HEROES

HEALTH CARE REWARDS TO ACHIEVE IMPROVED OUTCOMES

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What if... we moved from a sick care system to a system that truly rewards better health?
**HEROES Draft Program Solicitation (PS)**

- **Concise description of the program:** Under the HEROES program, public health entities and collaborators will have the opportunity to improve the health status of their communities for specific patient populations through the use of a payment model that incentivizes community-based interventions to improve health outcomes across a fixed geographic area. These solutions will investigate a new, regionally focused, outcomes-based financing approach for the healthcare industry, which rewards only positive health outcomes and reduces the healthcare burden on patients, providers, and the economy.

- **Health Outcomes include:**
  1. Maternal Health: Reduction in the rate of intrapartum and postpartum severe obstetric complications.
  2. Heart Attack and Stroke Risk: Reduction in aggregate 10-year risk of heart attack and stroke for people aged 40–70 years.
  3. Opioid Overdose: Reduction in the number of emergency medical service calls for fatal and non-fatal opioid overdoses.
  4. Alcohol-Related Health Harms: Reduction in the number of emergency medical service calls for alcohol-related emergencies.

Refer to the HEROES PS, ARPA-H-SOL-24-01 posted to [https://sam.gov](https://sam.gov) for full HEROES Program details to include key dates.
Preventive Health Care is Not Working for Many Americans

American life expectancy has been flat for decades and is declining, trailing other nations.

Despite massive spending, a high burden of preventable morbidity and mortality drives poor outcomes.

Years of Life Lost Per 100,000, All Ages, Age-Adjusted, from Global Burden of Disease, [http://www.healthdata.org/united-states](http://www.healthdata.org/united-states)
Health Care Outcomes: Current vs. Future State

**Current State:** Health care organizations don’t have strong financial incentives to fix early signs – and most people aren’t lucky enough to get the right care at the right time.

- **Human Lifespan**
  - Ignore early signs (Lack of post-partum care, Rising blood pressure, Pre-existing anemia)
  - Acute event (Severe post-partum bleed)

- **Lower quality of life**
- **High cost for sick care**

- **No Accountability:** Pay for expensive treatments, no focus on prevention.
- **Inequity:** Fragmented care, inability to make broad system investments.
- **Flying blind:** No timely data on health of the whole population.

**Future State:** HEROES rewards fixing early warning signs to deliver better outcomes for all people, not just the lucky few, incentivized via pre-negotiated payments.

- **Human Lifespan**
  - Find and heal early signs (Locate post-partum care, Treat blood pressure, Ensure iron therapy for anemia)
  - Acute event never happens (No severe post-partum bleed)

- **Good quality of life**
- **Cost avoided for sick care**

- **Accountability:** Payment only if preventive targets achieved.
- **Equity:** Whole geographic population is included.
- **Evidence-driven interventions:** Timely data to drive rapid-cycle improvement.
HEROES: Changing the System to Create a Market for Prevention

In the Right Regions:
Population-level accountability in areas hardest hit by preventable health burden

The Right Incentives:
Sustainable financing that rewards outcomes

With the Right Interventions:
Create the right Technology, Engagement, & Clinical Interventions
Health Accelerators will propose a high-need geographic region in one of four possible health outcomes.

Each Health Accelerator will need to meet a population-specific goal that has been projected to generate at least $60M value to society (across health care, productivity, and social service costs) over 3 years.

**Maternal Health Outcomes**

**Significance:** The U.S. experiences higher rates of Severe Obstetric Complications (SOC) than most other developed countries, and rates continue to rise.

**Goal:** Within a population of 5M (or an entire state if less than 5M), reduce the rate of SOC during delivery hospitalization and 60 days after delivery by 20%.

**Heart Attack and Stroke**

**Significance:** Heart disease (#1) and Stroke (#5) are among the leading causes of death in the U.S. Annually, there are about 805,000 Heart Attacks and 795,000 Strokes.

**Goal:** Within a population of 700,000 (or an entire state if less than 700,000), reduce 10-year aggregate risk of Heart Attack and Stroke for people aged 40-70 years by 1% point.

