American Association of Colleges of Osteopathic Medicine  
HRSA-22-109 Grant Application  
Resilient Mindsets in Medicine: Starting Strong, Staying Strong  
Project Narrative

**PURPOSE AND NEED**

Burnout among medical students and physician faculty across institutions of higher education is a crisis that must be addressed and resolved. At each stage - medical school, residency, and clinical practice - rates of burnout and other symptoms of distress are higher than among their peers in the general US population. The health and wellbeing of our communities across this nation depends on it. The American Association of Colleges of Osteopathic Medicine (AACOM) and its partner, Motivate Lab, are uniquely positioned to address and remediate this persistent and growing crisis. Grant support from the Health Resources and Services Administration (HRSA) will accelerate and extend our efforts to develop and implement nationally relevant and motivationally supportive learning communities, designed specifically for medical students and faculty, across the 37 medical colleges we represent, which currently train 26% of all current medical students.

Recent reviews of studies of the impact of the COVID-19 pandemic on health care workers including physicians (Shreffler, Petrey, & Huecker, 2020; Lee et al., 2021) revealed that the pandemic has increased stress, anxiety, PTSD, and symptoms of depression among those providing care to patients. Likewise, the COVID-19 pandemic affected both pre-clinical and clinical medical education (Rose, 2020), and the pandemic continues to pose challenges for Colleges of Osteopathic Medicine (COMs) and for medical students’ learning. The pandemic has become an additional stressor for students, with a profound influence on their psychological well-being (Abdulghani et al., 2021). Even before the pandemic, more than 50% of physicians were experiencing burnout (NASEM, 2019), as were 55.9% of medical students (Dyrbye et al., 2014). The changes in workload and isolation, as well as changes in wellbeing, make it more likely that both current and future physicians are experiencing increased burnout during COVID.

Common symptoms of burnout in medical students include emotional exhaustion, depersonalization, and professional cynicism or disbelief (Boni et al., 2018) that are prominent in early manifestations. In a recent study of Brazilian medical students (Boni et al., 2018), these symptoms are most pronounced in the first year of medical school, following the transition from previous education to this more intensive period of training. Medical students’ higher rates of burnout may be related to having higher expectations of self, pressure to achieve academically, isolation due to time spent studying and preparing for examinations, and their presence in a competitive and unsupportive environment. It seems likely that US medical students suffer the same response during their transition from undergraduate to graduate education. These symptoms lead to negative behaviors such as burnout, substance use, depression, and suicidal ideation, which adversely affect medical student academic performance and professional identity development, and later physician performance and professionalism (Boni et al., 2018). While practicing physicians suffer burnout, depressive symptoms, and suicidal ideation, medical school and residency training appears to be the peak time for these signs, of distress.
HRSA recently purported that “a common shortcoming in efforts to address burnout is a focus on the individual, while ignoring the surrounding systemic issues and work environment” (ACTPCMD Report, 2019). Physician suicide rates are double that of the general population (Andrew, 2017) and reports of burnout exists among half of physicians (Dyrbye et al., 2017). It is imperative that we develop and adopt a systemic approach that focuses on changes to the learning and working environment across the spectrum of medical education to support the health care professionals of the future. We cannot rely, exclusively, on selecting more “gritty” and “resilient” future physicians to spur sustainable change. Training interventions focused on already emotionally exhausted physicians is like “shutting the barn door after the horses have gotten out.” Instead, creating more motivationally supportive climates that prompt physicians to develop the capacities for greater persistence throughout their medical school journey represents a novel and more sustainable approach to promoting the well-being of health-care professionals. This is particularly important during the first year of medical school when symptoms of burnout are most common (Boni et al., 2018).

The recent ACTPCMD report (2019) and other salient studies (Eckleberry-Hunt et al., 2017), indicate that research into burnout and associated constructs requires more reliable measurement tools. AACOM has experience utilizing burnout and similar measures, as a part of the Project in Osteopathic Medical Education and Empathy, Phases I and II. Phase I was the largest survey of changes in medical student empathy ever conducted, a cross-sectional study with a 92% response rate across all COMs, administered near the end of the 2017–2018 academic year. Phase II is a longitudinal study of the entering Class of 2023 to evaluate reasons for changes in empathy, and relationships between empathy and measures of burnout and wellbeing. This study is in its third year of five. We are well-equipped to undertake a similarly far-reaching project in this effort and will employ similar strategies that garnered the outstanding response rate in the Osteopathic Medical Education and Empathy study. Similarly, given the distinct focus of our prior work and the current proposal, we anticipate that these projects will overlap in ways that benefit both projects.

Addressing burnout requires sustained, systemic intervention. Combining the network of current and future health care professionals across AACOM’s membership with the psychological expertise of Motivate Lab will allow the research team to intervene and measure critical constructs directly related to and including burn-out. It is necessary to take a rigorous and solution-oriented approach to establishing success metrics that can be standardized across the colleges of osteopathic medicine (COMs) to track progress and accelerate our efforts to support the long-term resiliency of residents and practitioners serving rural and underserved communities.

Curating reliable success metrics will be critical to fulfilling AACOM’s goal of creating a nationally relevant, motivationally supportive learning climates and communities, extending across its 37 colleges. In this effort, we will leverage our current partnership with motivation science experts at Motivate Lab to take the following 3 steps:

1. Standardize validated metrics for burnout, resilience, physician well-being, and medical student well-being across AACOM schools to facilitate the use of robust, reportable metrics.
2. Adapt a proven learning program with higher education instructors, a two-course sequence: Motivating Learners: Starting Strong and Motivating Learners: Staying Strong, to the
3. Recruit faculty fellows to support the implementation, scaling, and sustainability of the Resilient Mindsets in Medicine courses, and train them to facilitate the course so they can support community building and engagement over time, thereby leading AACOM’s efforts to combat burnout beyond the proposed three-year funding period.

