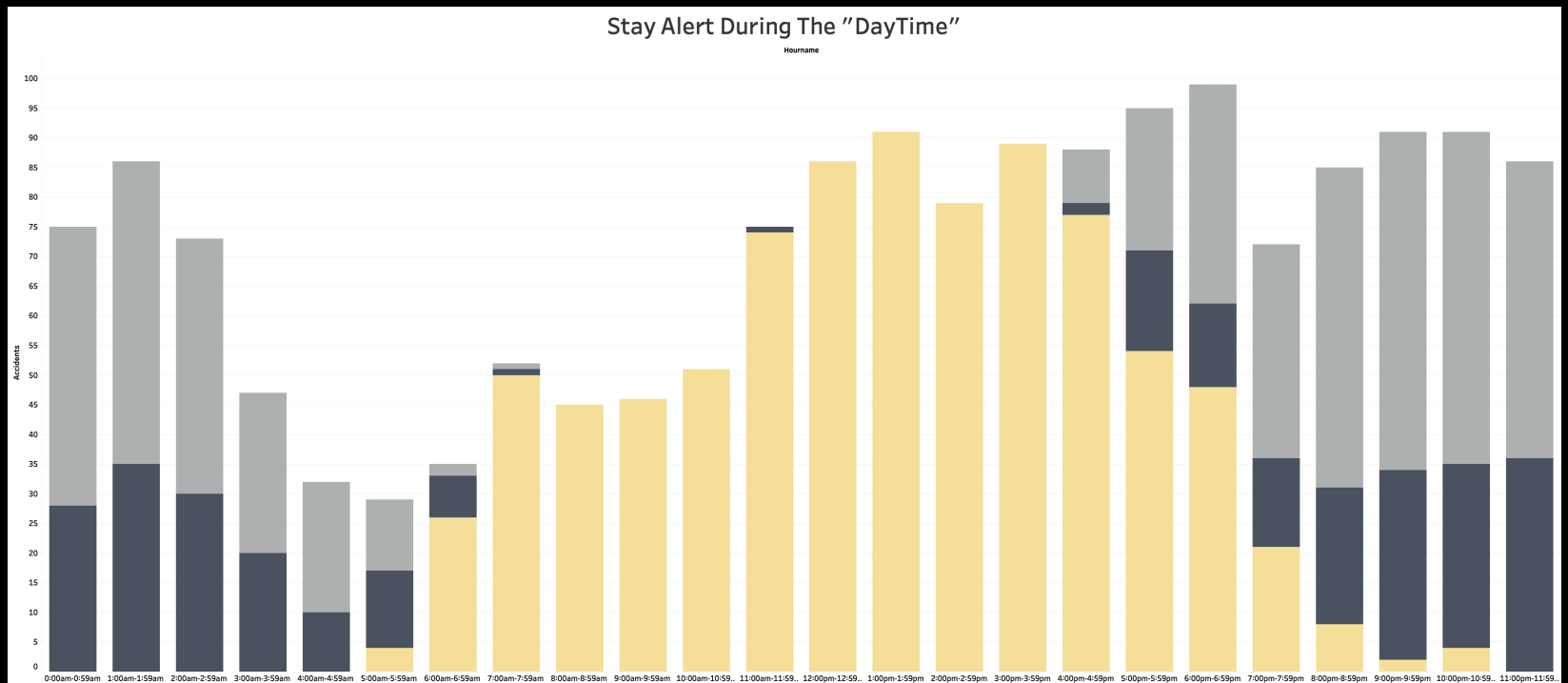Accident Cases Over Years in Massachussets
