Humana/Mays

2021 Healthcare Analytics Case Competition

Fifth Annual

Humana

TEXAS A&M UNIVERSITY
Mays Business School

Today's Agenda

01 | **Introductions** | Texas A&M, Humana

02 | **Competition Overview** | History, Eligibility, Timeline, Prizes

03 | **Analytics Challenge** | Introduction to the Case, Data Overview

04 | **Additional Details** | Judging

Your Hosts

Texas A&M – Mays School of Business

Dr. Arvind Mahajan | Associate Dean for Graduate Programs

Humana

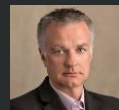**Geoff Monsees |** Director, Shared Services – Enterprise Data & Analytics

Genevy Dimitrion| VP, Data Strategy & Governance

Michael Aldridge | AVP, Experience Strategy & Transformation

Vinay Chiguluri| Principal Data Scientist– Enterprise Data & Analytics

About Texas A&M

o **First public higher education institution** in Texas

o One of the few universities in the country designated a **land grant, sea grant, and space grant** university

o **Over 70k students** enrolled in 2021

o **Largest student body** in the Nation (2021 US News & World Report)

o **$13.6 Billion** University Endowment

o **Over 525K alumni** who create a global Aggie network

About Humana

o **Founded in 1961** & Headquartered in Louisville, KY

o **Leading health care company** that offers a wide range of insurance products and health and wellness services

o **One of the nation's top providers of Medicare Advantage** benefits with over 30 years of experience and approximately 4.8 million members as of January 2021

o **# 41** in the Fortune 500 (2021)

Competition Overview

The Challenge

This is an opportunity for students to showcase their analytics skills to solve real-world business problems using Humana's data

Eligibility Requirements

o Student must be enrolled part- or full-time in an accredited Master of Science, Master of Arts, Master of Information Systems, Master of Public Health, Master of Business Administration, or similar master's programs that educate in business, healthcare, or analytics located within the US

o One entry per team; teams must have 2-4 members from the same school
  - If a participant drops out of the competition, no substitution is permitted
  - If the team falls below the 2-person minimum due to a member leaving, the team is no longer eligible to compete

o Students may only participate on one team

o Students must be currently enrolled and must not have graduated from the qualifying program at the time of the final case competition presentations
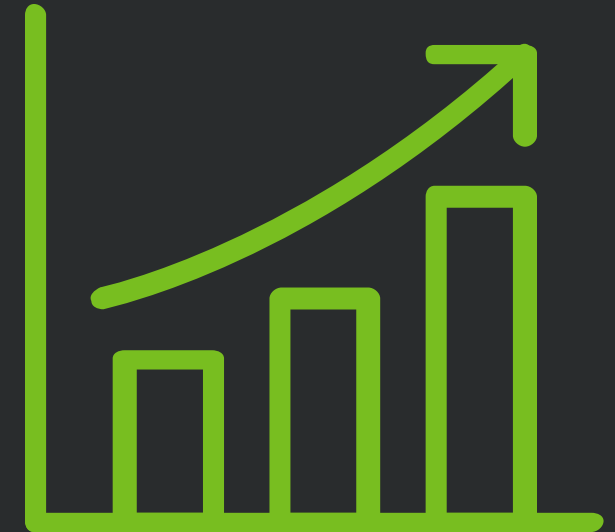
o Humana Employees are not eligible