**Opioid Overdose**

**Significance:** Opioid Use Disorder (OUD) affects over 2.1 million individuals and causes over 100,000 deaths annually in the U.S. Fewer than 10% of patients with diagnosed OUD receive medication-assisted treatment (MAT).

**Goal:** Within a population of 500,000, reduce the number of emergency medical service calls for opioid overdoses by 10%.

**Alcohol-Related Health Harms**

**Significance:** An estimated 1 in 5 deaths of people ages 20-49 result from excessive alcohol use. There are more than 140,000 alcohol-related deaths per year in the U.S.; excessive drinking, including binge drinking, costs the U.S. $249B annually.

**Goal:** Within a population of 500,000, reduce the number of emergency medical service calls for alcohol-related emergencies by 10%.
HEROES Outcome Toolkit

**Outcome Selection:** Chosen for maximum impact on health disparities

**Geographic Inclusion:** Health Accelerators must choose an entire geographic region and must serve **every person** in the area.

**Site and Performer Selection:** Performers are encouraged to choose a geographic area with performance **worse** than the national average and **must** have a plan to reach all people.

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**Selected Outcome:** Maternal Health

**Problem:** Although maternal mortality and severe maternal morbidity (SMM) rates continue to rise, most causes of poor maternal health outcomes are difficult to discern and compare nationally.

**Metrics:** The rate of SMM per 100,000 persons in a rolling 28-day period.

**Selection Constraints:** The selected population must be at least 5 million with a rate of SMM higher than the national average.

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**Evaluate Area Suitability**

To qualify for the funding, applicants must meet the following criteria:

1. The geographic area must serve all of the population in the region.
2. The area must have performance worse than the national average.
3. The area must have a plan to reach all people in the area.

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**Select the Geographic Areas For Intervention**

Each county on the map is coded by its ZIP code, which is the first three numbers of the county's ZIP code. This information provided also includes the county's population size.
How HEROES Creates Incentives

Pick Targets

Health Accelerator selects an outcome and target geographic area.

Identify Outcomes Buyers

Health Accelerator secures promise of future payment for successful health outcomes from ARPA-H and Outcome Buyers (e.g., employers, health plans).

Raise Funding

Health Accelerator raises money to be used in prevention-oriented care to fund new technologies and operations.

Help People

Health Accelerator deploys innovative, evidence-based technologies at scale to improve health outcomes in the specified geographic area.

Get Rewarded

If outcome achieved, ARPA-H and Outcome Buyers reward Health Accelerator.

| Population Benefit Over Three Years: At least $60M of value |
| Possible Incentive: Outcome buyers contribute $45M ($15M ARPA-H plus 2:1 match) |
| Build Capacity: Create tech and a community that is engaged in preventive care |
| Public Health Win: Outcomes, like heart attack risk or opioid overdoses, improve |
| Fiscal Win-Win: Outcome buyers create $60M value for $45M |
HEROES: How the rewards flow

Health Accelerator (+ investors) receive

Health Accelerator (and Outcome Buyers)

YES

via ARPAH

NO

No reward received

Investors contribute to Health Accelerator plan for equity in reward payment
**Step 1:** Agree to “rate card” at the start

Example at 24 months:

<table>
<thead>
<tr>
<th>Change Relative to Comparison Group</th>
<th>Outcome Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0% or worse</td>
<td>None</td>
</tr>
<tr>
<td>5%</td>
<td>$1.875M</td>
</tr>
<tr>
<td>10%</td>
<td>$3.75M</td>
</tr>
<tr>
<td>15%</td>
<td>$5.6M</td>
</tr>
<tr>
<td>20% or better</td>
<td>$7.5M</td>
</tr>
</tbody>
</table>

Calculation going into contract:
- Performance period 36 months, paid every 6 months.
- Total Outcome Buyer Commitment = $45M ($15M from ARPA-H + $30M from partners).
- Target Outcome = 20 percentage point improvement proportioned over 3y based on incremental improvement targets.