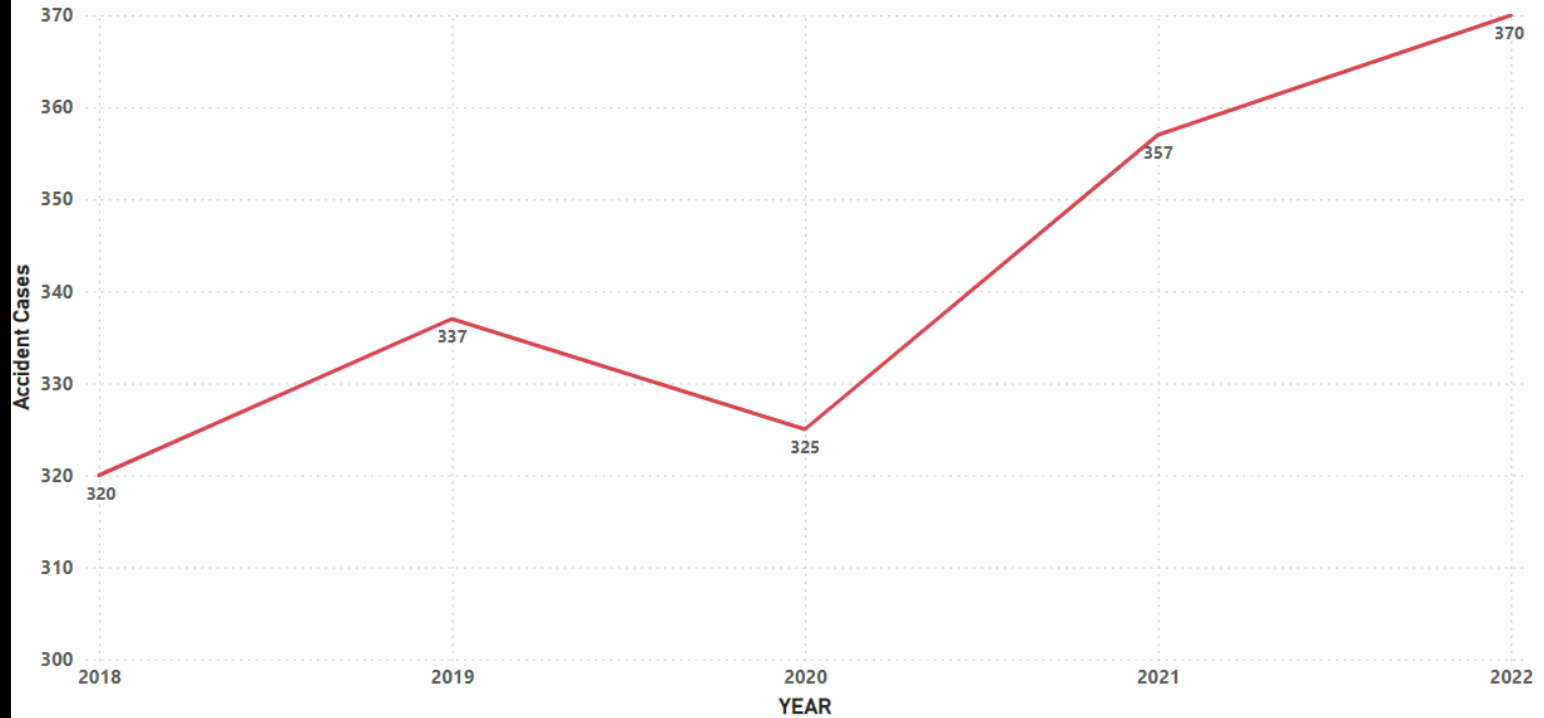
SUDDEN INCREASE IN THE NUMBER OF ACCIDENTS SINCE THE YEAR 2020