Motivate Lab has a history of creating, customizing, and validating measures related to STEM student growth and development in addition to modeling how new measures relate to critical outcomes including persistence, well-being, retention, and academic performance. Engaging in a holistic, empathize and learn process throughout year 1 of the project, AACOM will gain a better understanding of the underlying issues and measures related to burnout. Leveraging Motivate Lab protocols as a foundation and using an Advisory Committee that includes experts in rural health and in wellness measures, we will administer surveys across AACOM’s 37 colleges and strategically scaffold conversations and focus groups with students, residents, and faculty and practicing physicians that will inform the development of success metrics such as instances of burnout, well-being, and resilience customized for the medical field.

Motivate Lab recently created a multi-part Motivating Learners Course designed to support faculty to create more motivationally supportive learning climates by leveraging research on growth mindset (Dweck, 2006), perceptions of purpose and relevance (Hulleman & Harackiewicz, 2009), and a sense of belonging (Walton, 2014). Research has consistently demonstrated that these three constructs significantly predict metrics associated with burnout (e.g., retention), resilience (e.g., persistence), and well-being (e.g., motivation, belonging), particularly for students who have been historically underrepresented in STEM disciplines (Cronin et al., 2021; Harackiewicz & Priniski, 2018; Lazowski & Hulleman, 2016; Tibbetts et al., 2016). Interventions based on these constructs have proven to have sustained impacts. Growth mindset and purpose and relevance interventions have been shown to impact longitudinal outcomes, including retention within a STEM tract, even years after implementation (Canning et al., 2017; Hecht et al., 2019; Yeager et al., 2019). Similarly, interventions that target belonging have also had success. A belonging intervention implemented in the first year of college demonstrated the potential to support immediate academic and social outcomes with effects persisting 7 years later including greater career satisfaction, success, and psychological well-being among Black students in the sample (Brady et al., 2020).

Given the strong need in medical education to better support students from diverse backgrounds, it is also important to note that interventions based upon these three constructs have been lauded for leveraging the principles of culturally relevant pedagogy, using a distinct focus on knowledge and experiences of students from diverse backgrounds and discussed as a critical tool for anti-racist teaching practices (Cronin et al., 2021). Furthermore, in the medical field, growth mindset, purpose and relevance, and sense of belonging are closely related to the known causes of burnout among students: all-or-nothing performance thinking (Dunn, Inglewizz, & Moutier, 2008), professional identity development (Monrouxe et al., 2021), and feeling unsupported by faculty (Ishak et al., 2013). Thus, adapting this course for the medical field, and creating a two-course Resilient Mindsets in Medicine training sequence, will equip practitioners to implement the systemic cultural changes required to combat the causes and effects of burnout.
Emerging data from state-wide implementations of the Motivating Learners Course (MLC) indicate that participants benefit in terms of learning and being more willing to implement mindset-supportive practices. Compared to pre-course data, faculty reported more familiarity with strategies that support growth mindset ($d = .72$), purpose and relevance ($d = .48$), and sense of belonging ($d = .64$) in addition to feeling more prepared to support students’ motivation in the upcoming semester ($d = .31$). Participants also reported thinking more about how their syllabus both positively ($d = .36$) and negatively ($d = .23$) impacted student motivation. The course has been adapted and implemented across the University System of Georgia and the City Universities of New York. This course, as modified for osteopathic medical education, is expected to result in measurable individual and environmental improvements in wellness measures for all students and a reduction in faculty burnout. To the best of our knowledge, implementation of the 3 steps described above will be the first instance of an industry-wide intervention to address burnout among medical students and faculty. Given the reach of AACOM’s communities, this has the potential to have a nation-wide impact, particularly in communities that have been historically underserved.

While evidence on whether rural physicians suffer burnout at higher rates than their suburban or urban counterparts is mixed (Lavanchy, Connelly, Grzybowski et al., 2004; Marquez-Cunningham, Lenherr, Flynn, et al., 2019; Ward, Morgan & Peterson, 2020), rural areas have been disproportionately impacted by the pandemic (Tan, Kullar, Swartz et al., 2020) due to residents’ lack of access to hospital care, the absence of infectious disease physicians, and the age, health and political leanings of the communities. The locations and reach of AACOM’s member campuses ensure that future physicians serving rural communities will receive the benefit of this course, and thus, so will their patients. AACOM member COMs are more likely to be in rural areas compared to allopathic medical schools, and osteopathic physicians are more likely to serve rural areas (Griffith, Power, & Strand, 2017; Ahmed, Price, Robbins, & Braich, 2020). With physician burnout rates constantly increasing (Shanafelt & Noseworthy, 2017), the timing of this course is particularly pressing.

AACOM’s work with Motivate Lab will produce an evidence-based, persistent, longitudinal intervention, a version of MLC that will be adapted into a medical-school specific two course sequence titled **Resilient Mindsets in Medicine: Starting Strong and Staying Strong**, specifically designed to address the levers affecting burnout and resilience in medical students.

Additionally, our work includes the development and/or customization of reliable measures of physician and medical student well-being, resilience and burnout, and the validation of existing measures. These measures will be tracked so that the true impact of the Resilient Mindsets in Medicine course (RMM) can be assessed, allowing the research team to take a data-driven approach to improving our efforts throughout the project.

AACOM is uniquely qualified to undertake this project. The organization has close ties to the faculty, students, and leaders at its member COMs, as evidenced by the high level of support by our COMs. We have institutionalized data gathering practices including annual surveys of incoming and graduating students as well as annual surveys of each of our colleges, a survey that boasts a 100% response rate. AACOM Councils act as the member voice of our students and faculty and are engaged with AACOM’s supportive efforts. AACOM has experience completing large-scale national research projects. Finally, AACOM has partnered with Motivate Lab, the leading researchers in motivation science in education.
RESPONSE TO PROGRAM PURPOSE

(a) WORK PLAN

Overall Objectives: The overall objectives of the program are to:

1. Evaluate current measures of resilience, burnout, wellbeing, suicidal ideation, substance use, and other pertinent constructs in order to customize and further validate relevant measures within the medical field.