**Step 2:** Every 6 months, review metrics

- In **Comparison Group**, rate worsens from start time by 5% (from its baseline).
- In **Health Accelerator Group**, rate improves from start time by 10% (from its baseline).
- Thus, **Health Accelerator** showed 15% improvement relative to **Comparison**.

**Step 3:** Pay Health Accelerator per rate card

- ARPA-H / Outcome Buyers disburse $5.6M reward payment to **Health Accelerator**.
- 6-month cycle restarts.
### Hypothetical Reward Example (more details)

<table>
<thead>
<tr>
<th>Hypothetical maximum outcome-based payout (assuming $45M total reward pool)</th>
<th>6 months</th>
<th>12 months</th>
<th>18 months</th>
<th>24 Months*</th>
<th>30 months</th>
<th>36 months</th>
<th>Total payout ($) and average outcome reduction (%) over entire 3-year program*</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3.75M</td>
<td>$3.75M</td>
<td>$7.5M</td>
<td>$7.5M</td>
<td>$11.25M</td>
<td>$11.25M</td>
<td>$45M</td>
<td></td>
</tr>
</tbody>
</table>

| Expected reduction of severe obstetric complications (% relative to comparator) | 10% | 10% | 20% | 20% | 30% | 30% | 20% |

**Scenario 1:** Slow start with moderate sustained progress but does not achieve the expected 3-year average outcome reduction.

| Relative reduction achieved by the Health Accelerator | 0% | 0% | 17% | 15% | 24% | 30% | 14.3% |

| Reward earned by Health Accelerator | $2M | $0M | $6.38M | $5.63M | $9M | $11.25M | $34.25M |

**Scenario 2:** Strong performance but does not hit all milestones during the program. At end of the program, the 3-year average outcome reduction exceeds the expected amount. The HA is eligible to receive the balance of the reward pool via a post-program "true-up."

| Health Accelerator’s relative reduction | 6.7% | 10% | 15% | 20% | 30% | 38.3% | 20% |

| Health Accelerator Reward Payment | $2.5M | $3.75M | $5.63 | $7.5M | $11.25 | $11.25 | $41.8M earned and true-up to $45M |

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**Scenario 1:**
- The AHA does not earn the full reward amount available every 6 months except for the last where it performed at the target improvement rate.
- In each 6-month payout period, the AHA earns a reward value proportional to the improvement, except in the first 6-month payout period in which it earned the minimum floor payout of $2M despite showing no improvement.

**Scenario 2:**
- The AHA receives the full reward amount of $45M.
- Every 6 months, the AHA earns a payout proportional to its improvement performance (e.g., in the first 6-month payout period, a 6.7% reduction relative to a 10% target rate reduction earns two-thirds of the maximum payout of $3.75M, or $2.5M).
- Towards the end of the 3-year performance period, the AHA starts to perform better than the targets. However, the reward pools are capped regardless of the AHA over-performing.
- As a result, at the end of the implementation period, ARPA-H reviews the overall improvement and determines that the AHA met its overall improvement target of 20%.
- Therefore, the AHA will be true-up to earn the full $45M reward to encourage the catch-up improvements that were made.
## Today’s Financing Models

<table>
<thead>
<tr>
<th>Key organizational attributes</th>
<th>Traditional Payers (Medicare, Medicaid, Commercial)</th>
<th>Public Health Departments and Agencies</th>
<th>Venture Capital and Private Equity-Backed Companies</th>
<th>HEROES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payment for prevention</td>
<td>![ Limitations: Churn, provider focus ]</td>
<td>![ Strengths: Prevention focus ]</td>
<td>![ Limitations: Focused on high acuity patients ]</td>
<td>![ Strengths: Upstream outcomes ]</td>
</tr>
<tr>
<td>Geographic accountability</td>
<td>![ Limitations: Small fraction of the population ]</td>
<td>![ Limitations: Geographic scope, but no accountability ]</td>
<td>![ Limitations: Narrow population focus ]</td>
<td>![ Strengths: Population-wide accountability ]</td>
</tr>
<tr>
<td>Sustainable business model that integrates private capital</td>
<td>![ Strengths: Established contracting approaches ]</td>
<td>![ Limitations: Largely grant-funded, unstable ]</td>
<td>![ Limitations: Unproven ]</td>
<td>![ Strengths: Meaningful business case ]</td>
</tr>
</tbody>
</table>

