

Challenges, Opportunities, and Adaptations of a College Preparatory 4-H Youth Development Program during COVID-19

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Abstract

SARS-CoV-2 (COVID-19) has proliferated across the United States, and in the process, it has disrupted all sense of normalcy. Because adolescents are in a critical period for growth and development, youth are particularly susceptible to negative impacts of disruption from COVID-19. Therefore, sustaining youth development programs is essential to ensuring positive youth development occurs despite significant challenges. Unfortunately, the implementation of programs that maintain safety precautions can be challenging. Many programs have been forced to either cancel all activities or to transition program elements to a virtual format. Rural Medical and Science Scholars (RMSS) program administrative staff made the decision to transition to a virtual delivery. Despite only having a few weeks to reshape the program, RMSS administrative staff were able to innovatively adapt to new challenges in order to deliver a successful program. The success of the program extends beyond its participants. By understanding potential program barriers and successful adaptation methods, other youth development programs will be better equipped to sustain program activities and youth outreach during the COVID-19 pandemic.



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Ultimately, this will ensure negative developmental impacts of COVID-19 are lessened in adolescents and positive youth development is cultivated through program support, stability, and structure.

Key words: virtual program, program methods, COVID-19, program adaptation, positive youth development

Background

Rural Medical and Science Scholars Program History

As part of the Cooperative Extension Service founded in 1914, Mississippi State University (MSU) Extension Service has played an instrumental role in strengthening communities across Mississippi. MSU Extension has offered developmental opportunities and educational resources in the fields of agriculture and natural resources, family and consumer sciences (FCS), 4-H youth development, and community resource development ([CRD]; Sansing et al., 2019).

In order to address the most critical needs in Mississippi, many of the programs offered through MSU Extension have been carefully crafted to address a specific and current issue related to agriculture, health, youth development, and other topics. One perennial concern addressed by MSU Extension is the overwhelming need for more health care providers in rural areas. Unfortunately, Mississippi is one of the most medically underserved states in the country; in fact, evaluation of the state reveals Mississippi has the lowest physician per capita rate in the nation (Mississippi Academy of Family Physicians, 2017). The immense toll of the physician deficit can be seen in the rampant health disparities and yields negative health outcomes in Mississippi. To improve the overall health of Mississippians, additional health care providers and public health leaders are needed.

In an effort to address the physician deficit in Mississippi, MSU Extension began offering the Rural Medical and Science Scholars (RMSS) program in 1998. Since the program's inception, 459 students have participated in the program and have come from 70 of the state's 82 counties. Of the total participants, 63% are female and 27% represent minority groups (African Americans, Arab and other Middle Eastern Americans, Asian Americans, Latinos, Native Americans, and Native Hawaiians and other Pacific Islanders). Follow-up with participants indicates 13% have graduated from or are attending medical school and 6% currently practice in primary care. Additional confirmation indicates that 40% have pursued overtly health-related careers and approximately 70% have engaged in science-related careers. This program is helping to build the medical pipeline for ensuring a strong and passionate workforce for the long-term goals of improving Mississippi's economy and increasing access to health care.

The RMSS program is a 1-month 4-H youth development program that reaches rising high school seniors who show an interest in pursuing medicine or other medicine, education, technology, and science (METS) fields. The annual program admits RMSS scholars to MSU for one summer term, during which scholars earn health science college credits. Beyond coursework, the program also shapes students' interests and understanding of medical and science fields by offering shadowing experiences, exposure to METS disciplines, medical school tours, and health-related workshops.

Each academic, experimental learning, and peer engagement component of the RMSS program emphasizes the critical need for medical and science leaders in Mississippi. The state of Mississippi has experienced a severe shortage of health care workers for decades, especially in rural communities (Health Resources and Services Administration, 2021; County Health Rankings and Roadmaps, 2020). The COVID-19 pandemic exacerbated the need for health care workers in Mississippi, which demonstrates the strong need for health care workers in the state. In addition to serving as a pipeline for expanding the health care workforce in Mississippi, the RMSS program also seeks to strengthen, build, and empower scholars to be the change the state needs in regard to rural health care. The collective experiences in RMSS help scholars not only to determine if medicine or science is the correct career path but also to realize the potential each scholar has to play a role in reshaping the health and wellness of Mississippi. Ultimately, the program seeks to develop promising scholars into strong and passionate health advocates who will someday contribute to the long-term goal of improving Mississippi's overall health outcomes.

