

# MTFC Project Proposal 2024-25

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## MTFC Project Proposal Template Use Notes:

- Refer to the official MTFC Project Proposal Prompts 2024-25 for the 15 prompts and scoring instructions.
- The use of this template is OPTIONAL.
  - It is provided as an optional resource for teams to keep their Project Proposal response organized. Teams who wish to use this template should make a copy in order to edit.
- The final version of the team's MTFC Project Proposal should be downloaded as a PDF or Word document to submit on the ICS Dashboard. A single file will be submitted.
- Additional resources (including the Actuarial Process Guide) can be found on the Modeling the Future Challenge website: <https://www.mtfchallenge.org/resources/>
- Please direct any questions to [challenge@mtfchallenge.org](mailto:challenge@mtfchallenge.org).

## Part 1: Project Definition (Team's Topic)

These prompts can be found on page 3 of the MTFC Project Proposal Prompts 2024-25. Additional information on Project Definition can be found in **Step 1: Project Definition** in the Actuarial Process Guide.

Team Responses:

### #1: Identify the topic

- Response: School Shootings are our topic of choice, and this is vitally important because the protection of future youth and generations is essential. Since the end of the COVID-

19 Pandemic, school shootings increased around the United States. It affects the victims, the aggressor, and the families of the victims.

## **#2: Identify potential risks**

- Response: The organization that experiences major risks is schools. Schools' risks include loss of life for school staff and damage to school property. The best-case scenario is that no student or staff member's life is lost due to the aggressor being apprehended before they could act, and no damage to the school. The worst-case scenario would be a high amount of damage to school property and a great number of lives lost. Also, there would be a decline in mental health for the survivors.

## **#3: Identify a behavior change risk mitigation strategy**

- Response: One behavior change would be making school staff more vigilant and more prepared for the impending attacks from the aggressor, as well as noticing potential aggressors in the school. School staff would be impacted because their duties would increase.

## **#4: Identify a modifying outcomes risk mitigation strategy**

- Response: One outcome that could be modified would be increasing security to schools, such as hiring security guards or having police officers on site. Law enforcement officers would be impacted as well because their duties would also increase, and the school would also have to pay more money to them

## **#5: Identify an insurance risk mitigation strategy**

- Response: A new type of insurance could be school shooting insurance, where property damage, mental health, and physical health insurance would be provided in this. The students and staff would be impacted because they would receive support from this insurance, but the school would be negatively impacted because they would have to pay for it.

## **#6: Identify driving research questions for your topic**

- Response: How often are attacks carried out? What is the severity of the losses in each attack? How can the loss of life and damages be quantified?

## Part 2: Data Identification & Assessment (*Team's Topic*)

These prompts can be found on page 4 of the MTFC Project Proposal Prompts 2024-25. Additional information on Data Identification and Assessment can be found in **Step 2: Data Identification & Assessment** in the Actuarial Process Guide.

Team Responses:

### #7: Identifying the type of data you hope to find

- Response: We hope to find data that contains the number of violent crimes involving firearms that occur on school grounds each year. The ideal data set would also include the locations of the schools, the age of the aggressors, the number of victims, and the damages the schools face.

### #8: Identify potential data sources for your topic

- Response: There are many sources out there that contain data metrics on this topic. A substantial one can be found [here](#). This data is credible because it is a .org domain. This data is curated by a group of individuals who work for a nonprofit. With this data set, we would be able to examine the effects that covid and the mental health crisis have on violent crimes involving firearms on school grounds. Another data source can be found [here](#). This data source is also credible because it is managed by usafacts.org. This website is routinely updated by a group of specialized data analysts.

## Part 3: Mathematical Modeling (*Team's Topic*)

These prompts can be found on page 5 of the MTFC Project Proposal Prompts 2024-25. Additional information on Mathematical Modeling can be found in **Step 3: Mathematical Modeling** in the Actuarial Process Guide.

Team Responses:

### #9: Modeling research on your topic

- Response: There were many published papers on predicting and analyzing school shootings. This link contains a paper where the author attempted to predict school shootings by analyzing words of hate used across the world. This paper contains deep mathematical analysis that we are not familiar with. However, we feel This paper is credible as it was reviewed by professors at Johns Hopkins University. Another paper analyzes the mental health of students after school being victims of violent crime. This paper is also credible because Stanford published it.

### #10: Goals of a mathematical model in the project phase

- Response: What our mathematical model strives to obtain is to be able to quantify and mitigate school shootings. This will help identify the likelihood by quantifying the mental health of past and current students, as well as the staff members. This will help calculate a certain threshold, where if a student crosses this threshold, they are more likely to be an aggressor. So, quantifying mental health and determining the mitigation of school shootings would serve to be fruitful in our Project Phase.

### #11: Assumption development

- Response: Our model should be able to predict up to any amount of time in the future if the variables we use in our analysis stay the same. For example, if gun laws and regulations continue to stay consistent, our model will still work well. We expect our data to change in correspondence with the variables we will use. The historical trend of school shootings is that it has increased annually over the last couple of decades. We consider this a rational and logical presumption because of the existing historical trends.

## Part 4: Risk Analysis (*Team's Topic*)

These prompts can be found on page 6 of the MTFC Project Proposal Prompts 2024-25. Additional information on conducting a Risk Analysis can be found in **Step 4: Risk Analysis** in the Actuarial Process Guide.

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Team Responses:

Based on our research, the risk of loss of life is increasing steadily as the number of violent crimes in schools increases. We hope that if we can reduce the amount of school shootings, the number of fatalities will decrease.

The risk of property damage is also increasing, so if no action is taken, the damage will continue to grow. As violent crimes increase on school grounds, property damage such as broken glass, bullet holes, or biohazardous waste/ We hope that if we can reduce violent crimes on school grounds, this will also go down.

## Part 5: Recommendations (*Team's Topic*)

These prompts can be found on page 7 of the MTFC Project Proposal Prompts 2024-25. Additional information on making Recommendations can be found in **Step 5: Recommendations** in the Actuarial Process Guide.

Team Responses:

### #13: Recommendation differences between mitigation strategies

- Response: Important metrics for our future model could include the number of lives saved, the financial loss, and the mental health of the community where the violent crime occurred. We chose these as metrics because they are the most important. Lives are obviously the number one priority and should be valued above all in consideration.

### #14: Audience for recommendations

- Response: One audience for our recommendations could be the schoolboard of various high schools in America. We chose this audience because they have a lot of power over school systems and definitely have the ability to direct funding to mental health support.

#### **#15: Goals for situation improvement**

- Best Response: The best case scenario of the project is we can drastically reduce the number of violent crimes that are committed on school grounds. On top of this we hope to improve the mental health of those who might feel the need to commit violent crimes. If both of these were to be enacted, we could reduce the number of violent crimes.