Rural Medical Scholars Programs
University of Alabama –Tuscaloosa
Program Review

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Review Date: May 4th, 20 12

Present:	**Cathy Fuller**	**Chair, Special Programs Sub-committee**
	Peter Smith	**Special Programs Sub-committee**
	Marjorie Lee White	**Special Programs Sub-committee**
	John Wheat	**Director, RMSP**
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Review Process:

Special programs within UASOM are reviewed on the basis of a self-study conducted by the program directors with the aid of Undergraduate Medical Education (UME) and a face-to-face meeting between representatives of the Special Programs sub-committee of the MEC, program directors, and a representative from UME (i.e., the "Review Committee"). The final part of the review process is the drafting of the review report by the Special Programs committee representatives, which is then circulated to the Review Committee. Following any amendments and corrections the final report is presented to the MEC at the first available opportunity. Below is a summary of the face-to-face meeting, highlighting strengths and weaknesses of the program and identifying opportunities to enhance future success. This is followed by the detailed report, which provides the rationale for the recommendations and overall evaluation.

Rural Medical Scholars Programs
Goals

1. **Produce primary care physicians who are community health leaders for rural Alabama by recruiting and nurturing students who grew up in rural Alabama (Rural Medical Scholars Program).**
2. **Produce non-physician health professionals who are community health leaders for rural Alabama by recruiting and nurturing students who grew up in rural Alabama (Other Rural Scholars Programs).**

Summary

The Rural Medical Scholars Program (RMSP) and the related initiatives at the University of Alabama at Tuscaloosa have been very successful in achieving its primary goal to increase the number of students from predominantly rural communities who matriculate to UASOM and other medical schools and who then return as primary care physicians to rural Alabama. Since 1997, 108 out of 114 graduate students and 36 out of 40 undergraduates enrolled in the RMSP have matriculated into medical school. Thus, a total of 144 (93.5%) of 154 students enrolled in the RMSP have matriculated to medical school. Of these 144, 142 (98.6%) entered UASOM, and two entered osteopathic medical schools. The vast majority (62.6%) of these UASOM students who have had time to graduate (n=91) entered a primary care specialty, i.e., family medicine (45), internal medicine (5), or pediatrics (7). Four entered ob/gyn. As of February 2012, 54.5% of RMSP students who have completed training currently practice in a rural Alabama location, while 88.6% practice in Alabama. In contrast only 7.3% of non-RMSP students practice in a rural Alabama location. The purpose of this review therefore is to highlight points of strength that can be built upon, as well identifying areas that can be enhanced in order to further increase the success of the program.

Strengths:

The leadership of the RMSP and associated programs are a distinct strength. Their passion and commitment to rural medicine and the goals of the program are evident. Their efforts with the RMSP have resulted in the UASOM being ranked in Rural Medicine by *US News & World Reports* as #15 nationally in 2011 and #12 in 2012.

The Rural Health Leaders Pipeline model, in which high school students are identified and introduced to the health-related careers, is a distinct strength. The program has had good success in identifying students that progress to undergraduate college.

The program enjoys broad support in the legislature and from interested groups such as the agricultural community.

The Certificate in Rural Community Health is earned by all Rural Medical Scholars (graduate and undergraduate students) at completion of their pre-matriculation studies and by non-RMS graduate students in the associated Master's program. The certificate is an official qualification approved by the Board of Trustees, the UA President and Provost, and other stakeholders. This benefit to students makes the RMSP more attractive.

Considering the environmental (geographic and cultural) and academic stresses concomitant with preclinical sciences in Birmingham, the peer group support formed during the pre-matriculation year is a major strength in assisting Rural Medical Scholars during medical school.

It is a strength that Rural Medical Scholars graduate from medical school in four years at the same rate as do non-RMSs.

Another strength is the recent decision by the UASOM MEC that rural programs students should complete a rural scholarly activity and that an acting internship in rural

medicine could fulfill the requirements of the ambulatory care AI should promote continuing interaction with the rural programs throughout the four years of medical school.