2. Customize a faculty development course for physician and non-physician faculty teaching osteopathic medical students based on previous work by Motivate Lab (Hulleman & Harackiewicz, 2009; Tibbetts et al., 2016) utilizing learning mindsets that have historically related to burnout and resilience: growth mindset, perceptions of purpose and relevance, and a sense of belonging. We will confirm that course participation is related to increased wellbeing and resilience and decreased burnout, suicidal ideation, and other negative behavioral health outcomes in students through the development, testing and validation of salient success metrics.

3. Create a sustainable model for delivery of professional development of learning mindsets through a faculty fellows’ program. Faculty fellows will be recruited and trained to help facilitate the course so that it can be implemented even after the grant cycle ends. After testing and refinement, we plan to scale this course to all 37 COMs, their branch campuses, and additional teaching locations.

Key Partners: AACOM’s key partners in this effort are Motivate Lab and AACOM’s member Colleges of Osteopathic Medicine and their parent institutions. The partnership will be established and maintained by AACOM and supported by an Advisory Committee (AC) of COM leaders, key personnel from parent institutions, students, residents, and faculty and practicing physicians.

Responsible Staff: Responsible staff from AACOM include Mark Speicher, PhD, Senior Vice President for Medical Education and Research, who will oversee the execution of the project, the development of the consortium of participating COMs, and support participation in and adoption of the program within the COMs and Patricia Delaney, MEd, Senior Vice President for Finance and Operations, who is responsible for the compliance of the project with HRSA and COM guidelines and regulations. The key personnel from Motivate Lab are Chris Hulleman, PhD and Yoi Tibbetts, PhD, Executive Director and Research Director of Motivate Lab, who are responsible for researching, customizing, and validating measures, in addition to testing the efficacy of the RMM course sequence.

Goals, Objectives, and Timelines: The Work Plan (Attachment 1) outlines program goals, major objectives, and key tasks for each year of the three-year funding period.

This project incorporates ML’s 4 step research-design process that has been successfully utilized for the design of the original Motivating Learners Course:
1. **Empathize and Learn** - The empathize and learn phase of the process is focused on understanding the problem and context by listening to relevant stakeholders. In this step, AACOM and ML will assess current markers of resilience, wellbeing, burnout, and suicidal ideology from discussions with our expert Advisory Committee, and from listening to our student, faculty/staff, and administration stakeholders in our member COMs, especially those located in and providing physicians for rural areas. Furthermore, working with COMs to conduct focus groups and customize the Resilient Mindsets in Medicine course sequence will ensure that we are incorporating the perspectives of those the course will be built to support.

2. **Synthesize and Plan** - The synthesize and plan phase of the process is focused on consolidating learnings to develop actionable next steps. In this step, AACOM and ML will analyze and generalize evidence-based measures and interventions for student wellbeing, discover and highlight existing effective practices, and create customization plans for updating the course with relevant effective strategies.

3. **Prototype and Test** - The prototype and test phase of the process is focused on customizing interventions and strategies based upon data, feedback, and theory. In this step we will pilot the course with several faculty and use a combination of surveying, discussions, and active listening to systematically reflect on this information with our Advisory Committee and member COMs to identify and further develop customized intervention strategies. We will then identify strategies that can be scaled to support our model of an optimal learning environment and establish the efficacy of this model in reducing burnout and negative behaviors caused by stress and depression.

4. **Adopt and infuse** - The adopt and infuse phase of the process is focused on integrating effective strategies and responsibly scaling them. In this step, AACOM and ML will test and replicate positive effects from the course, as well as convene and support those involved in establishing this model on their campuses to continue to norm and scale the evidence-based strategies embedded in the course.

The work plan also incorporates iterative logic model building to assess the threats in the transitions to medical school, from pre-clinical classroom and laboratory learning to clinical learning at the patient’s bedside, and the transition from clinical learning in medical school to postgraduate training.

The analyses are appropriate for the iterative design of the work plan, with at least annual evaluation using validated, meaningful measures of wellbeing, yet also appropriate for rigorous, quasi-experimental testing of the effects of the interventions, while systematically controlling for other student and COM variables, like pre-matriculation academic performance or curriculum type. Finally, the development and testing of the courses are subject to a rigorous quality improvement process.

The work plan incorporates stakeholders and participants from the continuum of osteopathic medical education, especially those who influence professional identity development, and continuous professional development, and lifelong learning. The participants include faculty and students from AACOM’s 37 member COM main campuses, 6 branch campuses, and 15 additional
teaching sites. These COMs, many of which are located in rural areas, comprise 6 of the top 10 (including the top 2) medical schools ranked for the most graduates practicing in rural areas according to *US News and World Report* (Attachment 5). Regular meetings with the Board of Deans (Deans of each of the 58 campuses) are included in the work plan, and letters of support from 29 of the COMs have already been received (Attachment 8).

The project’s Advisory Committee consists of key stakeholders and experts in medical student and physician wellness, medical students, and resident physicians. These stakeholders are embedded in the planning process through frequent project updates, involvement in the development and refinement of course construction, and receipt of quantitative and qualitative measures of intervention impact.

HRSA staff, in this collaborative opportunity, are included in site visits, focus groups, and Advisory Committee meetings so that this project can fully benefit both from their expertise, as well as from their knowledge of the discoveries that other grant recipients are making that could be helpful to increase or better assess the effect of these courses.

An equivalent representation of individuals from those COMs not yet participating in the intervention will be included in surveys for comparisons to ensure that the interventions developed through this program are effective.

