MESA DAY CONTEST RULES 2025-2026
(DRAFT)

AI & Health Disparities Challenge - PILOT

LEVEL: High School

DIVISION(S): Grades 9-12 (combined)

COMPOSITION OF TEAM: 2-3 students per team

NUMBER OF TEAMS: Preliminary – Determined by your local MESA center
Regional – NO regional events

SPONSORS: UC Davis MESA College Prep
UC San Francisco MESA College Prep

OVERVIEW: Welcome to the **AI & Health Disparities** Challenge! In this competition, students will address real-world health disparities by analyzing public datasets. Teams will use data analysis tools like Python with the Pandas library and the power of AI chatbots to explore how Social Determinants of Health (SDOH) impact specific populations. In preparation, students will complete a CodeHS course covering SDOH, data analysis fundamentals, and how to leverage AI chatbots for insights. The challenge culminates on MESA Day, where teams will deliver a presentation of their findings and propose a data-driven solution to a panel of judges.

Competition Prompt: Investigate how specific *social determinants* (e.g., poverty, discrimination, healthcare access) contribute to disparities in (*one health outcome*) for (*two different populations/regions*) in the **United States**. Using AI chatbots, analyze datasets to identify patterns and create graphs and tables. Propose solutions to reduce these inequities based on findings.

MATERIALS: List all legal/illegal materials:

- The Host Center will provide the following during competition day:
  - Internet access
  - Projector and projector screen/TV
  - Computer and HDMI cable w/ adaptor
- Provided by teams:
  - Laptop with internet access
  - Access to a generative AI chatbot (e.g., Gemini, ChatGPT)
  - Google Slides or other presentation software
  - Writing utensils and scratch paper for planning
- Illegal items:

- Pre-completed analysis or projects not done by the students.
- Outside assistance from coaches, advisors, or anyone other than team members once the competition period begins.

GENERAL RULES:

1) Teams **must** consist of 2 to 3 students. Individual participants will not be allowed to compete.
2) **Pre-Competition Requirements:**
    a. **CodeHS (7 hours):** At least **ONE team member** must complete at least 95% of the assignments in the official CodeHS course for your specific region prior to MESA Day (see "Enrollment Links" attachment/appendix). Failure to meet this requirement will result in the team not being able to compete in the competition. The date to complete the specified pre-course will be determined by the host center.
    b. **Oracle AI Foundations Certification (6 hours)**: As a pre-competition requirement, **all team** members must earn the certificate of completion from the free *Oracle AI Foundations Associate* course. Proof of completion must be submitted by each team member prior to the event; date to be determined by the host center.
        i. **Certification Link:** https://mylearn.oracle.com/ou/learning-path/become-a-oci-ai-foundations-associate-2025/147781
        ii. **Why is this necessary?**: Proficiency in artificial intelligence is no longer a niche skill but a standard expectation in the modern workforce. This certification is imperative for the competition as it equips students with a foundational understanding of the different technologies that fall under the AI umbrella, such as Large Language Models (LLMs), machine learning, and deep learning. This knowledge will enable teams to effectively and responsibly use AI tools in their data analysis, moving beyond simple queries to a deeper comprehension of the technology powering their insights.
3) **Population/Region Selection:** Teams must choose **TWO** different populations or regions (e.g., urban vs rural, two racial/ethnic groups, men vs. women) in the United States to examine how the social determinants of health (SDOH) impact the chosen **health outcome** uniquely.
    a. **Population:** A group of people with common characteristics (e.g., location, disease, etc.)
        i. **Race/Ethnicity**
            1. Hispanic, African American, Native American, Asian American, White
        ii. **Sex & Gender**
            1. Women, Men, LGBTQ+
        iii. **Age Groups**
            1. Elderly, adolescents, youth
        iv. **Immigration Status**
            1. Born in the US
            2. Born abroad

    *Tip: Combine categories (e.g., "hispanic vs. white women")
    b. **Region:** A geographic location where environmental, economic, or policy factors shape health disparities
        i. Urban vs Rural
        ii. Neighborhoods/Cities/States
4) **Health Outcome Selection:** Teams must choose **ONE** of the following health outcomes to investigate for their project:

a. **Cancer**: Teams may choose a specific type of cancer for their analysis.
b. **Type 2 Diabetes**
c. **Cardiovascular Disease**
d. **Respiratory Disease**
e. **Chronic Kidney Disease**
f. Obesity
g. Depression

5) **Social Determinant of Health (SDOH) Selection:** Teams must choose **at least one** of the following social determinants of health and/or one of their respective subcategories during their population analysis. Students are expected to find correlations between the SDOH and a health outcome in their chosen populations.