Majority of Accidents Strike in Daylight, Regardless of Weather

Light Conditions
- Dark - Lighted
- Dark - Not Lighted
- Daylight

Percentage of Accidents (%)

Clear: Daylight 50%, Dark - Not Lighted 15%, Dark - Lighted 29%

Cloudy: Daylight 52%, Dark - Not Lighted 18%, Dark - Lighted 24%

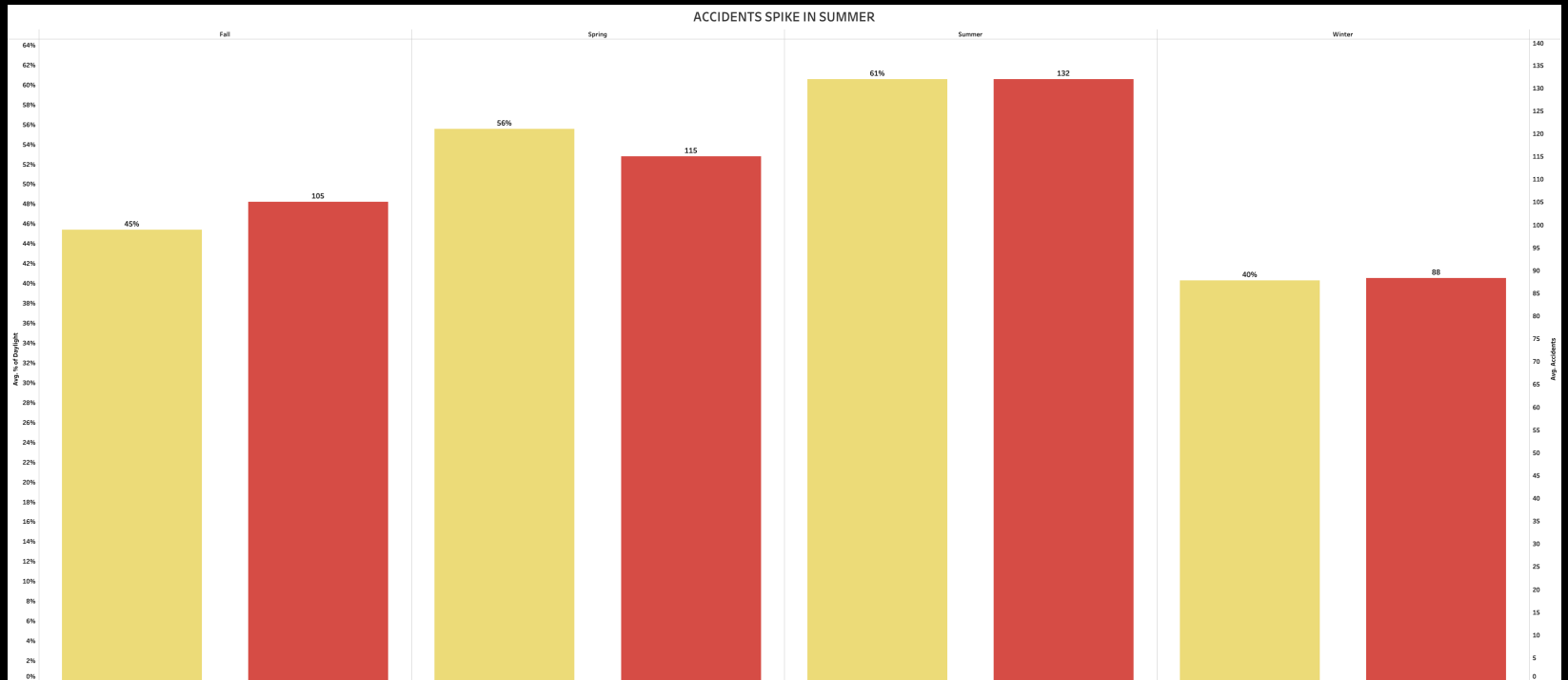**Rain:** Daylight 43%, Dark - Not Lighted 15%, Dark - Lighted 37%

Weather Conditions

SO, DOES DAY-LIGHT REALLY CONSTITUTE TO INCREASING NUMBER OF ACCIDENTS?

This graph demonstrates a significant increase in accidents during midday hours, with the highest concentrations occurring between late morning and late afternoon.