(b) METHODOLOGY AND APPROACH

AACOM intends to work with ML to develop, refine, and deliver culturally competent training that promotes resiliency and well-being, and reduces burnout and other important measures of negative physician behavior through a staged approach for the development of courses that focus on growth mindset, purpose and relevance, and belonging. This training is based upon the Starting Strong and Staying Strong courses previously developed by ML and utilized in higher education. Learning mindsets are students’ beliefs and perceptions about learning and school. They shape how students interpret difficulty and respond to challenges.

This approach has five strategies that are reflected in the work plan:

1. Recruit and orient an Advisory Committee (AC) comprised of a diverse group of administrators, faculty, staff, and students from Colleges of Osteopathic Medicine around the country, focused on those in rural environments. The AC will provide ongoing oversight and reflection on the progress of the course development and outcomes. They will also select and refine the measures that will be used to assess the impact of the courses on students and faculty.

2. Establish a second group of COM leaders and front-line faculty to develop and iterate a logic model for the Starting Strong, Staying Strong courses, and the levers that can impact wellbeing, such as support during transitions to different environments during and after training.

3. Engage a core of faculty at COMs that produce the most rural physicians to provide feedback on the proposed course, take the course, and institute changes to their practices
of curricular design, content delivery, teaching and assessment in the COM learning environment. This faculty, and the students they teach, will then be a part of ongoing conversations to further refine the courses.

4. Utilize a methodologically rigorous, mixed-methods assessment process to ensure that the course is meeting the established goals.

5. Leverage the use of ML’s expertise in culturally relevant and sustainable pedagogies. Co-investigators, Dr. Tibbetts and Dr. Hulleman have numerous publications on leveraging learning mindsets that utilize the backgrounds, knowledge, and experiences of students from diverse backgrounds to support the development of students from historically marginalized backgrounds (Cronin et al., 2021; Tibbetts et al., 2016).

Both the education literature and the medical education literature make it clear that some features of the medical education system contribute to students’ and physicians’ depression, anxiety, and role confusion. In the United States, it is estimated that more than half of all medical students experience burnout during their medical education (Dyrbye et al., 2014). Research has also shown that the effects of burnout can last beyond a student’s medical education and can be associated with psychological disorders and suicidal ideation (IsHak et al., 2013). Various studies have found particularly high levels of depression and anxiety in medical students (Johnson et al., 2020; Rotenstein et al., 2016; Quek et al., 2019; Mousa et al., 2016). In addition to these high levels of depression and anxiety, students frequently find themselves in situations of role confusion due to high demands and simultaneously managing multiple roles (Nassar, Waheed, & Tuma, 2019; Shapiro, 2019).

The evidence also shows that developing learning mindsets will promote individuals’ learning, growth, achievement, and wellbeing (Ortiz-Alvarado et al., 2019). ML uses those insights to develop evidence-based solutions that can be applied across educational, extracurricular, and work contexts. Learning mindsets shape how students interpret difficulty and respond to challenges. Research suggests that learning mindsets are meaningful in that they relate to academic success and wellbeing and malleable in that they can be altered through targeted interventions and supports. One way to think about learning mindsets is to focus on students' Mindset GPS: Growth Mindset, Purpose and Relevance, and Social Belonging.

The original two-course Motivating Learners sequence equips faculty to teach with motivation-supportive pedagogies. Participating faculty learn how to modify an existing course to guide students in developing adaptive beliefs about learning and school. Participants adopt messages and practices which support three key learning mindsets: growth mindset, purpose and relevance, and sense of belonging. The course sequence is organized around several performance tasks through which participants are challenged to apply principles of learning mindset support to their own context, with a focus on planning for an upcoming instructional term.

The first course: **Resilient Mindsets in Medicine: Starting Strong** will cover key principles for engaging and supporting medical students prior to and during the first few weeks of the semester. Following this, the **Resilient Mindsets in Medicine: Staying Strong** course will serve as a refresher course for participants, allow them to reflect on their implementation, and explore how the principles introduced in the initial course can be extended.
Based on evidence from Motivate Lab’s work with undergraduate students, we believe that early development of Mindset GPS will persist and provide students with growth opportunities that will continue to protect them from the high rates of burnout, substance abuse, and depression that plague physicians today. This grant allows us to measure the persistence of these characteristics, and the association of these characteristics with improved wellbeing, through the students’ transition from didactic learning to clinical care.

To achieve these aims, our pilot work has identified four main products/deliverables to focus our quality improvement efforts during the three years of this project:

1. Logic Model
2. Measures of Wellbeing and Burnout
3. Resilient Mindsets in Medicine: Starting Strong Course
4. Resilient Mindsets in Medicine: Staying Strong Course

**Quality Improvement Framework**

In the proposed project, our partnership will continue to implement a version of the quality improvement framework first developed in healthcare settings by the Institute for Healthcare Improvement, and adapted for education contexts by the Carnegie Foundation for the Advancement of Teaching (Bryk et al., 2015). A guiding hallmark of this approach is to test our improvement concepts through iterative inquiry cycles to develop and test revised innovations that are more likely to work for different contexts, student populations, and at scale. The addition we make to Carnegie’s quality improvement framework is to incorporate a design thinking element to create innovations that can then be improved to create changes in the system. We outline our proposed process below, including PDSA cycles, within the context of the project work plan.

**Design Process**

Our approach to designing solutions to educational challenges combines principles from the tradition of design thinking (Kelley & Kelley, 2013) with advances in psychological theory and research. In the case of creating interventions based on psychological theory, expertise in psychology is crucial. But theory alone does not help a designer connect to the users of the innovation. What is also needed are principles of design that solve predictable problems for the specific user group (Bryk, 2009; Kelley & Kelley, 2013). The design process privileges the user’s subjective perspective; in the present case that is medical students and faculty. To do so, we employ qualitative research methods to understand the user experience and create viable products that can be tested early in the design process (Rosenzweig et al., 2019; Yeager et al., 2016).

**Background.** As presented in Attachment 7, AACOM and Motivate Lab have developed a logic model that will serve as the foundation for the proposed project.