Health Care and Quality	Neighborhood and Built Environment	Social and Community Context	Economic Stability	Education Access and Quality
- Insurance coverage -Health literacy -Transportation to health care facilities -Copays -Provider availability -Quality of care	-Housing -Transportation -Safety -Walkability -Recreation/Parks -Water Quality -Access to healthy food	-Social and community integration -Support systems -Community engagement -Stress -Discrimination	-Employment -Income -Debt -Expenses -Support -Medical bills	-Higher education -Literacy -Early childhood -Language -Vocational training

a. Some social determinants of health (SDOH) are **interconnected**—meaning one can influence another—showing how they collectively impact a population.

6) **Dataset Requirement:** The analysis must be based on publicly available data. Teams must use:
a. At least one dataset that includes data on both a **health outcome** and a **social determinant of health** for the chosen **populations/regions**.
b. Alternatively, at least two separate datasets where one contains health outcome data and the other contains social determinant data, but both datasets must examine the same populations/regions in the same year/time period (i.e., do not combine a 2014 dataset with a 2025 dataset).
c. Teams can refer to the Attachments/Appendix for dataset resources.
d. Datasets name and source must be mentioned during the presentation.
e. Teams should use **AI chatbots** to assist with coding based data analysis (e.g., Gemini, ChatGPT, Claude, etc.), but all findings must be student-driven.

7) **Presentation Guidelines**: Each team creates and presents a 5-minute slideshow presentation on the competition date to include the following elements:
a. Teams must submit presentation slides (Google Slides, PowerPoint Presentation, etc.) in advance of the competition date (to be determined by the host center).
b. Presentation slides must be clearly labeled with the team members' names, grade levels, school, and MESA center. A **10% penalty** will be assessed for failure to include this information.
c. Address the **competition prompt** directly which includes the following:
i. The single chosen health outcome being investigated.
ii. The Social Determinants of Health that are being examined/researched.
iii. The two chosen populations/regions for the analysis.

d. The dataset(s) used, their source and a justification for why they were chosen.
e. An **in-depth** analysis of the influence/consequences of the SDOH on the health outcome of choice for both populations/regions of interest.
    i. A comparison of how the same SDOH manifests uniquely in each group/region.
    ii. Explanation of why these differences lead to disparities in health outcomes.
    iii. Determine which group experiences greater health disparities (i.e. identify the most vulnerable population), supported by the datasets analyzed.
f. At least two clear insights generated with the help of an AI chatbot, and these insights must be identified as AI-driven.
g. One original table with statistics from the dataset used. Teams may use AI chatbots to help come up with the table information.
h. One original graph (bar graph, line graph, scatter plot, etc.) using data from the dataset.
i. A summary of current programs, laws, or methods being used by governmental entities or non-profits that aim to improve the chosen health outcome disparities in the most vulnerable population/region out of the two analyzed.
j. Develop a novel intervention proposal to address the disparities affecting the health outcome of choice in the more vulnerable of the two analyzed populations/regions.
k. Citations (APA format) for all resources used, including datasets and outside research.

8) **Competition Format**: The challenge will be conducted in two parts, pre-competition period, and competition day.
    a. During the pre-competition period teams will:
        i. Create a slide presentation following the presentation guidelines.
            1. Research Options:
                a. Use the main competition prompt (provided in Page 1 of rules)
                b. OR use the guided challenge prompts (found in the Sample Challenge Prompt Appendix)

JUDGING:

1) On the day of the competition, each team will have 5 minutes to present their findings to a panel of judges.
2) Judges will determine team order by random selection and will post the team order prior to the start of competition.
3) The team must be ready to present when called or forfeit the competition.
4) Only judges, MESA staff, and competing teams will be allowed in the competition room.
5) Presentation may not exceed 5 minutes. Once 5 minutes has elapsed, teams will be stopped and prevented from speaking beyond the 5 minute mark.
6) Judges will provide time signals at the following intervals: one (1) minute, thirty (30) seconds, and five (5) seconds remaining.
7) Judges' decisions are final.