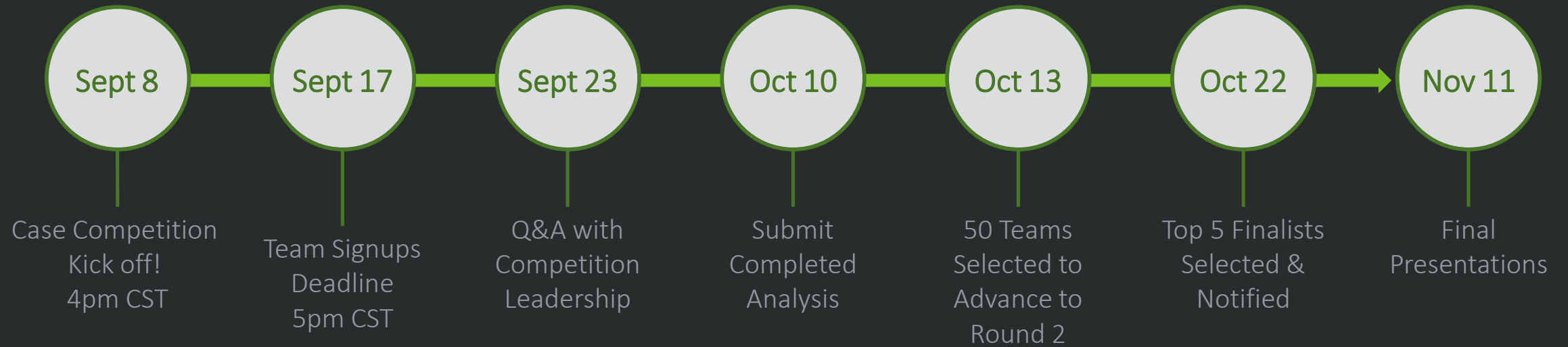|	2017	2018	2019	2020
Participants	350	700	1300+	800+
Teams	109	234	473	300
Universities	19	48	81	78
Prize Money	$10.5K	$35K	$52.5K	$70K

2021 Enhancements

Every year we make tweaks to improve the overall experience associated with Humana-Mays Healthcare Analytic Case Competition.

Some of the highlights include…

o Integrating fairness and equity measurements into the solution

o Including business sponsor to final panel of judges
   ▪ Individual specifically involved with this business issue at Humana

o Introduction of a "Leaderboard" associated with Round 1 (Model Performance)
   ▪ Allow teams to see where they "stand" prior to final submissions

Competition Timeline

Sept 8	Sept 17	Sept 23	Oct 10	Oct 13	Oct 22	Nov 11
Case Competition Kick off! 4pm CST	Team Signups Deadline 5pm CST	Q&A with Competition Leadership	Submit Completed Analysis	50 Teams Selected to Advance to Round 2	Top 5 Finalists Selected & Notified	Final Presentations

Competition Prizes

First Place

$50,000

Second Place

$20,000

Third Place

$10,000

Getting Started

Register Your Team @ https://mays.tamu.edu/humana-tamu-analytics

Information Needed:
o Team Name
o Team Member Names
o Designated Team Leader
o School Represented
o Signed NDA for *each team member*

Team Registration:
o Early: September 13th
o Deadline: September 17th, 5:00 PM CST

Data Release:
o Starts September 15th (must have completed team registration & signed NDAs)

Issues with Registration? Send an email to humanacasecomp@tamu.edu

2021 Problem Statement

Increasing the COVID-19 vaccination rates among Humana's members continues to be a priority both for member and the larger population health and safety considerations. Humana is particularly focused on providing vaccination opportunities for the most vulnerable and underserved populations. Existing disparities in health equity have become very visible during the vaccine response to COVID-19.

Humana and many others have reduced real barriers to gaining access for those who want the vaccine. In addition, a portion of the members, like in the general population, are hesitant or resistant to get the vaccine due to a combination of factors that include, misinformation, and lack of trust in the vaccine. It is believed that these members will require personalized outreaches involving clinical conversations to build trust in the vaccine. However, member level vaccination status data is incomplete due to lack of consistent and timely data capture at the vaccination sites.

Using the provided data and potentially supplementing with public data, create a model to predict which members are likely to be hesitant so that Humana can design targeted outreaches for these members, prioritized to reach the most vulnerable and underserved populations to receive health solutions.

Competition Objectives

o Identify members most likely to be hesitant to the COVID vaccine

o Provide recommendation & potential solutions to drive vaccination among the sub-segments of hesitant members based on the insights derived from the data

o Ensure analysis and recommendations demonstrate fairness and equity through mitigation of potential bias inherent in the data

Case Requirements | Key Components

Important Definitions

- *Fairness in AI:* Augmented Intelligence (AI) can help deliver easy and seamless experiences to members and improve their health outcomes. It can also reflect and magnify the history and values of a society, including biases. Intentional or not, without our intervention, decades of fighting for equality can be unwritten in a few lines of code.