RMSS Response to the COVID-19 Pandemic

Beginning in 1998, the RMSS program was offered in person every summer. Planning for program delivery occurs in the 11 months leading up to the start of the program. Preparation for the 2020 RMSS program began in July 2019, and all decisions regarding the program were made with the assumption that a traditional delivery of the program would occur in June 2020. By mid-March 2020, the COVID-19 pandemic disrupted the lives of millions of people, including adolescents.

Youth have been impacted by infection, new regulations, loss of structure, and fewer developmental resources (Ettekal & Agans, 2020). It has been shown that adolescents possess an abundance of free time outside of school and sleep (Sliwa et al., 2022); how this time is spent greatly impacts the growth and development of youth (Mahoney et al., 2009). Research

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also indicates that positive youth development is supported and often facilitated by programs outside of school (Ettekal & Agans, 2020) due to their structured delivery methods (Larson, 2000). During the COVID-19 pandemic, adolescents have had greater availability of out-of-school time, and the programs available to youth during this time are essential to ensure positive youth development occurs despite challenging times. Consequently, the vulnerability of youth has increased due to the COVID-19 pandemic, which brought deep concern and uncertainty regarding the plans that had been made for the 2020 RMSS program.

With the world continuing to change due to COVID, the program needed to adapt to the increasing demand of virtual learning settings. As new technologies develop, the module of learning and teaching must change to keep up with the requirements of various types of students, learners, and instruction (Das et al., 2019). In making the decision to move the program completely virtual, there were many things to consider, including program adaptability. Would the students be able to adapt to the new virtual program? The RMSS administrative staff quickly responded to news of the COVID-19 pandemic. Staff members thoroughly examined all available COVID-19 information and safety precautions that had been released to the public. It became very apparent that a traditional delivery of the RMSS program would pose far too many risks to the health of scholars, staff, speakers, and families. Consequently, RMSS program leaders were faced with the decision of either cancelling the 2020 program or drastically altering its delivery method.

Though the novel coronavirus has disrupted all sense of normalcy, RMSS program leaders recognize that promoting positive youth development should not be halted due to difficult circumstances. The COVID-19 pandemic presents many new challenges to youth development programs, but it is imperative to sustain opportunities which provide structure, stability, and support to adolescents. Consequently, the RMSS staff chose to transition program delivery to a virtual format. With only a few weeks to prepare, this transition required drastic change and innovation. The purpose of this article is to outline the challenges, opportunities, and adaptations that helped make the first virtual delivery of the RMSS program a positive experience for youth. The students adapted well to the program. The course material and activities were well received by the students.

Adaptation Methods

Overall Program Structure

Transitioning the RMSS program to a virtual format required reimagining the basic structure of a program that had stood the test of time for over two decades. The traditional program setting is on the Mississippi State University campus where scholars attend lectures and workshops as part of for-credit college courses. Scholars live on campus in an MSU dorm room with an assigned roommate from the program. RMSS counselors live in the same dorm hall as scholars to promote support, relationships, and mentorship. Shadowing and professional school exposure traditionally occur off campus throughout Mississippi. Any needed supplies or program reminders are delivered directly to students in a face-to-face format, such as within lectures, group meetings, or counselor advising.

To ensure safety was not threatened during the COVID-19 pandemic, all components of the 2020 program were delivered virtually. The RMSS program utilized Zoom to facilitate virtual meetings for orientation, workshops, lectures, networking, and other needs. Each Zoom session was monitored by scholars for attendance and uninvited participants. RMSS scholars received a virtual roommate and networked via Zoom breakout rooms. RMSS administrative staff delivered all program supplies via mail. All materials were sent approximately a week before the scholar calendar called for specific items. One staff member was responsible for sending daily reminders outlining program information, needs, and expectations to ensure consistent communication.

The Introduction to Health Professions course occurred synchronously Monday through Thursday from 8 to 10 a.m., with tests every Friday. This course used Zoom and Canvas to communicate with scholars. This course exposes scholars to the many opportunities of health-related occupations, such as health insurance, nursing, and physical therapy. In addition to virtual class lectures, videos, and activities, the instructor invited different health professionals to share their experiences about their career path and field with the scholars. The scholars also had the opportunity to network with and ask guest speakers questions about their health-related field through virtual breakout rooms. Guest speakers included health professionals such as a mental health nurse, speech language pathologist, registered dietitian, environmental health safety officer, and veterinarian. This course also allowed students to dive deeper into the health care worker shortage in Mississippi and exposed scholars to the many health-related occupations within the medical field and outside the medical field.