**Key**
- ◐ Minimal alignment with program requirement
- ◁ Moderate alignment with program requirement
- ☀ Complete alignment with program requirement
How HEROES Could Transform Care in Communities: Current State Example Maternal Health Patient Journey

Engagement: Disparities are invisible until it’s too late

Natalia lives in a community with limited access to care and doesn’t have her first prenatal care visit until her 7th month of pregnancy.

Clinical Interventions: Mothers with newborns suffer through intense and reactive treatment plans only after experiencing a poor outcome

Natalia experiences significant blood loss and develops an infection, both of which are preventable with improved hospital protocols.

Technology Advancements: Promising technologies go to select few

Natalia develops dangerously high blood pressure after returning home with her infant, resulting in a rehospitalization that could have been prevented with home blood pressure monitoring technology.
# Evaluating Effectiveness of Interventions and Progress Towards Financial Sustainability

<table>
<thead>
<tr>
<th>Health Outcomes</th>
<th>Interventions</th>
<th>Sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEROES will evaluate if Health Accelerators achieve health outcome milestones.</td>
<td>HEROES learns and shares what works and what doesn’t to drive impact.</td>
<td>HEROES supports a path to sustainability for the program performers.</td>
</tr>
</tbody>
</table>

## Tools to Monitor Success and Estimate Payout

HEROES will use metrics to:

- **Track progress toward health outcome goals at 6-month intervals** for ARPA-H funded Health Accelerators.
- **Determine the expected payout** based on changes in the outcome relative to the adjusted national average.

## Evaluation to Understand Intervention Effectiveness

HEROES will work with Health Accelerators to:

- **Understand which interventions were delivered to whom** to understand how population-level improvements were achieved, or why they weren’t achieved.
- **Evaluate the impact of interventions on subgroups** to learn what strategies were (and weren’t) effective in different demographic groups, and which strategies were effective in closing equity gaps.
- **Convene workshops for learning and diffusion among Health Accelerators** to build infrastructure for collaboration and trust.

## Drivers of Financial Sustainability

Through data collected from Health Accelerators and key stakeholders, HEROES will:

- **Track Outcome Buyer and Investor activity** to determine whether the financial incentives are operating as intended.
- **Monitor financial outcomes** for all stakeholders to determine whether each Outcome Buyer and Investor met financial goals.
- **Identify which Health Accelerators successfully scaled to long-term contracts or new geographies** through renewed or expanded contracts (with Outcome Buyers and Investors) by the end of the HEROES period.
APPENDIX: OUTCOMES
Severe Obstetric Complications

Goal: Improve Care During the Postpartum Period to Reduce Rates of Severe Obstetric Complications (SOC)

- **Severe Obstetric Complications (SOC)**
  - Has been increasing due to changes in the overall health of the population of women giving birth (e.g., increases in maternal age, pre-pregnancy obesity, preexisting chronic medical conditions, cesarean delivery).
  - Research and prevention efforts historically have been focused on the delivery hospitalization; less is known about SOC diagnosed after delivery discharge.

- **Scope of the Problem**
  - Affects approximately 65,000 women each year (or 1.8 percent of women giving birth in 2021).
  - Up to 17% of cases first developed a SOC after the delivery discharge (e.g., one in seven among commercially insured women, and almost one in six among Medicaid-insured women).
  - Predominantly occurs within the first two weeks after delivery (75% of SOC cases) and could be avoided with timely, appropriate care in most instances.
  - Estimated total maternal morbidity costs for all US births in 2019 were $32.3 billion from conception through the child’s fifth birthday, amounting to $8,624 in additional costs to society for each maternal-child pair and $500,000 for each SOC case.