TIEBREAKER: The team scoring the highest cumulative points in Categories 2 (AI & Data Analysis) and 4 (Creative use of AI tools) will be the winner.

AWARDS:

- Awards will be given based on the highest Overall Score.
- Medals will be awarded for 1st, 2nd, and 3rd place.
- This is a pilot competition so winners will NOT advance to regionals.

ATTACHMENTS/APPENDIX:

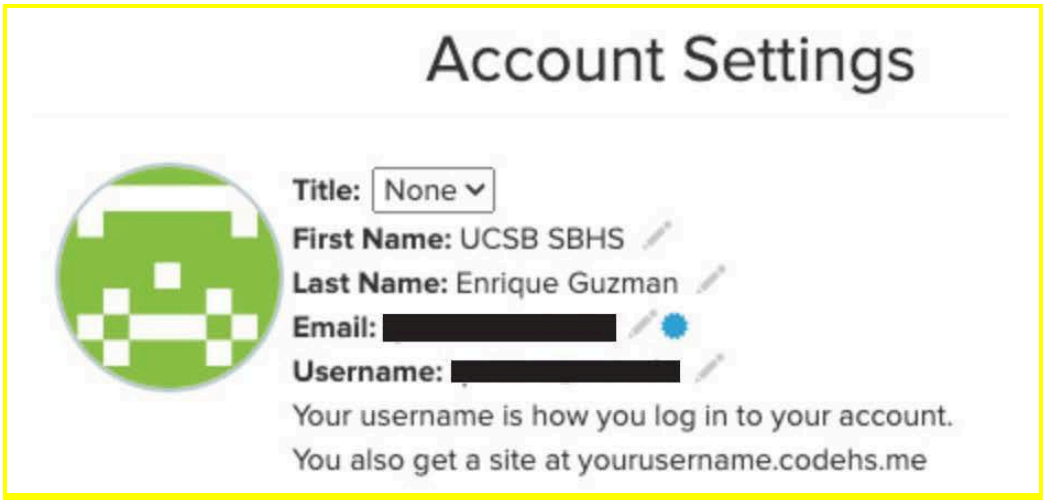
- A: AI &Health Disparities course in CodeHS
- B: Mathematical Topics
- C: AI & Health Disparities Datasets and Resources
- D: Presentation Template
- E: AI & Health Disparities Specifications Checklist
- F: Scoring Rubric

A: Enrollment Links for AI & Health Disparities CodeHS Course

Enrolling Instructions

When enrolling in CodeHS, EACH team member **MUST** include their **MESA CENTER and SCHOOL** in their registration. See below for example:

- **First name field:** Abbreviated MESA Center and School Name
- **Last name field:** Student's First and Last Name



Course Links

Courses have been created to match the MESA region your host center is affiliated with. Please register for your appropriate course:

Northern California: For students affiliated with CSU East Bay, RISE, UC Davis, UCSF, Ukiah
Northern Central: https://codehs.com/go/69DE5
Enrollment Code: 69DE5

Central California: For students affiliated with Fresno State, San Jose State, UCSC, University of the Pacific
Central Region: https://codehs.com/go/330E0
Enrollment Code: 330E0

Los Angeles / Central Coast: For students affiliated with CSULA, CSULB, UCLA, UCSB, USC
LA/Central Coast Region: https://codehs.com/go/EB0E9
Enrollment Code: EB0E9

Southern California: For students affiliated with Imperial Valley, San Diego State, UCI, UCR
South Region: https://codehs.com/go/55333
Enrollment Code: 55333

B: Mathematical Topics *(Students should aim to have a fundamental understanding of)*

- Basic Math
  - Addition/subtraction
  - Division/multiplication
- Basic statistics
  - Mean/average
  - Mode
  - Min/max

C: AI & Health Disparities Datasets and Resources

This appendix provides a list of recommended resources to help teams understand the core concepts of the competition and find relevant data for their analysis.

Understanding Social Determinants of Health (SDOH): Use these resources to build a strong foundational knowledge of what the Social Determinants of Health are and why they are important for health disparities.

- Centers for Disease Control and Prevention (CDC) - About SDOH
  - Link: https://www.cdc.gov/socialdeterminants/
  - Description: The CDC's main portal for SDOH, offering definitions, background information, and examples of how these factors affect health outcomes.
- Healthy People 2030 - Social Determinants of Health
  - Link: https://odphp.health.gov/healthypeople/priority-areas/social-determinants-health
  - Description: Outlines the U.S. national objectives for improving health and well-being, with a key focus on the five domains of SDOH.