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Furthermore, the Applied Public Health Sciences course was offered as a 3-credit-hour synchronous course and provided both lectures and experiential education opportunities in the form of distance-based seminars with a focus on public health approaches and research methodologies used to address the health of people in Mississippi, the United States, and the world. Lecture topics included how to access local health-related data, interprofessional connections in health care, how to shadow physicians (shadowing etiquette), and pandemic preparedness. Hands-on activities were feasible because the team mailed materials to participants, including things like suturing kits, food science supplies, and other tools. Tactile activities included suturing, engineering, nutrition, and food preparation. All activities were facilitated via Zoom, with lecturers demonstrating on their screen how to perform activities. Scholars wrote daily reflections and completed evaluations each day of activities. They also read and completed discussion board posts on *The Ghost Map*, which addresses John Snow's mapping of disease during the cholera epidemic in the 1800's. They were required to draw connections to contemporary public health challenges.

Social Networking and Connections

Historically, social networking among scholars, staff, and speakers is considered a program highlight by alumni of the program (Sansing et al., 2019). In fact, a key element of program staffing is the hiring of college-age staff that are RMSS alumni and/or have a passion for the program. The close age connection with the scholars helps develop the bonding experience that is essential for building relationships. In a traditional delivery method, these relationships form naturally as program participants spend abundant time together. Additionally, all scholars and staff are centralized in the same location with no outside distractions or responsibilities. A virtual youth development program amid a global pandemic undoubtedly faces new challenges for building relationships.

In preparation, RMSS staff members planned ahead for some of the challenges generally associated with virtual learning, such as digital literacy, technical issues, time management, and motivation. At orientation, RMSS staff members did a thorough overview of how to operate the tablets and navigate the applications used for learning (i.e., Zoom, Canvas, Microsoft Office). The staff members developed a plan that allowed scholars to participate from their local county Extension office should technical issues arise. Lastly, the RMSS staff and counselors consistently met with the scholars to keep the scholars on task and motivated.

While the RMSS staff was prepared for virtual learning challenges, several challenges became evident at the start of the virtual program. Scholars were initially hesitant to interact on screen

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with staff, speakers, or peers. This led to relationships budding at a slower pace. Additionally, many scholars had difficulty fully engaging in the program initially. This was due to scholars living at home with more distractions, responsibilities, and activities. Finally, staff members noted that scholars rarely initiated any conversation outside of program-specific questions. Due to the factors mentioned, staff members experienced difficulties building relationships during the start of the program.

RMSS staff members met at the end of the first week of the program to reflect and discuss initial challenges. After reflecting on the difficulty of relationship building, staff determined new, innovative approaches to promote social networking among scholars and staff. These approaches were implemented by staff in formal, structured settings (planned meetings, lectures, etc.) as well as informal, unstructured settings (group chats, social media, etc.). Throughout the program, staff continually adapted approaches to best serve scholars. For example, the counselors led virtual interactive activities to build relationships with the scholars. These activities included icebreakers, virtual dinners, and trivia nights. In addition to the virtual group activities, the counselors and apprentice intentionally reached out to each scholar for one-on-one conversations via FaceTime, text messaging, and social media messaging. These one-on-one conversations started out as general conversations that were tailored to meet the goals and career interests of each scholar. Connecting with the scholars was crucial for scholar performance. Additionally, communication skill-building activities helped foster relationships among scholars.

Communication Techniques

With any successful program, excellent communication sits at the intersection of program delivery, participant awareness, and youth development (Khan et al., 2017; Lutgen-Sandvik, 2010). In a virtual delivery method, communication is even more vital to ensure program success (Gray & DiLoreto, 2016). During program preparation, this knowledge played a significant role in the staff's decisions for the virtual program. At weekly staff meetings, RMSS leaders reflected on communication challenges and developed adaptations to address issues.

One challenge in the virtual program was ensuring that all scholars were informed and prepared for all program components. In comparison to the traditional delivery of the program in previous years, 2020 scholars had an enhanced dependence on staff members for thorough information and reminders. This was likely due to the nature of the program and its many moving parts; a virtual delivery challenges the program's cohesive transitions. Another

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significant communication barrier was ensuring scholars were fully engaged in virtual presentations. These challenges required great innovation, but adaptations proved effective.

