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## I. ABSTRACT

This particular research will explain the complex dynamics of how injuries affect win probabilities within the National Football League (NFL), an area within which athleticism and strategic gameplay are combined, highlighted by the spectacle of adrenaline-driven excitement of each game. With inevitable injury in both an unpredictable fact of professional football, the impact on team performance and larger elements of season storylines. This study tries to address to what extent injuries influence a team's chance of winning. This is a question that is poised at the crossroads of sport science, strategy, and player welfare. n

Injuries really challenge a team since from the minor impairments to the serious season-ending damages, they may change strategies and change the game results. Our analysis unveils a negative correlation between the statistical relationship of the presence of injuries against win probabilities, quantified as the variable "out. Specifically, for every increase in the "out" variable, there is a slight decrease in the odds of how much more a team is likely to win, which proves that a slight changing factor, such as injury, would disrupt the potential outcomes of the level of success for the team. The effect size is moderate, but the results highlight that the availability of players is highly related to the outcome of a match.

However, the study recognizes the fact that it wasn't possible to include variables like the player's quality and the strength of the opponent, which might further ascertain the effects of the injuries in a more nuanced manner. There is thus significance that can be drawn from this study within a wider perspective of team dynamics and strategy. This thus forms a foundational perspective for future investigations, aiming at being able to understand in entirety the role that injuries play in shaping NFL outcomes.

# II. EXPLORING DATA

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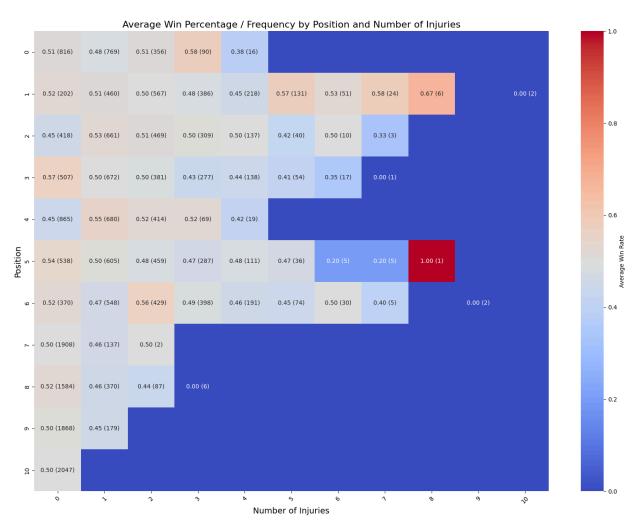


Figure 1: Heat Map of Injuries

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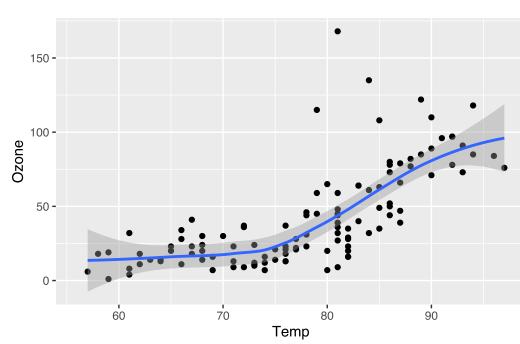


Figure 2: Temperature and ozone level

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$$\sum_{n=0}^{\infty} k = \frac{n(n+1)}{2} = \frac{n^2 + n^2}{2}$$