Threats

Lower academic performance of rural students as compared to their non-rural peers is a continuing barrier to increasing the number of qualified rural students that enter the program and later matriculate to medical school.

There are insufficient focused academic support services during preclinical sciences for the Rural Medical Scholars and similar students, who experience academic difficulty during the pre-clinical years of medical school, with a statistically greater proportion failing modules, re-cycling a year, and gaining lower scores on USMLE Step 1 than many of their classmates.

Limitations in financial support for students in the pre-matriculation year and preparatory Master's program is a barrier to performance and, thus, to matriculation for students.

Only three out of nine competencies in the Rural Medicine Clerkship currently include "Rural" in the description. This is an important component in the track of study for RMSs and other Tuscaloosa-based students.

There is no clear line of faculty succession in terms of leadership of this program once the current director(s) and leadership team retire.

Continuation of funding over and above the state allocation in the current financial climate is a concern, as is scarcity of scholarship funds for the RMS's in the pre-matriculation year and for students in the associated Master's degree program.

The continued expansion of osteopathy schools may reduce the number of applicants to the RMSP and subsequently to UASOM.

Recommendations

Increasing the ability of students to score well on the MCAT and thus qualify for matriculation to UASOM should be considered. This could be achieved by providing for an intensive MCAT course (e.g., Kaplan, Princeton, or Flowers) that could be taken via on-line, video presentations, or via residential courses. This should be made available to RMSP students who have not yet achieved the required scores, as well as to those in the associated MS program. The availability of funds to support this potentially via scholarships should be investigated.

The possibility of expanding the current MS to include the option of a two-year program should be considered. This would allow for better preparation of selected students to deal with the first two years of medical school, by including more rigorous science courses focused on pre-clinical topics.

Strengthen interactions between Rural Medical Scholars and the RMSP personnel during the first two years of medical school, perhaps by requiring students to meet once a semester with representatives from the program to touch base over their progress in medical school, or by holding seminars at UASOM with a rural focus, such as a Rural Medicine interest group. This could also be an opportunity to increase participation of rural preceptors in these activities, perhaps by use of teleconferencing.

The RMSP Director should seek to strengthen the program's ability to provide financial assistance to rural pipeline students before matriculation and to assess and support RMSs in their social adaptations and academic performance during the pre-clinical years of medical school in order to decrease struggles with modules and USMLE Step 1 scores.

The Rural Medicine Clerkship is required of all students at the Tuscaloosa campus to introduce students to the rural context and population health principles in underserved populations and serves additionally to keep Rural Medical Scholars connected to their rural culture. The RMSP should work with the Rural Medicine Clerkship Director to begin to identify competencies that could further potentiate this experience as an essential component of the RMSs' track of rural medical education. Inclusion of the appropriate wording in the description of these competencies should help focus on the rural nature of the required competencies. The RMSP track should be coordinated throughout, pre-matriculation year through residency, to meet the goal set by the initiating Dean (Fallon), to maximize the rural medical education experience and to make efficient use of public resources.

The RMSP Director should pursue ways to achieve a better geographic distribution of graduates to also serve the more isolated rural areas whose populations are socioeconomically and educationally depressed; adaptation of the Masters in Rural Community Health should be considered for this purpose. Interdisciplinary or inter-professional programs of study might be considered.

The RMSP Director should initiate planning to achieve a succession of leadership for the program and to assure funding for enhancements to the program.