To maintain effective communication throughout the virtual program, weekly staff meetings allowed staff to reflect on challenges and successes of the program. These meetings also allowed program modifications to occur simultaneously with program implementation. In addition to the weekly meetings, a GroupMe message group was used to enhance relationship building and communication. Two GroupMe message groups were created, one for the scholars, counselors, and apprentice and a separate group for scholars. The staff-only GroupMe was used to provide a resource for urgent and/or quick communication and enabled staff to bring attention to urgent issues and potentially plan an emergency Zoom meeting to address issues. The Scholar GroupMe was used to send reminders, offer scholar competitions, discuss general topics, and facilitate further conversations between scholars. GroupMe is a great tool for communication and relationship building. While staff members communicated with scholars through GroupMe and Zoom, instructors communicated with students mostly through Canvas, e-mail, and Zoom. Having different communication mediums allowed scholars to use a platform on which they felt most comfortable communicating with instructors and staff.

Experiential Workshops

One key feature of the RMSS program is the workshop component, which exposes scholars to health and METS disciplines. These workshops were integrated into a for-credit college course and served as a developmental component that enables scholars to develop knowledge and skills pertinent to future health and science leaders. Developing leadership and advocacy skills in adolescents is essential to addressing public health concerns; with support and empowerment, youth can contribute significantly to health advocacy in local communities (Toomey et al., 2018). Workshops also serve to enhance skills in empathy, career preparedness, cultural awareness, and other technical skills (Anderson et al., 2007; Layton et al., 2020; Smith & Soule, 2016). Sustaining these experiential workshops is vital to ensure positive youth development through engagement (Ettekal & Agans, 2020).

Transitioning interactive workshops to a virtual delivery presented many challenges. One significant barrier was ensuring that all scholars had materials and resources necessary to complete workshops. To address this, RMSS staff developed virtual toolkits that were sent to scholars via ground mail. These toolkits included any materials or instructions needed to engage in workshops. Traditionally, many activities required scholars to break into groups before

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rejoining a larger discussion; this was resolved by utilizing breakout rooms in Zoom. Finally, many workshops were innovatively adapted to fit into a virtual format.

Examples of virtual workshops included Scholars in the Kitchen, Interprofessional Web of Connections, Technical Skills Training, and Medical Exposure. For Scholars in the Kitchen, each scholar received a stipend to purchase groceries to cook a healthy and nutritious meal for his or her family through the Scholars in the Kitchen session. Traditionally, scholars see connections between health professionals by standing in a circle and tossing yarn as relationships are verbalized during the Interprofessional Web of Connections activity. To adapt this activity, a Google Drawing was created that included a circle of professionals. As scholars verbalized relationships on Zoom, scholars would insert a line on the drawing between professionals. Technical skills trainings, such as the virtual suturing lab activity, were provided to the scholars. A veterinarian who is a faculty member from the College of Veterinarian Medicine at Mississippi State University led a discussion on ONE health and trained scholars on proper suturing techniques during the virtual suturing lab. ONE health is a transdisciplinary approach that recognizes the close connection between human health and animal health and our shared environment (Centers for Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Disease, 2022). Students practiced suturing techniques using the sterilized suture tools on a large silicone suture pad included in the student toolkit. The veterinarian was able to provide enhanced views of her workspace to show students how to make correct sutures. Students learned several different suturing techniques such as continuous sutures, interrupted sutures, and purse-string sutures. The students were very engaged throughout the presentation, asking the veterinarian many questions. Instructions for each activity and workshop are available upon request to the corresponding author.

Students could not participate in the normal shadowing experience. Students were, however, required to attend a virtual presentation about shadowing etiquette to get the experience of what is involved in shadowing a health care professional. The presentation included basic knowledge about shadowing in a professional setting. To ensure scholars still received medical exposure in a virtual setting, a virtual medical simulation software was utilized. Scholars were able to respond to virtual simulations and make medical decisions to treat a virtual patient. Scholars received feedback following each simulation.

Promotion, Documentation, and Social Media

Media such as photography and videography plays a significant role in capturing annual RMSS programs. Media also serves to enable program promotion each year for scholar recruitment. In

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a traditional setting, program documentation occurs easily as photos and videos are taken of all scholars as various program components are completed. In a virtual setting, obtaining media presents a significant barrier. Not only are scholars not together physically, but scholars have varying resources to provide media content. Despite significant challenges, various methods were established to ensure photos and videos were obtained throughout the program. Two staff members were designated to oversee either photo or video submissions. Scholars were provided specific instructions for documenting the program and asked to submit two photos and two videos each week. A challenge was developed to encourage scholars to fully capture their experience. Scholar engagement was tracked by monitoring a number of media submissions and posts shared on Instagram. A prize was offered to the winner of the challenge. All of the submitted pictures and videos were used on social media throughout the program, as well as for the end of the program video. These pictures and videos will also be used to create future marketing materials.