Because the proposed length of this project is three years, the long-term measures of patient outcomes are beyond the scope of this project. Therefore, the focal measures of this project will be process measures, which are highlighted as “Short-Term Outcomes”. These measures include medical student wellbeing, burnout, and belonging.

We are targeting the first two years of the medical school experience because our initial work and prior research has revealed this time period to be particularly stressful for students, although it is integral to setting the pathway for success (Boni et al., 2018). This support will take the form of a
two-part professional development course for faculty patterned after Motivate Lab’s current two-course offering for higher education STEM faculty, Resilient Mindsets in Medicine: Starting Strong will address the first two weeks of a students’ experience in medical school, whereas the Resilient Mindsets in Medicine: Staying Strong course will address the middle of the first semester.

**PDSA Cycles.** An essential component of continuous improvement is to engage in disciplined inquiry involving Plan-Do-Study-Act (PDSA) cycles to determine whether a proposed change idea results in improvement (Bryk et al., 2015). The “Plan” proposes a change idea for improvement, initial predictions of what will happen when you implement the change, and how the idea will be tested; “Do” involves carrying out the change idea, collecting data, and reflecting on how well the plan was implemented; “Study” involves analyzing the results of the test and reflecting on how well results compare to the initial predictions; and “Act” represents a final reflection on whether the change idea should be adopted, adapted, or abandoned.

Another essential component of continuous improvement is to consider the scale of a given PDSA test (Bryk et al., 2015). Rather than going straight to wider-scale implementation of a change idea, tests of a change concept begin on a smaller scale, especially when knowledge about the change idea or the capacity to implement the change idea is limited. The data collected from PDSAs along a ramp help establish whether adopting a given change idea is warranted and whether further adaptations of the change idea are needed before wider-scale implementation. As a result, Bryk et al. (2015) coined continuous improvement methodology as a shift from “implementing fast and learning slow” to “learning fast to implement well.”

**Logic Model**

We will use the preliminary logic model (Attachment 7) as a foundation for this work. This will allow us to test, and amend, different links throughout the logic model to ensure that we are targeting the most high-leverage aspects of AACOM’s system. We will first conduct campus visits and focus groups with stakeholders for feedback. We will then use the data and feedback collected to revise the logic model, which will guide the development of surveys and revisions to Motivate Lab’s higher education version of the Motivating Learners Courses.

<table>
<thead>
<tr>
<th>Table 1. PDSA Cycles - Logic Model</th>
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<tbody>
<tr>
<td><strong>Logic Model PDSA 1 (6/1–8/1)</strong></td>
</tr>
<tr>
<td><strong>Plan</strong></td>
</tr>
<tr>
<td><strong>Do</strong></td>
</tr>
<tr>
<td><strong>Study</strong></td>
</tr>
<tr>
<td><strong>Act</strong></td>
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</table>
**Surveys.** We will survey AACOM’s network to establish the necessary psychometric properties to feel confident in standardizing a valid and reliable measure of physician burnout, resilience, and well-being. Multiple survey implementations and analysis will allow us to improve measures over time and test components of the logic model so that we can better assess the effects of enrolling physicians in the Resilient Mindsets in Medicine courses.

**Table 2. PDSA Cycles - Surveys**

<table>
<thead>
<tr>
<th>Survey PDSA 1 (4/1–7/1)</th>
<th>Survey PDSA 2 (1/2–5/2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plan</strong></td>
<td></td>
</tr>
<tr>
<td>Identify high functioning and low functioning items by implementing the survey, which will result in a version to implement across all COMs.</td>
<td>Implement survey across all COMs and identify any low functioning items to revise or remove.</td>
</tr>
<tr>
<td><strong>Do</strong></td>
<td></td>
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<tr>
<td>Collect baseline measures from all COMs.</td>
<td>Collect measures from all COMs.</td>
</tr>
<tr>
<td><strong>Study</strong></td>
<td></td>
</tr>
<tr>
<td>Describe, analyze, and norm data.</td>
<td>Analyze results and compare to previous.</td>
</tr>
<tr>
<td><strong>Act</strong></td>
<td></td>
</tr>
<tr>
<td>Revise logic model and adjust survey as needed.</td>
<td>Revise logic model and adjust survey as needed.</td>
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**Resilient Mindsets in Medicine: Starting Strong**

Implementing three PDSA cycles for the Resilient Mindsets in Medicine: Starting Strong will allow us to continually improve the course for each academic year through the duration of the grant. Leveraging participant feedback and Advisory Committee input and integrating our best motivational measures will position us to continually improve the course throughout this grant cycle and beyond, as well as determine an appropriate rate for scaling the course across the AACOM system. In the “Act” stages of PDSA 1 and PDSA 2, a scale will be determined for administering the Starting Strong course in the subsequent PDSA cycle. The ranges for the scaling decision at the end of these first two PDSA cycles are 55–110 faculty participants and 110–220 faculty participants.

**Table 3. PDSA Cycles – RMM: Starting Strong Course (RMM:SS1)**

<table>
<thead>
<tr>
<th>Starting Strong PDSA 1 (9/1 – 3/2)</th>
<th>Starting Strong PDSA 2 (3/2 – 12/2)</th>
<th>Starting Strong PDSA 3 (1/3 – 12/3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plan</strong></td>
<td></td>
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<tr>
<td>Implement the RMM:SS1 course with one cohort of faculty and identify areas most in need of revision.</td>
<td>Implement the RMM:SS1 course with a second cohort of faculty and identify areas in most need of revision.</td>
<td>Implement the RMM:SS1 course with a third cohort of faculty, at a larger scale, and identify areas for revision with a focus</td>
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on aspects of implementation at scale.