Timely identification of at-risk postpartum women can improve outcomes.

- If more at-risk women are identified early enough, appropriate care can be initiated, improving outcomes.
- The CDC has identified 21 indicators (16 diagnoses and five procedures) for measuring SOC. Monitoring for precursors can help identify women at risk.

**Key Outcome Metric**

- Severe Obstetric Complications measure was developed by The Joint Commission, CMS, and Yale New Haven Health Service Corporation/Center for Outcomes Research and Evaluation.
  - It identifies patients with severe obstetric complications that occur during the inpatient delivery hospitalization.
  - The measure may be modified to capture SOCs during the delivery hospitalization and 60 days after discharge using claims data.
Prospective approach to generate >$60M economic value (>30% ROI) from the Severe Obstetric Complications (SOC) program

Current state in target geography
- Population of 5,000,000
- 2,525,000 females
- 55,000 births
- ~1000 SOC cases per year
- Average societal cost of each case
- Total annual economic cost

Potential impact in target geography
- Reducing ~200 SOC cases per year for 3 years (~20% annual reduction relative to national average)
- ~600 SOC cases prevented
- Estimated economic cost savings over 3-year program

Potential annual economic value if successfully rolled out across the US
- Total annual economic savings
- ~$1.4B

1) Claims-based prevalence of severe obstetric complications based on US-wide averages
2) Excludes costs associated with reduced quality of life and therefore represents a minimum societal cost estimate
Severe Obstetric Complications: US-wide Economic Costs

- **Total Estimated US-wide Economic Costs = $7B**
  - $2.5B in Acute Healthcare Costs (36%)
    - Extended intrapartum hospitalization.
    - Readmissions for Severe Maternal Morbidity as identified by the Centers for Disease Control and Prevention through a list of 21 indicators and corresponding ICD codes.
  - $4.1B in Productivity Losses (58%)
    - Presenteeism (reduced productivity and accuracy at work)
    - Absenteeism (regularly missing work)
    - Unemployment
  - $423M in Social Service Use (6%)
    - Mental health support services and other assistance, such as the Supplemental Nutrition Assistance Program (SNAP), Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), Medicaid, Temporary Assistance for Needy Families (TANF).
Heart Attack and Stroke Risk

Goal: Reduce the Rates of Heart Attack and Stroke, the Leading Causes of Death and Disability

Scope of the Problem
Nationally, heart disease is the leading cause of death. About 695,000 people in the United States died from heart disease in 2021 (this equates to 1 in every 5 deaths).

In 2021, 1 in 6 deaths from cardiovascular disease was due to stroke.

1.6M annual total heart attack and strokes deaths and 1.2M first time heart attack and strokes per year.

Opportunity for Change
• Patients are unaware of their Heart Attack and Stroke risk (as there is no requirement for screening in the clinical setting).
• The Million Hearts Cardiovascular Risk Reduction Model resulted in several hundred thousand Medicare age members having significant improvement in Heart Attack and Stroke risk, use of preventive medications, and 6% relative reduction in death, in a randomized design.

Health Outcomes & Costs
• Heart disease and stroke totals $254.2B in annual direct and indirect costs.
• With 123 million adults between the ages 40-70 living in the United States, the approximate cost per case in this age group is $101,000.
• A 1% point reduction in 10-year Heart Attack and Stroke risk would result in a total cost savings of $20.3M per year, or $61M over 3 years.

Key Outcome Metric & Reporting
• Reduce the aggregate 10-year Heart Attack and Stroke risk for intermediate-high risk people (>7.5% risk) at the population wide level in specific geographically attributed populations in people aged 40-70 years.
• Partner with hospitals and primary care providers in the identified geographies to report Heart Attack and Stroke data. Partner with Health Information Exchange Networks or Organizations within the identified geographies to obtain Heart Attack and Stroke-related data to calculate risk.