Results

Scholar Participation

Despite significant challenges during the COVID-19 pandemic, the Rural Medical and Science Scholars program was able to successfully deliver a virtual program for 2020 scholars. Immediately after making the decision to move to a virtual delivery, RMSS staff contacted all program applicants regarding the decision. Additionally, news of the transition was announced via social media and on the program's website, interested individuals were encouraged to apply. Ultimately, 25 scholars were selected to participate in the program's first virtual delivery.

After the first 2 days, three scholars made the personal decision to withdraw from the program due to program requirements and personal situations while home during the COVID-19 pandemic. The remaining 22 scholars completed the program. Most students reported identifying as female (91%). This cohort of scholars was diverse with 50% identifying as Caucasian, 41% identifying as African American, 4.5% identifying as Asian, and 4.5% identifying as Pacific Islander. All scholars were rising seniors in high schools and reported a mean age of 17 years.

Successful Program Adaptations

The theory of reasoned action/planned behavior (TRA/TPB) has been utilized as a useful model for organizing and explaining components of RMSS development, evaluation, and refinement over the course of the program (Ajzen & Driver, 1991). The RMSS program design is

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intentionally structured realizing that scholars' knowledge, learned attitudes, beliefs, and aspirations can change through instilling a positive attitude toward health and science careers. The TRA/TPB model supports the theory that attitudes drive intent, and intent is believed to drive behavior. In addition, the ecological systems theory was applied to the virtual delivery model and is grounded in two key concepts: (a) multiple levels of influence related to behavior and (b) social environment (reciprocal causation) connected to individual behavior. The virtual environment adds a more complex and challenging concept with a multidimensional design related to program delivery. Thus, communication techniques, simulations, virtual tours, social networking and team building, remote living, coursework, and orientation components impact intent and drive behavior. Likewise, reciprocal causation suggests that people both influence and are influenced by those around them (Glanz & Rimer, 2005).

RMSS program staff remained flexible throughout the program and continually evaluated the program. All scholars evaluated program experience positively and reported significant growth in leadership, public health knowledge, soft skills, and passion, ascertained from program evaluations. Future reports will include findings from program evaluations. Program reflection was made by reviewing scholar feedback on questionnaires and by discussing program challenges and successes at weekly staff meetings. When barriers were identified, staff innovatively constructed methods to adapt program delivery the following week. Significant growth was seen in the virtual delivery of the program due to constant adaptations. Though different, the virtual RMSS program presented new opportunities to serve as a pioneer in virtual youth development programs and to promote positive youth development during a global pandemic. The overall program changes are summarized in Table 1.

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Table 1. Comparison of Delivery Approaches

Traditional face-to-face program		2020 virtual program	
Category	Description	Category	Description
Theoretical models for development	The theory of reasoned action/planned behavior (TRA/TPB) helps program staff understand the connections between beliefs, attitudes, intentions, and behaviors. Applying the theory helps staff understand the changes in knowledge that occur in the program and helps promote positive attitudes and behaviors.	Theoretical models for development	In addition to the TRA/TPB theory, the ecological systems theory was identified and applied to help program leaders understand the multifaceted nature of scholars' experience in a virtual program due to other factors impacting scholars' engagement in the program (Ettekal & Agans, 2020).
Program directors	Directors interact with students at orientation, workshops, and group meetings. Directors oversee program and deliver in-person instructions.	Program directors	Directors managed program components, provided information via email and/or Zoom meetings, and attended virtual meetings to engage with scholars.
RMSS counselors and tutors	One female and one male counselor are selected to live in the dorm with scholars for mentorship. Selected tutors also facilitate mandatory study sessions.	RMSS counselors	One female and one male counselor served as virtual counselors. Counselors provided optional Zoom study sessions, built relationships via Zoom networking sessions, provided further mentorship and support via individual communication, and were integral to providing helpful feedback per class assignments.
RMSS apprentice	MSU Extension apprentice works with RMSS program in an administrative role to oversee basic organization of program components.	RMSS apprentice	MSU Extension apprentice worked with RMSS program in a traditional administrative role and expanded role to supporting, mentoring, and advising scholars, and assisting counselors.
On-campus living	Scholars live on campus in a dorm room during weekdays and return home on weekends. Scholars live with an assigned roommate from RMSS.	Living remotely	Scholars completed virtual program from their usual living arrangements. Scholars had a virtual roommate to interact with via Zoom breakout rooms and provided phone numbers.