  Humana is committed to developing and fostering more equitable and inclusive AI for protected classes: *race, sex, age, low income status, and disability status*.

Challenging Problem

- *Predictive model* – Definitively knowing a member's vaccination status is difficult without a broad screening, therefore, having an effective predictive model to accurately identify members most likely to be hesitant is very important.

- *Proposed solutions* – It is likely that non-vaccinated members are not homogeneous and may have different reasons for not getting the vaccination (e.g. pre-existing conditions, access, misinformation, lack of trust in the vaccine). As such, there are perhaps different solutions for different segments of members.

Data Included:

- COVID19 Vaccination status
- Medical claims features
- Pharmacy claims features
- Lab claims features
- Demographic / Consumer data
- Credit data features
- Clinical Condition related features
- CMS Member Data elements
- Other features

Case Data | Overview

o Target population: Humana MAPD members

o Event: Each member will have a binary flag to indicate Vaccination Status

o Lookback: Vaccination data as of 3rd week of March 2021; 1 year look back; Demographic & RWJF features as of July 2020

o Data warehouse: 350+ features

Medical Claims Features

Utilization by Category (IP admits/ER visits/Outpatient, etc.)
Authorization and PMPM Cost by conditions
data for inpatient claims

Pharmacy Claims Features

Prescription Days Covered
Brand/Generic Prescription
Mailed/Non-mailed Prescription
Maintenance Prescription
GPI2 Level Prescription Utilization

Lab Claims Features

Abnormal Lab Results Indicator
Abnormal Lab Results Indicator by Category (Cholesterol/ EGFR/HbA1c/Hemoglobin etc.)

Demographics/Consumer Data

Age
Geography
Census Education Level
Household Composition
Homeowner Status
Census Percent Motor Vehicle Ownership

Credit data

Balance All Mortgage Accts Past Due
% HH Bank Card Accts - Severe Derogatory Accts
Number All Mortgage Accts - 120 Days Past Due or Collections
% Balance to High Mortgage Credit

Condition Related Features

Count of claims by Charlson Comorbidity Index
CMS Diagnosis Code Categories
% of claims associated with MCC Diagnosis Code Categories

CMS Features

Disability
CMS Risk Score
CMS Total Payment Amount

Other features

Home Health discharge
HEDIS-like Features
Out of network provider costs
Revenue Code Features
Behavioral Segmentation

Judging Criteria

SIMPLY STATED: We are looking for …

A solution that …

- o Demonstrates an understanding of the underlying business issue
- o Is grounded in the data that has been provided
- o Is a combination of technical accuracy and practical application
- o Provides a clear & articulate path forward

Competition Judging | Three Rounds

Round 1: Model Accuracy & Fairness
Open to all teams
	o Ability to predict members most likely resistant to the COVID vaccination
	    ✓ Observed ROC curve and AUC metric
	o Ability to ensure fairness in the modeling solution
	    ✓ Observed Disparity Score

Round 2: Written Submission Evaluation
Top 50 teams from Round 1
	o Multiple judges will review each submission creating a composite score based on the entirety of the solution: approach, analytics, insights, recommendations, and actionability.
	    ✓ 20% - Establishing key questions & performance indicators aligned with business issue
	    ✓ 30% - Depth and description of analysis resulting in actionable business insights
	    ✓ 50% - Ability to provide meaningful implications and recommendations based on results/insights

Round 3: Presentation *Top 5 teams from Round 2*	o Build on previous rounds by demonstrating the solution's ease of understanding, impact to the business, and viability with regards to implementation. o Panel of Humana Executives and Texas A&M Professors will listen and evaluate final presentations o Clarity of the solution, visualization, implications for the business, actionability, and professionalism are the key components the judges will be focused on

Round One | Model Accuracy

Participants to "score" model using secondary data file

- o Humana will provide a 2nd data set to be used in evaluation of model accuracy & fairness
- o Teams will apply their model to the 2nd data set and produce a resultant score (i.e. predictive value)
- o Teams will return, as part of their submission, a scored file in CSV format that includes the following fields:
    - ✓ ID (Unique identifier provided with 2nd data set)
    - ✓ SCORE (Resulting score from modeling algorithm)
    - ✓ RANK (Most likely individual based on predicted scored = 1, 2nd most likely individual = 2, etc...)