Maximum Daylight, Maximum Risk
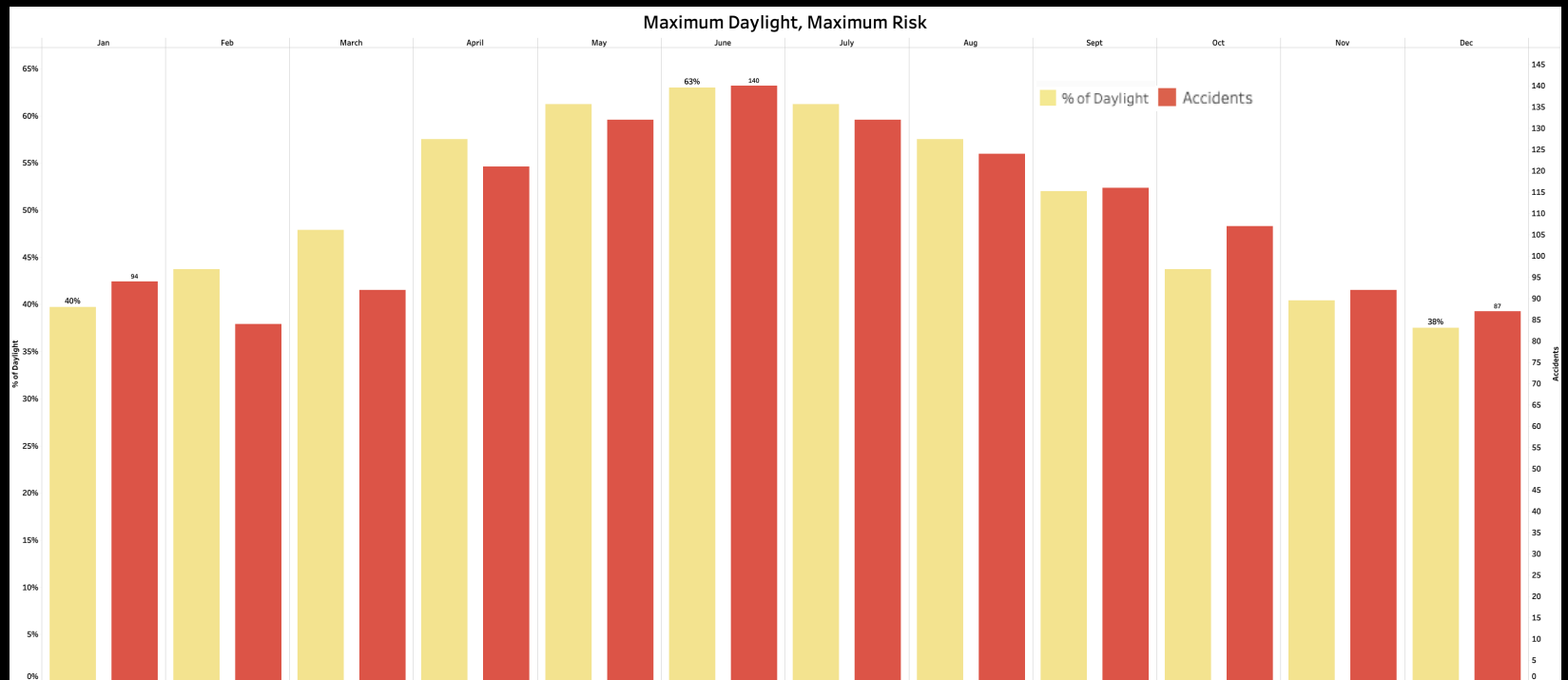
This graph, constructed by calculating the percentage of daylight for each month, validates our hypothesis that accidents indeed escalate with increasing daylight. The upward trend in accidents aligns with the extension of daylight hours, reinforcing the need for strategic safety interventions during these peak times.

ACCIDENTS SPIKE IN SUMMER

	Fall	Spring	Summer	Winter
Avg. % of Daylight	45%	56%	61%	40%
Avg. Accidents	105	115	132	88