Heart Disease Facts (cdc.gov)
Know Your Risk for Heart Disease (cdc.gov)
State of the States - Stroke Mortality (cdc.gov)
Evaluation of the Million Hearts® Cardiovascular Disease Risk Reduction Model: Third Annual Report (cms.gov)
Heart Disease and Stroke Statistics—2018 Update: A Report From the American Heart Association

Approved for Public Release: Distribution Unlimited
Prospective approach to generate >$60M economic value (>30% ROI) from the Heart Attack and Stroke program

Current state in target geography
- Population of 700,000
- ~250,000 adults ages 40-70
- ~1825 First Time Heart Attack and Stroke cases
- Average societal cost of each case ~$101,000
- Total annual economic cost ~$184M

Potential impact in target geography
- 9% baseline population Heart Attack and Stroke risk
- Maintaining a 1% reduction in the population’s 10-year Heart Attack and Stroke risk
- 8% population Heart Attack and Stroke risk
- Estimated economic cost savings over 3-year program ~$61M

Potential annual economic value if successfully rolled out across the US
- Total annual economic savings ~$13.5B

1. Based on EHR ambulatory data
2. Excludes costs associated with reduced quality of life and therefore represents a minimum societal cost estimate
3. 10-year Heart Attack and Stroke Risk correlates with absolute Heart Attack and Stroke cases and will be used to track intervention efficacy
Heart Attack and Stroke: US-wide Economic Costs

- **Total Estimated Economic Costs = $123B**
  - $73.2B in Direct Costs (60%)
    - Physician - Office-based Visits
    - Hospital
      - Inpatient
      - Outpatient
      - Emergency Room
    - Prescriptions
    - Home Health
    - Other
      - Vision
      - Medical Supplies
      - Dental
  - $49.8B in Indirect Costs (40%)
    - Productivity loss from morbidity and mortality.
Opioid Overdose

Scope of the Problem

- Opioid Use Disorder (OUD) is the chronic use of opioids that causes clinically significant distress or impairment. OUD consists of an overpowering desire to use opioids, increased opioid tolerance, and withdrawal syndrome when discontinued. OUD includes dependence and addiction.

Health Outcomes & Costs

- OUD is a life-threatening condition associated with a 20-fold greater risk of early death due to overdose, infectious diseases, trauma, and suicide.

Opportunity for Change

- Fewer than 10 percent of US patients with diagnosed OUD receive medication-assisted treatment (MAT).

- Behavioral therapies, when delivered alone, have limited efficacy in addressing the complex symptomatology and physical aspects of OUD.

Key Outcome Metric & Reporting

- Decrease the rate of fatal and non-fatal opioid overdoses/100,000 population/rolling 28-day period.

- National Emergency Medical Services Information System (NEMSIS) is a county-level database updated semi-monthly which includes fatal and non-fatal opioid overdoses. It is a collaboration of the Office of National Drug Control Policy, the National Highway Traffic Safety Administration, and the Department of Health and Human Services.
Prospective approach to generate >$60M economic value (>30% ROI) from the Opioid Overdose program

### Current state in target geography
- Population of 500,000
- ~3,700 individuals with Opioid Use Disorder (OUD)

### Potential impact in target geography
- Reducing ~360 OUD cases per year for 3 years (~10% annual reduction relative to national average)

### Economic value calculations

<table>
<thead>
<tr>
<th>Calculation</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population of 500,000</td>
<td>~3,700</td>
</tr>
<tr>
<td>Average societal cost of each case¹</td>
<td>~$73,000</td>
</tr>
<tr>
<td>Total annual economic cost</td>
<td>~$270M</td>
</tr>
<tr>
<td>~1080 fewer individuals with OUD</td>
<td>~$79M</td>
</tr>
<tr>
<td>Estimated economic cost savings over 3-year program</td>
<td>~$79M</td>
</tr>
<tr>
<td>Potential annual economic value if successfully rolled out across the US</td>
<td>~$17.8B</td>
</tr>
</tbody>
</table>