Key Data Portals & Repositories: These portals are excellent starting points for finding and exploring a wide range of public health and demographic data at national, state, and local levels.

- County Health Rankings & Roadmaps
  - Link: https://www.countyhealthrankings.org/
  - Description: Provides health data for nearly every county in the nation, allowing for comparisons of health outcomes and the factors that shape them.
- CDC PLACES: Local Data for Better Health
  - Link: https://www.cdc.gov/places/
  - Description: A CDC data source that provides model-based, population-level health data for small areas like counties, cities, and census tracts.
- The Opportunity Atlas
  - Link: https://www.opportunityatlas.org/
  - Description: An interactive tool that maps data on social mobility and economic opportunity by neighborhood, providing powerful insights into community context.

Specific Datasets and Tools: These links point directly to valuable datasets that are well-suited for this competition. Many are available in user-friendly formats like CSV.

- U.S. Chronic Disease Indicators (CDI) on Kaggle
  - Link: https://www.kaggle.com/datasets/cdc/us-chronic-disease-indicators

    - Description: A comprehensive dataset from the CDC containing state and national data on chronic diseases and their risk factors.
- USDA Food Access Research Atlas
    - Link: https://www.ers.usda.gov/data-products/food-access-research-atlas/
    - Description: Maps and provides data on food access indicators, allowing students to investigate "food deserts" and their connection to health.
- Behavioral Risk Factor Surveillance System (BRFSS)
    - Link: https://www.cdc.gov/brfss/
    - Description: The nation's premier system of health-related telephone surveys that collect state data about U.S. residents regarding their health-related risk behaviors and use of preventive services. Datasets are available for download.
- National Health and Nutrition Examination Survey (NHANES) on Kaggle
    - Link: https://www.kaggle.com/datasets/cdc/national-health-and-nutrition-examination-survey
    - Description: A program of studies designed to assess the health and nutritional status of adults and children in the United States, combining interviews and physical examinations.

D: AI & Health Disparities Specifications Checklist

This checklist is provided **ONLY** as a reference for teams to "pre-inspect" their project to ensure they meet the rules specifications. Teams may check-off each of the following items after comparing their competition ready project with the rules. **This checklist will NOT be used by judges.**

- ☐ 2025-2026 rules are used
- ☐ Completion of 95% of the CodeHS course
- ☐ Submitted proof of certificate of completion for Oracle AI Foundations Associate Course
- ☐ Submitted the slideshow presentation with the contents specified in the score sheet
- ☐ Correct labeling on all submissions that includes:
    - ☐ Team names
    - ☐ Grade
    - ☐ School
    - ☐ Center

Sample Guiding Challenge Prompts

Teams will be given a set of guiding questions that encourage them to analyze the dataset chosen critically. They have to include one of the following prompts:

Economic Stability and Health Outcomes

- Challenge:
  - Examine correlations between income and health outcomes across regions/populations.
  - Propose a data-driven intervention to reduce economic-related health disparities.

Education and Health Literacy

- Challenge:
  - Investigate how educational attainment impacts access to preventive healthcare.
  - Suggest policies or programs to improve health literacy in low-education communities.

Healthcare Access and Quality of Life

- Challenge:
  - Analyze the relationship between healthcare access and quality of life indicators like life expectancy among different regions/populations. Examine how these disparities lead to poorer health outcomes among chosen populations/regions.
  - Design an outreach plan to improve healthcare access in underserved areas.

Neighborhood Environment and Chronic Health Conditions

- Challenge:
  - Explore links between environmental factors (e.g., pollution, food access) and chronic conditions.
  - Recommend an initiative to address environmental health concerns in affected areas.

Social and Community Support in Mental Health Outcomes

- Challenge:
  - Assess whether more community support resources correlate with better mental health outcomes.
  - Propose a program to strengthen social support for mental health.

Discrimination and Health Disparities

- Challenge:
  - Identify health disparities linked to systemic discrimination across demographic groups and how they contribute to poorer health outcomes in vulnerable populations.
  - Design a public health campaign to address one identified disparity.

Impact of COVID-19 on Health Disparities

- Challenge:
  - Analyze how COVID-19 highlighted or exacerbated health disparities in certain groups.
  - Recommend strategies for public health agencies to support marginalized communities in future crises.