This graph vividly illustrates that summer not only brings a surge in daylight hours but also coincides with the highest frequency of traffic accidents
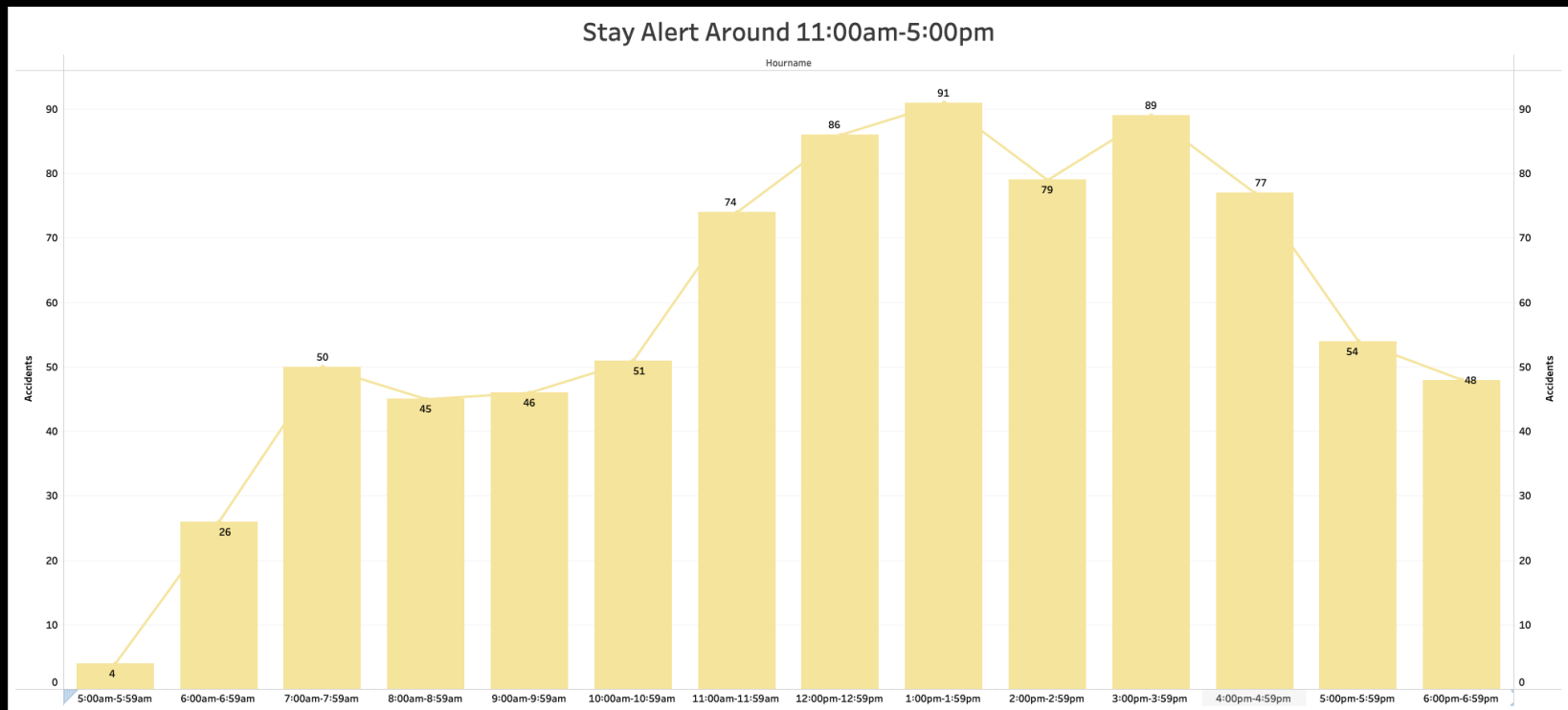
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THE STORY

Our visualizations revealed a surprising pattern: despite the clear visibility that **daylight** offers **keeping traffic constant**, the majority of accidents in Massachusetts occur during these hours, peaking in the **summer**, especially between **11:00 am and 5:00 pm.**

SOLUTIONS

Enhanced Monitoring: Increase patrols and enforcement of traffic laws during peak accident times to deter dangerous driving behaviors like speeding and distracted driving.

Public Awareness Campaigns: Launch seasonal road safety campaigns ahead of and during the summer to raise awareness about the increased risk of accidents during these months.

Driver Education: Offer educational programs highlighting the risks associated with driving during high-accident times and encourage safe driving practices.

Safety Technology Incentives: Encourage the adoption of advanced safety technologies in vehicles, such as automatic emergency braking and collision avoidance systems, with incentives or awareness programs.

Data-Driven Decision Making: Continue to leverage data analytics for real-time monitoring and predictive modeling to anticipate and mitigate potential accident spikes.

THANK YOU!

Drive Safe.