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Table 1. (continued)

Traditional face-to-face program		2020 virtual program	
Category	Description	Category	Description
Orientation	Scholars attend a half-day orientation session which includes program introduction & overview, study skills workshop, getting-to-know-you relationship-building activity with program staff, staff and scholar dinner, scavenger hunt to familiarize students to campus.	Orientation	Scholars attended an afternoon 3 hour zoom session focused on introduction & program orientation, study skills in online environment, online etiquette, technology tips, and concluded in an evening session with getting-to-know-you session with counselors/scholars.
Academic coursework	Scholars complete health science college courses on MSU’s campus. Scholars engage in interactive workshops with face-to-face support.	Academic coursework	Scholars completed MSU online courses via Canvas and Zoom. Workshops were altered to support a virtual delivery via altered instruction methods and mailed toolkits including textbooks, iPads, keyboards, program incentives and materials per MSU targeted recruitment efforts.
Shadowing experiences	Scholars travel throughout the state of Mississippi to shadow primary-care physicians and some specialty physicians. Scholars receive 12-15 shadowing hours. Reflections are submitted per each shadowing experience.	Medical simulations	Scholars completed medical simulations via Oxford Medical Simulation software. A variety of physician Q&A sessions were held in the Zoom platform. Reflections are submitted per each session.
Junior Master Wellness Volunteers (JMWW)	Scholars receive JMWW training which develops leadership, service, and advocacy skills. To receive certification, 24 hours of service must be completed. Scholars discuss service ideas. Scholars are connected to Extension agents in respective counties for mentorship and assistance with community service projects.	Junior Master Wellness Volunteers	Scholars received the traditional JMWW training introduction via Zoom. In addition, special emphasis was placed on brainstorming ideas for service opportunities during COVID-19 regulations, which helped build scholar leadership despite circumstances. Scholars were connected to Extension agents in respective counties for mentorship and assistance with community service projects.

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Table 1. (continued)

Traditional face-to-face program		2020 virtual program	
Category	Description	Category	Description
Academic medical center visit	Scholars travel to UMMC School of Medicine to learn about the admissions process and the path to becoming a physician.	Virtual tour with UMMC admissions	Scholars met with UMMC Admissions representatives via Zoom to discuss admissions requirements and the path to become a physician.
Relationship building/social networking	Scholars interact in dorm halls and program events. Orientation strategically features activities to promote group bonding. Scholars and staff utilize phone numbers and social media to stay connected.	Relationship building/social networking	Scholars utilize GroupMe for group chats not only to receive reminders but also to facilitate relationship growth. Special Zoom meetings, scholar competitions, and conversation prompts were utilized to enhance relationships.
Media	Staff take photos/videos throughout the program to document activities. A group photo is taken on MSU's campus.	Media	Scholars submitted photos/videos to fulfill weekly requirements and to compete in the Social Media Challenge. A composite photo was made of individual photo submissions.
Reflection and evaluations	Scholars complete questionnaires throughout the program to evaluate program experiences and growth. Scholars reflect via papers and communication at the end-of-program event.	Reflection and evaluations	Scholars received access to Qualtrics questionnaires via links and QR codes. Reflection was encouraged via workshop discussion boards. Scholars also had the opportunity to reflect at the virtual end-of-program event.
Communication	Instructors and staff communicate with scholars via daily face-to-face interaction and GroupMe. Instructors and staff had weekly face-to-face meetings to ensure the program was operating appropriately.	Communication	Instructors and staff communicate with scholars via zoom, GroupMe, e-mail, social media platforms, and Canvas. Staff met weekly via zoom.

Discussion and Conclusions

The COVID-19 pandemic brought many unforeseen challenges to the 2020 Rural Medical and Science Scholars program. Many of the students in this program had been introduced to school and other activities in a virtual setting. This helped with the attitude and skills they were able to bring to the program from the beginning. Some students possess some personal characteristics, such as organization skills, self-awareness, and adaptability, which contribute to their success in an online or virtual environment (Kalman et al., 2020). Helping students feel comfortable in their environment also helps them adapt to their surroundings in the virtual setting. By incorporating team-building activities, we found that students became more comfortable in the program.

Despite these challenges, the 2020 program was successfully delivered in a virtual format. The successful transition can be accredited to significant flexibility and innovation throughout the program. Though different, the 2020 RMSS program offered new opportunities and experiences for scholars. Amid the COVID-19 pandemic, the program was able to offer support and structure to the lives of 22 adolescents. After completing the 2020 program, scholars completed a final questionnaire.

