



A Program of The Actuarial Foundation

**Modeling the Future  
Challenge**

# 2020-21 Project Proposal Template

Each team must submit a “Project Proposal” along with their scenario response to complete Phase 1 of the Modeling the Future Challenge. Project Proposals should be no more than one page in length, and should follow the word count guidelines for each section below. The Project Proposal will be used to help evaluate the team’s understanding of the project structure and requirements. It will also be used to help connect teams with actuary mentors in the Project Phase of the Challenge. Teams are NOT locked in to doing a project exactly as they say in their proposal. It is common that teams will modify their projects as they learn more about the data and try out various mathematical modeling and analysis.

## Part 1: Problem Statement

The problem statement should be no more than 100 words and must include information covering three items (See the Actuarial Process Guide and Data Sources Guide for examples):

- (1) What is the risk your project is analyzing?
- (2) Who is at risk?
- (3) What are the possible risk mitigation strategies you are evaluating?

## Part 2: Data Sources

List the data sources your team is considering using for your project. Describe the value you expect each data source will bring to your project. What will it help you determine in your analysis, how will it help you characterize your risks, or how will it help you evaluate risk mitigation strategies? The description of your data sources should be no more than 200 words.

## Part 3: Mathematical Modeling

Describe, at a high-level, how you expect to mathematically model the risks for your project, and evaluate potential mitigation strategies. The description can be as simple as using regression analyses to project trends, or creating a random walk model, or whatever other type of analysis you expect to conduct. Description of your mathematical model should be no more than 200 words.

## Part 4: Risk Mitigation Concepts

Describe the potential risk mitigation strategies that you think your team will evaluate for your project. Descriptions should be high-level to show a general concept what possible strategies you have identified. The description of your risk mitigation strategies should be no more than 200 words.



A Program of The Actuarial Foundation

**Modeling the Future  
Challenge**

# Example Project Proposal 1

## Part 1: Problem Statement

Distracted driving has become a serious transportation safety risk across the country. It is even more pronounced in young drivers aged 16 to 25. We evaluate the overall risks that distracted driving is causing the United States in terms of accidents and costs of care for those involved. We then evaluate an alternative insurance product involving a hands-free guarantee phone system in cars.

## Part 2: Data Sources

We plan to use the Fatality and Injury Reporting System from the NHTSA to define how many automobile accidents occur each year due to “distracted driving” or cases where the driver looks away from the road, most often at a hand-held cell phone. We will also use this NHTSA information to look for trends over the years to see if cases of distracted driving are increasing.

We plan to use information from National EMS Information System to determine a model cost for EMS response to traffic accidents.

We plan to use the EMS information and other Center for Medicare and Medicaid Services (CMS) data along with additional web research to determine other ways of identifying the costs associated with each auto accident.

## Part 3: Mathematical Modeling

We will conduct a regression analysis on the NHTSA data to determine if there are trends in the number of distracted driving accidents. We will then combine the information gathered on the costs of each accident to generate a value for the risk of crashing. We will then model levels of reduction in overall crashes by creating a “hands-free” guarantee product that will ensure drivers with our hands-free phone dock will not be distracted by their phone while driving.

## Part 4: Risk Mitigation Concepts

Our main risk mitigation concept is the creation of a “hands-free phone dock” for the car. The dock will have a sensor to identify when a registered phone is inside the dock. We propose to auto-insurance companies that reductions in the premiums for auto-insurance policies be provided for every year the drive meets a minimum standard of times their phone is in the dock while driving. We will compare the cost of reducing these policy premiums versus the savings in payments the insurance companies make in auto accidents.



A Program of The Actuarial Foundation

**Modeling the Future  
Challenge**

# Example Project Proposal 2

## Part 1: Problem Statement

As with many towns along the Mississippi river, Memphis, TN, is at an increasing risk of flooding due to climate change. Flooding in Memphis could cause the city government to spend significant money to repair the damage to the city's streets and infrastructure. In this project, we examine new policies and insurance plans that the Memphis could adopt to help protect against a devastating loss in an extreme flood.

## Part 2: Data Sources

We plan to use information from the Memphis city government to identify past damage from previous floods. We will also use datasets from FEMA's National Flood Insurance Program to identify how many homes and commercial buildings required payouts from previous floods to help us identify the severity of the risk to Memphis.

We will use the FEMA disaster declarations summaries to identify how often there have historically been floods in this section of the Mississippi River, and combine this with information from the U.S. Global Change Program to provide information on the future likelihood of flooding in Memphis.

## Part 3: Mathematical Modeling

We will project future trends of flooding using the Global Change Program data and the existence of past floods from the FEMA database. We will attempt to differentiate several levels of flooding risk (extreme, severe, moderate, and mild) based on the length of disaster declaration in the FEMA database and the overall amount of NFIP payouts. We may have to make some assumptions about the data to do this. We will then model the future expected values for payouts to flood losses in Memphis through the year 2050.

## Part 4: Risk Mitigation Concepts

We explore the possibility of Memphis constructing a larger floodwall along a 5 mile stretch of the Mississippi river to help protect it against floods. Previous proposals for a floodwall have been fielded by the city. We evaluate the costs of an expanded floodwall versus the potential savings to city and private infrastructures in the event of future floods.