| Do | Test RMM:SS1 Course with 10 Pilot Faculty from 5 rural COMs. | Provide the RMM:SS1 course to 2–5 faculty from 5 additional rural COMs. | Provide the RMM:SS1 course to at least 2 faculty members from at least 10 additional COMs. |
| Study | Gather feedback on Customized Course from: Pilot Participants, Board of Deans, AC, AACOM Councils, Faculty, and Students. | Gather feedback from: Course Participants, Board of Deans, AC, AACOM Councils, Faculty, and Students. | Gather feedback from: Course Participants, Board of Deans, AC, AACOM Councils, Faculty, and Students. |
| Act | Revise RMM:SS1 course based on learner feedback, logic model, and measures. Scaling Decision Point A | Revise RMM:SS1 course based on learner feedback, logic model, and measures. Scaling Decision Point B | Revise RMM:SS1 course based on learner feedback, logic model, and measures. |

Resilient Mindsets in Medicine: Staying Strong

Implementing two PDSA cycles in years 2 and 3 of the grant will enable us to learn from customizing the Resilient Mindsets in Medicine: Starting Strong and apply those learnings to the customization of the Resilient Mindsets in Medicine: Staying Strong. Similar to the PDSA cycles outlined above for Starting Strong, we will leverage a combination of participant feedback, Advisory Committee input, and the analysis of key measures of resilience and burnout from surveys and other data to ensure we are iteratively improving the course to optimally support participating faculty.

Table 4. PDSA Cycles - RMM: Staying Strong Course (RMM:SS2)

| Staying Strong PDSA 1 (5/2–12/2) | Staying Strong PDSA 2 (1/3–7/3) |
| Plan | Implement the RMM:SS2 course with one cohort of faculty and identify areas most in need of revision. | Implement the RMM:SS2 course with a second cohort of faculty and identify areas in most need of revision. |
| Do | Test RMM:SS2 Course with at least 2 faculty from the original 5 Pilot COMs. | Provide RMM:SS2 course to the participants from rural COMs who pilot RMM:SS1 in Year 2. |
| Study | Gather Feedback from: Pilot Participants, Board of Deans, AC, AACOM Councils, Faculty, and Students. | Gather Feedback from: Pilot Participants, Board of Deans, AC, AACOM Councils, Faculty, and Students. |
Act | Revise RMM:SS2 course based on learner feedback, logic model and measures. | Revise RMM:SS2 course based on learner feedback, logic model and measures.
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**Decision Points for Rate of Scale – Resilient Mindsets in Medicine Course**

Scaling decisions will be made upon a confluence of factors including reports of faculty course satisfaction, performance task completion, relevant student data (e.g., student perceptions of the learning context), and logistical feasibility factors. Overall, we expect that these faculty will impact the resilience and wellness of more than 3000 future physicians during the funded phase of this project, including more than 400 physicians who will dedicate themselves to practicing in rural areas. These scaling decisions will also impact the rate of scale for the subsequent Staying Strong course implementations. Once the course is fully customized to the medical field context, we will be able to accelerate our scaling rate to eventually impact all future physicians who enroll in the COMs.

Figure 1. Decision Points for Rate of Scale - Resilient Mindsets in Medicine: Starting Strong

(c) **RESOLUTION OF CHALLENGES**

Our combined team has significant experience conducting survey research and providing faculty training and support services across a wide variety of institutional contexts, including rural and urban settings, and using a variety of modalities, including in-person, virtual/remote, and asynchronous. Based on this experience, we anticipate several challenges that we plan to address.

1. A first set of challenges relates to participation, either for students to complete surveys or for faculty to participate in this professional development program. For student surveys, AACOM has traditionally been successful in achieving high participation rates in its surveys. AACOM uses a three-part approach to ensuring survey success. First, AACOM obtains commitments from COM Deans and other leaders to promote the surveys on their
Second, AACOM recruits, trains, and engages in ongoing communication with a survey coordinator from each COM. This survey coordinator helps AACOM plan the optimal timing and delivery strategies based on each COM’s specific schedule and logistics. Finally, AACOM uses direct links to students through a national council of osteopathic student government presidents from each campus to ensure students understand the importance of the studies we ask students to participate in and can ask questions and see survey results. This process resulted in a median response rate of 92% for our most recent national survey on empathy in osteopathic medical students. For faculty participation, we will offer opportunities to earn professional development certification, and to present their learning at regional and national conferences. In addition, we will utilize our Faculty Fellows to help generate enthusiasm for the work in Years 2 and 3, including providing additional support to course participants.

2. A second set of challenges relates to offering integrated culturally competent training for faculty. Fortunately, Motivate Lab has extensive experience and expertise to ensure that the Resilient Mindsets in Medicine course has an integrated set of learning experiences, including reading, reflection, interactive quizzing, and discussion posts. In addition, Motivate Lab’s current course for higher education faculty has a focus on equity that will be applied to this project. Dr. LaDonna Young, ML’s Senior Director for Strategic Partnerships and Development, has over twenty years’ experience, as both an instructor and administrator, integrating culturally sustaining principles into curricula. Her expertise will be paramount to ensuring the creation of an equity centered course.

3. A third set of challenges relates to accessing the institutions and students to develop our network of institutions, targeting rural institutions first. AACOM has an excellent track record of partnering with all of its institutions. Because the courses are designed to be predominantly asynchronous, faculty can access the course from anywhere, provided they have an internet connection and a capable electronic device. This allows faculty in rural locations to be connected to the learning community from wherever they live, even if they are the only person at their institution currently taking the course. In terms of accessing students to develop a valid and reliable measure of burn-out and well-being, AACOM’s support of the student government associations on each campus will enable us to obtain the large, representative sample of students needed to conduct improvement cycles on relevant measures.

4. A fourth set of challenges relates to scaling the faculty training. We will engage in at least 5 PDSA cycles related to developing the Resilient Mindset in Medicine courses during the three years of project funding. This will allow us to scale as fast as possible, while also learning as much as possible before expanding the reach of the courses. Motivate Lab has experience in taking the course to scale and has identified two decision points from which the project can be scaled based upon the results of the PDSA cycles. We will also be training Faculty Fellows each year of the project, and the cumulative growth in fellows will allow for even more scaling after the three years of the project. AACOM has been successful in delivering faculty development courses in leadership, health policy, and
bedside teaching for a decade; both the infrastructure and interest on the part of faculty to learn more about supporting their students exist.