The primary form of evaluation for this program is its outcomes and impacts. Responses indicate that all 22 students (100%) plan to attend college and 18 (81.82%) have plans to attend medical school, 3 students (13.64%) are undecided and 1 (4.55%) plans another career path. Thirteen students answered the question, "Would you be interested in working in a rural area as a health care provider in the future?", 12 (92.31%) responded "yes" and one (7.69%) responded "no." We failed to include "undecided" as an option, but obviously the nine students who did not answer were unsure. When asked their top three selections for types of health care professional, most included family practice, pediatrician, and "other specialty." Consistently, when asked about their favorite part of the RMSS program, scholars responded with the relationships they developed and their ability to network with counselors, scholars, and faculty, in addition to learning about the many opportunities in health- or science-related careers and finding clarity and passion for a career choice. It has been a past norm that scholars stay connected with their counselors after the program ends for the purpose of mentoring and friendship, a very valuable component of the program. Intentional gatherings for study sessions using breakout rooms were a plus. The counselor/networking sessions provided time for building relationships with focused team-building activities. Additionally, being able to FaceTime, text, and use other social media platforms such as GroupMe and Instagram were added components to increasing social connections.

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Consistently, responses indicated that the teaching/methods experiences that best helped students learn material virtually included

- discussion boards,
- guest health care speakers,
- presentation slides and notes, and
- hands on workshops.

The feedback per positive aspects to a virtual delivery of the program included

- no commute time,
- comfort of own home,
- flexibility for engagement with other activities,
- increased knowledge of technology,
- ability to spend time with family and complete work on own time,
- protection from the virus, and
- learning more about responsibility and independence.

Improvements and lessons learned include

- Reduce class time on zoom, if possible, incorporate podcast for audio/video mini-lectures.
- Create personal connection to instructors and students with introductory videos.
- Bring in guest speakers with real life experiences.
- Build engaging and interactive discussion board activities.
- Utilize various platforms for interaction like video chat for instructor/student question sessions if individual mentoring/instruction is needed.
- Incorporate Google platform and support use of google software tools.
- Design courses that incorporate all learning styles which helps boost learner autonomy.

Staff reflection of the 2020 program revealed unanimous support of the decision to move the 2020 program online. Despite barriers, staff members saw the extreme impact the program had to promote positive youth development in an environment that has halted many youth opportunities. Though the program varied from a traditional delivery, RMSS staff witnessed immense growth in 2020 scholars. Ultimately, scholars left the 2020 program with the same passions and increased knowledge that previous alumni have reported: 2020 scholars had a better understanding of Mississippi's critical needs, the endless options in health care, the importance of public health advocacy, and many other vital characteristics of future leaders.

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The successful transition of the 2020 Rural Medical and Science Scholars Program had tremendous impact on 22 scholars from across Mississippi, but the impact of the 2020 program extends beyond program participants. The methods that were used to adapt interactive activities, relationship building, and other program components have the potential to aid other programs in successful transitions to a virtual delivery method. In a time of uncertainty, youth development programs are more important than ever before. By understanding potential challenges and general adaptation methods, other essential programs can sustain opportunities and promote positive youth development.

Supporting and incorporating flexible, engaging, and varied pathways for exploration and learning is paramount for building the pipeline for our next generation of students that have an interest in health or science-based careers. The Rural Medical & Science Scholars program is exploring new landscapes and expanding horizons for the long-term goals of improving Mississippi's economy, increasing access to health care, and ensuring a strong and passionate workforce. Bottom line: the long-term impact = improved access to health care + economic improvement.

Acknowledgements

The 2020 virtual Rural Medical and Science Scholars program would not have been possible without the support of many individuals. The program would like to thank all sponsors for their financial contributions which aided in program delivery and scholar participation. Additionally, the program would not have been possible without the support of the previous head of the Department of Food Science, Nutrition, and Health Promotion, Dr. Will Evans, the current head of the Department of Food Science, Nutrition, and Health Promotion, Dr. Ashli Brown, and program staff Reagan Moak, Makenzie Phillips, and Tyler Wilson.