Transportation Access and Health Care Utilization

- Challenge
  - Explore how limited transportation in a specific population/region impacts healthcare access and health outcomes.
  - Suggest an initiative to improve transportation access to healthcare

E: SCORE SHEET FOR AI & Health Disparities Challenge

High School – Grades 9-12

Copies of this score sheet will be provided by the MESA Day Host Center.

Student Names: _____ MESA Center: _____

School: _____ **Grade:** 9, 10, 11 or 12*(circle one)*

TOPIC/PROMPT #:_____

Required Elements for Presentation	YES	NO
CodeHS course: Completion of at least 95%		Unable to compete
Oracle OCI AI foundation Certification submitted		Unable to compete
Team consist of 2-3 students		Unable to compete
Visual aid (e.g. google slides)		Unable to compete
Labeling: Presentation intro includes MESA center, school name, team members names and school grades.		Minus 10% from final score
Presentation addresses the competition prompt		Unable to place
Two comparison populations/regions in the United States		Unable to place
ONE health outcome discussed		Unable to place

Category 1: SDOH Critical Thinking	In-depth discussion (4 points)	Satisfactory discussion (3 points)	Fair discussion (2 points)	Briefly mentioned (1 points)	Not Present (0 point)De
SDOH Manifestation: Clearly demonstrating how specific SDOH are manifested in each of the two populations/regions of choice and relate to the health outcome of choice.	4	3	2	1	0
Disparity Explanation: Clear explanation of how the differences in SDOH manifestation in each population/region lead to health disparities.	4	3	2	1	0
Vulnerability Determination: Determination of which population/region experiences greater health disparities (most vulnerable group).	4	3	2	1	0

Category 2: AI & Data Analysis	Excellent (4 points)	Very Good (3 points)	Good (2 points)	Fair (1 points)	Not Present (0 point)
2 visualizations included (graphs and table)			2	1	0
Dataset usage: Clearly state dataset used for analysis with in-text citations			2	1	0
Data table: Dataset statistics in table format.	4	3	2	1	0
Graph visualization: At least one bar, scatterplot, pie chart, or line chart visualization from a dataset that enhances topic understanding.	4	3	2	1	0
AI-Driven Data Insights: Two clearly defined data-driven insights from datasets performed by prompting an AI chatbot, (e.g. "number of diabetes diagnoses in this rural region). Must state clearly which insights were AI-driven.	4	3	2	1	0

Data Science Tools: Clearly demonstrated usage of Python pandas data science library, matplot data visualization library, etc.			2	1	0
Category 3: Intervention Proposal	**In-depth discussion (4 points)**	**Satisfactory discussion (3 points)**	**Fair discussion (2 points)**	**Briefly mentioned (1 points)**	**Not Present (0 point)De**
Current interventions: Summary of current intervention programs (laws, gov. programs, non-profits, etc.)	4	3	2	1	0
Novel proposal addressing disparities: Team proposes an innovative intervention to reduce disparities in the more vulnerable population/region.	4	3	2	1	0
Data-driven Proposal Reasoning: Team supports their proposal using the datasets of choice and other outside sources	4	3	2	1	0
Category 4: Creative use of AI tools	**Excellent (4 points)**	**Very Good (3 points)**	**Good (2 points)**	**Fair (1 points)**	**Not Present (0 point)**
Usage of machine learning for predictive model creation:	4	3	2	1	0
Automation/Innovation: (e.g. use of AI agent to find insights, API usage to gather data from database, etc.)	4	3	2	1	0
Category 5: Presentation	**Excellent (4 points)**	**Very Good (3 points)**	**Good (2 points)**	**Fair (1 points)**	**Not Present (0 point)**
Clarity of Presentation:	4	3	2	1	0
Speaking/Delivery:	4	3	2	1	0
Visual Appeal of Presentation:	4	3	2	1	0
Team Participation: All team members participate equally.	4	3	2	1	0
Citations: Team correctly cites datasets and outside sources used in APA format.			2	1	0
TIE BREAKER: Q&A Session (2 min max)	4	3	2	1	0
COLUMN TOTALS:					
AI & Health Disparities Score					**___/72**

OVERALL SCORE
AI & HEALTH DISPARITIES SCORE (X/70):___/72
LABELING DEDUCTION (-10%): YES/NO
OVERALL SCORE: *(MISLABELING DEDUCTION):* (X/72):___/72