5. A final set of challenges relates to the unknown obstacles presented by the COVID-19 pandemic. Given that the course is designed to be mostly asynchronous, this provides tremendous flexibility in delivery and training. The surveys are also designed to be completed using online survey software. The challenge then becomes reduced participation due to the stress of a persisting pandemic, including the unexpected changes in people’s daily lives. However, Motivate Lab developed the first version of its course, in part, as a response to the pandemic and the uncertainty that many faculty members identified switching to online teaching. The course was designed in June 2020 for virtual learning and the first group of course participants responded positively. We will leverage these lessons to remain flexible in our approach to project completion regardless of what COVID-19 has in store for us.

**IMPACT**

(a) EVALUATION AND TECHNICAL SUPPORT CAPACITY

Our team has extensive experience in continuous improvement, program evaluation, and intervention fidelity research ensuring that we can effectively track project developments over time.

Dr. Chris Hulleman was a fellow at the Carnegie Foundation for the Advancement of Teaching where he learned to leverage the tenets of improvement science (Bryk et al., 2015), including utilizing logic models and PDSA cycles to track program effectiveness. Additionally, Dr. Hulleman received postdoctoral training in educational research methods and regularly publishes on intervention fidelity: methods of evaluating the extent to which educational interventions are implemented as designed (Hulleman, Rimm-Kaufman, & Abry, 2013; Nelson, et al., 2012).

Dr. Yoi Tibbetts’s expertise lies in implementing and evaluating experimental and quasi-experimental research designs intended to support STEM learners from traditionally marginalized backgrounds (Tibbetts et al., 2018; Tibbetts et al., 2016).

Dr. Kenn Barron’s expertise lies in creating learning communities for students and faculty (Buch & Barron, 2012), developing, and testing pedagogical innovations that increase student learning and motivation (Barron & Apple, 2014), as well as the development and evaluation of educational interventions that promote equitable motivation and outcomes (Getty et al., in press; Hulleman & Barron, 2015). Dr. Barron also has extensive expertise leading networked improvement communities in K-12 and higher education.

Dr. Hulleman, Dr. Tibbetts, and Dr. Barron have their PhDs in experimental social and personality psychology which has enabled them to conduct a variety of relevant research on scale development (Kosovich et al., 2015; Kosovich et al., 2017; Tibbetts et al., 2018) as well as program and intervention effectiveness research with short-term (Harackiewicz et al., 2015; Rozek et al., 2017; Hulleman & Harackiewicz, 2009; Williams et al., 2020; Yeager et al., 2019) and longitudinal outcomes (Tibbetts, et al., 2016; Rozek et al., 2017).
Their expertise in survey development, intervention implementation, and evaluation in conjunction with the experience of AACOM’s Dr. Mark Speicher, Senior Vice President for Medical Education and Research, ensures the focal project team possesses the skills necessary to carry out the project. For the past 15 years, AACOM has conducted annual surveys of its member Colleges of Osteopathic Medicine on topics such as curriculum, faculty numbers and qualifications, costs and debt, and special programs and clinical experiences. Additionally, AACOM surveys all entering and graduating students on their experiences, expectations, and plans for practice. Utilizing our survey experience and the cooperation we receive from member COMs, we have engaged in a national survey of all osteopathic medical students as part of a cross-sectional study on empathy and changes in empathy across the four years of osteopathic medical school. This study included support from every participating COM Dean who reached out to students about the importance of the survey. This led to a 92% median response rate across the participating COMs. We will use a similar method to ensure adequate responses to the surveys associated with this project.

In addition, AACOM’s ongoing work with its member COMs and their institutional assessment and data teams, have allowed AACOM to engage in national program evaluation research on curriculum, assessment, and other measures of learning and clinical progress like its recent work on Osteopathic Considerations for Entrustable Professional Activities for Entering Residency, or its leadership of the revision of the Interprofessional Education Core Competencies, shared by all health professions educators.

AACOM has the ability and the reputation of encouraging participation from all areas of its member COMs. AACOM has 12 Councils that are the voice of its members throughout the organization. AACOM will name and convene an Advisory Committee (AC), a core group of participants with diverse but relevant experiences in rural practice, physician wellness, clinical teaching, and medical education to support the empathic listening and discovery that AACOM wants to characterize its process of developing effective interventions for the wellbeing of America’s future physicians. The AC will include students, faculty, and administration from COMs as well as medical practice environments and will meet throughout the year to serve as a sounding board in development of measures of well-being and resilience and the interventions designed to affect these measures.

**(b) PROJECT SUSTAINABILITY**

The Resilient Mindsets in Medicine fellows will enable the Motivating Learners Course to continue to be implemented across the COMs. The fellows will be capable of facilitating the course via the asynchronous course offered in our learning management system. This scalable design allows for more participation among students and faculty.

Funding currently exists for faculty development delivered by AACOM at the annual Educating Leaders Conference. This funding will sustain the fellowship program, similar to the currently existing Health Policy Fellowship funded by AACOM membership dues and individually participating COMs.

At the conclusion of the proposed project, AACOM’s 37 colleges will be positioned to continue tracking and improving strategies designed to combat burnout. Three years of data collection and validation efforts will ensure that reliable measures of burnout, well-being, resilience, and other relevant constructs have been created. AACOM, through the Office of the Senior Vice President
for Medical Education and Research, conducts annual surveys of all graduating osteopathic medical students. After leading data-collection efforts throughout the project, AACOM will be equipped to continue analyzing data on a yearly basis.