1. Excludes costs associated with reduced quality of life and therefore represents a minimum societal cost estimate.
2. OUD cases correlate with absolute prevalence of Fatal and Non-fatal Opioid Overdoses in the National Emergency Medical Services Information System (NEMSIS) Opioid Overdose Tracker, which will be used to track intervention efficacy.
Opioid Overdose: US-wide Economic Costs

- **Total Estimated US-wide Economic Costs = $182B**
  - $40B in Healthcare Costs (22%)
    - Emergency Department Visits
    - Emergency Medical Services Activations
    - Hospitalizations and Rehabilitation Services
    - General Medical Care
  - $124B in Productivity Losses (68%)
    - Presenteeism (reduced productivity and accuracy at work)
    - Absenteeism (regularly missing work)
    - On-the-job injuries
    - Unemployment
  - $18.6B in Criminal Justice System (10%)
Alcohol-Related Health Harms (ARHH)

Reduce the number of alcohol-related Emergency Medical Services (EMS) activations

- **Binge Drinking**
  - Binge drinking is defined as consuming 5 or more drinks on an occasion for men or 4 or more drinks on an occasion for women.
  - Drinking too much alcohol can cause serious health problems including stroke, cancer, and cirrhosis.
  - People with alcohol use disorders, including binge drinking, are also more likely to get sick and are less able to fight off infections.

- **Scope of the Problem**
  - Binge drinking is the most common and costly pattern of excessive alcohol use in the United States.
  - Binge drinking is a serious but preventable public health problem.
  - Every day, about 37 people in the United States die in drunk-driving crashes—that's one person every 39 minutes. In 2021, 13,384 people died in alcohol-impaired driving traffic deaths—a 14% increase from 2020. These deaths were all preventable.

- **Opportunity for Change**
  - 18% of Americans have engaged in binge drinking in the past month.
  - A 2019 government survey found less than 1 in 10 people with an alcohol use disorder received any treatment, and less than 2% of those individuals said they had been offered medication.
  - In every state, it is illegal to operate a motor vehicle with a blood alcohol content of 0.08% or higher. Yet for every 88 instances of driving, someone is arrested for operating a motor vehicle above the legal limit.

- **Key Outcome Metric**
  - Metric: Number of alcohol-related emergencies reported by EMS services/100,000 population.
  - The National Emergency Medical Services Information System (NEMSIS) dataset is a repository for emergency medical technician provision of services nationally. It is funded primarily by the National Highway Traffic Safety Administration.

% of residents with prior DUI arrest (source: MPR, 2010)
Prospective approach to generate >$60M economic value (>30% ROI) from the Alcohol-Related Health Harms (ARHH) program

**Current state in target geography**
- Population of 500,000
- ~90,500 individuals who binge drink

- $3,900
- Total annual economic cost

**Potential impact in target geography**
- Reducing ARHH cases ~9000 per year for 3 years (~10% annual reduction relative to national average)
- ~27,000 fewer individuals with ARHH

- ~$106M
- Estimated economic cost savings over 3-year program

**Potential annual economic value if successfully rolled out across the US**

- ~$23.8B
- Total annual economic savings

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1. Excludes costs associated with reduced quality of life and therefore represents a minimum societal cost estimate.
2. ARHH cases correlate with the prevalence of alcohol-related EMS calls reported via National Emergency Medical Services Information System (NEMSIS), which will be used to track intervention efficacy.
Alcohol-Related Health Harms: US-wide Economic Costs

- **Total Estimated US-wide Economic Costs = $237.6B**
  - $20.2B in Healthcare Costs (9%)
    - Emergency Department Visits
    - Emergency Medical Services Activations
    - Hospitalizations and Rehabilitation Services
    - General Medical Care
  - $166.6B in Productivity Losses (70%)
    - Presenteeism (reduced productivity and accuracy at work)
    - Absenteeism (regularly missing work)
    - On-the-job injuries
    - Unemployment
  - $50.7B in Other (21%)
    - Criminal Justice
    - Motor Vehicle Crashes
    - Fire Losses

Healthcare, $20,228,333,400, 9%
Productivity Losses, $166,606,002,200, 70%
Other, $50,736,401,100, 21%