References

- Ajzen, I., & Driver, B. L. (1991). Prediction of leisure participation from behavioral, normative, and control beliefs: an application of the theory of planned behavior. *Leisure Science, 13*(3), 185–204. <https://doi.org/10.1080/01490409109513137>
- Anderson, S. A., Sabatelli, R. M., & Trachtenberg, J. (2007). Evaluation of youth leadership training programs. *Journal of Youth Development, 1*(3).
- Centers for Disease Control and Prevention, National Center for Emerging and Zoonotic Infectious Diseases. (2022). *What is one health?* <https://www.cdc.gov/onehealth/basics/index.html>

Challenges, Opportunities, and Adaptations

- County Health Rankings & Roadmaps. (2020). *Primary care physicians*.
<https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model/health-factors/clinical-care/access-to-care/primary-care-physicians>
- Das, N., Khawandiza, S., Sawar, B., Ahmed, A., & Hassan, S. (2019). Technology-embedded educational policy: Mediation effects of the use of virtual learning influence on leader satisfaction. *Journal of Education and Training*, 6(1).
<https://www.macrothink.org/journal/index.php/jet/article/view/13856>
- Ettekal, A. V., & Agans, J. P. (2020). Positive youth development through leisure: Confronting the COVID-19 pandemic. *Journal of Youth Development*, 15(2), 1–20. <https://doi.org/10.5195/jyd.2020.962>
- Glanz, K., & Rimer, B. (2005). *Theory at a glance: A guide of health promotion practice* (NIH Pub. No. 05-3896). National Cancer Institute, National Institutes of Health, U.S. Department of Health and Human Services.
- Gray, J. A., & DiLoreto, M. (2016), The effects of student engagement, student satisfaction, and perceived learning in online learning environments. *International Journal of Educational Leadership Preparation* , 11(1), n1.
- Health Resources & Services Administration. (2021). *Health professional shortage areas: Mental health, by county, 2021 – Mississippi*. <https://www.ruralhealthinfo.org/charts/7?state=MS>
- Kalman, R., Esparza, M., & Weston, C. (2020). Student views of the online learning process during the COVID-19 pandemic: A comparison of upper-level and entry-level undergraduate perspectives. *Journal of Chemical Education*, 97(9), 3353–3357. <https://doi.org/10.1021/acs.jchemed.0c00712>
- Khan, A., Khan, S., Zia-Ul-Islam, S., & Khan, M. (2017). Communication skills of a teacher and its role in the development of the students' academic success. *Journal of Education and Practice*, 8(1), 18–21.
- Larson, R. W. (2000). Toward a psychology of positive youth development. *American Psychologist*, 55(1), 170–183. <https://doi.org/10.1037/0003-066X.55.1.170>
- Layton, R. L., Solberg, V., Jahangir, A. E., Hall, J. D., Ponder, C. A., Micoli, K. J., & Vanderford, N. L. (2020). Career planning courses increase career readiness of graduate and postdoctoral trainees. *F1000Research*, 9, 1230. <https://doi.org/10.12688/f1000research.26025.1>
- Lutgen-Sandvik, P. (2010), *Destructive organizational communication: Processes, consequences, and constructive ways of organizing*. Routledge.
- Mahoney, J. L., Vandell, D. L., Simpkins, S., & Zarrett, N. (2009). Adolescent out-of-school activities. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology: Contextual influences on adolescent development* (pp. 228–269). Wiley & Sons.
<https://doi.org/10.1002/9780470479193.adlpsy002008>
- Mississippi Academy of Family Physicians. (2017, May 9). *Office of Mississippi Physician Workforce*.
<https://www.msafp.org/workforce/office-of-ms-physician-workforce/>

Challenges, Opportunities, and Adaptations

- Sansing, A., Buys, D. R., Evans, M. W., Downey, L., & Harris-Speight, J. (2019). Rural Medical Scholars Program: Filling the gap for health-care and public health leaders in Mississippi. *Journal of Public Health in the Deep South*, 1(1).
- Sliwa, S. A., Lee, S. M., Gover, L. E., & Morris, D. D. (2022). Out of school time providers innovate to support school-aged children during the COVID-19 pandemic. *Preventing Chronic Disease: Public Health Research, Practice, and Policy*, 19. <http://dx.doi.org/10.5888/pcd19.210347>
- Smith, J., & Soule, K. E. (2016). Incorporating cultural competence and youth program volunteers: A literature review. *Journal of Youth Development*, 11(1). <https://doi.org/10.5195/jyd.2016.431>
- Toomey, M., Smathers, C., Iaccopucci, A. M., Johnston, K., & Johannes, E. (2018). Youth workers' role in engaging youth in health advocacy for community-level change. *Journal of Youth Development*, 13(3), 12–23. <https://doi.org/10.5195/jyd.2018.668>