The greatest challenge associated with project sustainability is maintaining the involvement of the fellows. Again, AACOM has experience in maintaining motivation among those who complete our fellowship programs, both through the Health Policy Fellowship Alumni Program and the National Association of Osteopathic Medical Educators (NAOME). NAOME maintains active involvement of their fellows through mentoring programs, continuous professional development, and a re-application process. This same approach would be applied to the Resilient Mindsets in Medicine Fellows.

**ORGANIZATIONAL INFORMATION, RESOURCES, AND CAPABILITIES**

(a) **ORGANIZATIONAL CAPACITY**

AACOM leads and advocates for the full continuum of Osteopathic Medical Education (OME) to improve the health of the public. Founded in 1898 to support and assist the nation's osteopathic medical schools, AACOM represents all 37 accredited colleges of osteopathic medicine—educating nearly 31,000 future physicians, 25 percent of all U.S. medical students—at 58 teaching locations in 33 U.S. states, as well as osteopathic graduate medical education professionals and trainees at U.S. medical centers, hospitals, clinics, and health systems. AACOM’s 2020-2022 strategic plan specifically identifies the wellbeing of the osteopathic medical workforce, including students, residents, faculty, and leaders, as one of our three 10-year inspired goals, approved by our Board of Deans. AACOM is committed to building innovative and systematic approaches with our research partners and network of members colleges to improve physician and patient outcomes in rural and underserved communities.

Osteopathic medicine plays an essential role in our nation’s healthcare delivery system and is a growing field. According to recent data, AACOM received more than 28,000 applicants to osteopathic medical school for the 2020-2021 application cycle, representing a 19.26 percent increase over the previous year. Osteopathic physicians focus on treating the whole person, and over half practice in the primary care specialties of family medicine, internal medicine, and pediatrics. Importantly, osteopathic medical students receive 200 hours of additional training in osteopathic manipulative treatment, a hands-on treatment used to diagnose and treat illness and injury, giving us a unique voice and perspective in the medical community.

OME also has a proven history of establishing educational programs for medical students and residents that target the healthcare needs of rural and underserved populations. With health disparities on the rise, and worsening because of the COVID-19 pandemic, we are proud to help make healthcare access more equitable for all of our country’s patients and communities. In fact, AACOM data show that 50 percent of incoming 2019-2020 osteopathic medical students plan to practice in a medically underserved or health shortage area; of those, 46 percent plan to practice in a rural community.

Per the 2022 (ranked in 2021) US News and World Report Medical School Rankings, AACOM member colleges of osteopathic medicine (COMs) are well represented in the primary care, rural,
and underserved practice categories, which are relevant to the purpose of Health and Public Safety Workforce Resiliency Training Program. Osteopathic medicine is rooted in primary care, and osteopathic medical students are taught through this lens, equipping them to care for patients as whole people. Many COMs are focused on improving healthcare access in rural and medically underserved communities and that commitment to primary care and access to healthcare is reflected in these rankings.

- **Nine COMs ranked in the top 10, and 12 in the top 20, for most graduates practicing primary care:**
  - #1 Midwestern University CCOM
  - #2 Pacific Northwest University of Health Sciences
  - #3 Western University of Health Sciences
  - #4 Des Moines University College of Osteopathic Medicine
  - #5 Kentucky College of Osteopathic Medicine at University of Pikeville
  - #6 A.T. Still University of Health Sciences- Kirksville
  - #7 Edward Via College of Osteopathic Medicine
  - #8 Touro University California
  - #9 Kansas City University of Medicine and Biosciences
  - #10 West Virginia School of Osteopathic Medicine
  - #11 A.T. Still University of Health Sciences- Mesa
  - #12 Nova Southeastern University Patel College of Osteopathic Medicine

- **Six COMs ranked in the top 10, and 10 in the top 20, for most graduates practicing in rural areas:**
  - #1 Kentucky College of Osteopathic Medicine at University of Pikeville
  - #2 William Carey University College of Osteopathic Medicine
  - #3 A.T. Still University of Health Sciences- Kirksville
  - #4 Des Moines University College of Osteopathic Medicine
  - #5 Rocky Vista University
  - #6 Oklahoma State University College of Osteopathic Medicine
  - #7 New England College of Osteopathic Medicine
  - #8 Missouri University of Science and Technology
  - #9 University of New England College of Osteopathic Medicine
  - #10 West Virginia School of Osteopathic Medicine
  - #11 Pacific Northwest University of Health Sciences

- **Four COMs ranked in the top 10 for most graduates practicing in medically underserved areas:**
  - #2 Pacific Northwest University of Health Sciences
  - #5 William Carey University College of Osteopathic Medicine
  - #6 Lincoln Memorial University DeBusk College of Osteopathic Medicine
  - #7 Oklahoma State University College of Osteopathic Medicine

(b) **ORGANIZATIONAL EXPERTISE**

AACOM is also an inaugural partner of the Interprofessional Education Collaborative (IPEC), which was formed to promote and encourage constituent efforts to advance interprofessional learning experiences to help prepare future health professionals for enhanced team-based care of
patients and improved population health outcomes. IPEC was founded by the Association of American Medical Colleges, American Dental Education Association, American Association of Colleges of Pharmacy, American Association of Colleges of Nursing, the Association of Schools of Public Health, and AACOM, and has developed a widely accepted set of competencies in interprofessional education.

The OME community is also on the front lines of the battle against COVID-19. Osteopathic medical educators and students are serving as first responders in medical facilities across the country and helping to treat COVID patients. To further engage medical and other health professions’ students in the pandemic response, AACOM is spearheading Students Assist America, an interprofessional collaborative of 11 associations representing academic health institutions across the country. Additionally, COMs have pivoted to safely adapt clinical education and training curricula to the COVID-impacted learning environment to safeguard the future physician workforce.

**SUPPORT REQUESTED: BUDGET AND BUDGET JUSTIFICATION**

Please see attached AACOM Budget Justification Narrative and Motivate Lab Subaward Budget Justification Narrative.

*(Bibliography & references cited are provided in Attachment 9)*