Humana will access model accuracy & fairness

- o Humana will append 'outcome' to the scored file provided by each team
- o Judging metrics will be established based on each team's scored file
    - ✓ ROC curves generated & AUC metric will be calculated
    - ✓ Disparity Score and corresponding weighting will be calculated utilizing RACE & SEX
- o Based on the 2 metrics, a final combined metric will be assigned to each team's submission
    - ✓ Combined Metric = AUC * Disparity Score Weight
- o Top 50 teams will be identified and selected using combined metric

*Additional details related to the Disparity Score be found on the competition website in a document titled: "*Fairness in AI Guide*"

Round One | Leaderboard

Introduction of a Mid-Cycle Leaderboard
- o Provide teams an ability to see where their model ranks – in terms of performance – compared to other participants
- o Leaderboard results will be posted daily on competition website
- o Mid-cycle Leaderboard will be available from September 27th – October 8th
- o Teams may submit multiple times to mid-cycle Leaderboard
  - ✓ Highest performance score for each team will be recorded and used in Leaderboard rankings
- o Teams are not required to participate in mid-cycle evaluation, however, must submit a scored validation file prior to submission deadline of October 10th to be considered for Round 2.
  - ✓ Mid-cycle Leaderboard provides relative guidance only…it is not a guarantee of final placement

Final Leaderboard will be posted on October 13th
- o All teams who submit a scored validation file will see their final metrics & rankings
- o Top 50 teams will be confirmed via email

Additional details related to the Leaderboard can be found on the competition website in a document titled: "*Humana Mays Case Competition – Round 1 Leaderboard Guide*"

Round Two | Written Submission Evaluation

Establish key performance indicators aligned to business issue | 20%
- o Explicit statement of the business issue and a translation into a data problem
- o Statement and definition of the metrics that will be used to evaluate the abovementioned business problem

Depth and description of analysis resulting in actionable business insights | 30%
- o Analytical approach conveys an appreciation of varying data types, variable relationships, and background research
- o Data have been cleaned, manipulated, and labeled appropriately ensure analyses are broadly applicable
- o Key drivers of outcomes are identified and explained
- o Performance/evaluation of analytical approach are provided along with rationale for final selection

Ability to provide implications and recommendations based on results/insights | 50%
- o Tell the story of why your results matter and how they should be actioned….'So What?'
- o Include a clear statement of recommendations – *based on your findings & results*
- o Based on the recommendations, include the potential impact to the business

Round Three | Presentation

The final round is the culmination of the challenge where everything gets pulled together and presented to a team of executives

Professionalism and Communication

- o Presentation is visually engaging and professionally delivered
- o Business problem, analytical approach, and results are well connected and clearly articulated
- o Recommendations and Implications to Humana are well-defined and appropriate to the payer context
- o Presenters are well prepared and able to address questions in a clear and concise manner

Final Submissions

Submissions due on Sunday, October 10th at 11:59PM CST **Late submissions will not be accepted**

Submit @ https://mays.tamu.edu/humana-tamu-analytics

*Scored File Format: *CSV* (Fields include: ID, SCORE, RANK) | Example:

```
ID,SCORE,RANK
1545,0.8954,1
32,0.8532,2
368,0.7976,3
```

*Written Submission Format: *MS Word, PDF*

*Final submission file names should be in the following format, using the first and last names of your team captain
- o   2021CaseCompetition_*FirstName_LastName_2021mmdd*.csv
- o   2021CaseCompetition_*FirstName_LastName*.doc

Judging is Blinded | Do not include names or school in content of submission

If you have any issues with your submission, please email: *humanacasecomp@tamu.edu*

*Failure to comply with submission requirements may result in disqualification

Questions?

Website: *https://mays.tamu.edu/humana-tamu-analytics*

Email: *humanacasecomp@tamu.edu*

Facebook: *https://www.facebook.com/humanacasecomp*