Report of RMSP Review Committee Meeting, May 4th, 2012

Rural Medical Scholars Programs
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History of the RMS Program at University of Alabama- Tuscaloosa

Forty percent of Alabama's population is rural, and virtually all of rural Alabama exists within the boundaries of Primary Care Health Professional Shortage Areas (HPSAs). The Rural Medical Scholars Program at the University of Alabama evolved out of an initiative to improve health care in rural Alabama by increasing the number of rural based physicians. The overarching concept is that students from rural communities are more likely to return to serve those communities as practicing physicians, if they are admitted and nurtured through medical school. The initial step was formation of a partnership between the Rural Alabama Health Alliance, the University Of Alabama College Of Community Health Sciences, and the University Of Alabama School Of Medicine. This partnership led to the formation in 1993 of the Rural Health Scholars Program (RHSP), a program targeted at identifying rising high school seniors who have an interest in careers in the field of health care. These students are involved in a summer session at UAT which involves various college level courses, along with seminars and field trips. This program enrolls approximately 25 students per year; since inception, 99% of these students have entered college, with 11% subsequently entering medical school programs. In 1996, the Rural Medical Scholars Program was initiated with a class of 10 students. This program recruits college students (rising seniors) or graduates who are interested in practicing rural medicine and who come from a rural Alabama background. This is a 5 year program encompassing a pre-matriculation year and 4 years of medical school at UASOM, dependent on achieving the requisite MCAT scores and performance at interview. The pre-matriculation year of study requires completion of courses specific to the program. Some of these courses may also contribute to an individual's course requirements for college graduation. For a few exceptional students, the pre-matriculation courses are completed during their senior year as undergraduates. Undergraduate senior students from outside UAT who have not completed their undergraduate degree may transfer to UAT for their senior year during which they complete their degree and take the relevant additional courses. Undergraduate Rural Medical Scholars who complete designated courses qualify for a Certificate in Rural Community Health in addition to their baccalaureate. RMSs who have completed their undergraduate degree may take the same courses for Master's level credit and the Certificate. Those post-baccalaureate students graduating from 1999-2005 obtained an MA in Health Studies; students graduating from 2005 onwards have graduated with an MS in General Studies in Human Environmental Sciences-Rural Community Health Specialization. This degree program is modeled after a rural public health curriculum. In 2005, the MS program was expanded to include students from outside the formal RMS program who were interested in rural health careers; these students are known as Rural Community Health Scholars, and many hope to gain entry to medical school.

In 2001 a new program, the Rural Minority Health Scholars Program (RMHSP), was introduced with the goal of increasing the recruitment of college-eligible rural minority students to health related careers. Between graduating high school and attending college, these students attend a summer session at UAT obtaining college credit and participating in field activities related to health careers. Thus, Rural Medicine programs associated with UAT include one high school program (RHSP), one college-level entry program specifically aimed at minority students (RMHSP), one Master's degree program focusing on rural community health (also known as Rural Community Health Scholars Program), and one Baccalaureate or Master's degree program with the provision of medical school admission (RMSP), thus forming a 5 year BS-MD or MS-MD program. Entrance into the RMSP is based on rural background, an MCAT of ≥ 24, and a GPA ≥

3.3, as well as an interview process conducted by UASOM Assistant Dean of Admissions revealing a commitment to rural medicine. Some students may enter the RMSP prior to taking or "passing" the MCAT, but entry to UASOM requires that an MCAT of ≥ 24 is achieved prior to matriculation. The overall goal has been to establish a pipeline starting at the high school level culminating in graduation from UASOM and return to rural Alabama for practice in Family Medicine, General Internal Medicine, or General Pediatrics.

Program Review

Rural Health Scholars Program/
Rural Minority Health Scholars Program

The Rural Health Scholars Program recruits rising high school seniors to a summer program consisting of seven hours of college level courses in Chemistry and Creative Writing, combined with seminars, and field trips. Since inauguration in 1993, 498 students have been enrolled as Rural Health Scholars. Of these, 98.7% have progressed to undergraduate school. Forty-three students (11%) have continued to medical school, so far. The vast majority of these students have attended UASOM; other schools attended include USA, Duke, Meharry, MUSC and Tulane. Three students attended osteopathic schools, while one student attended an off-shore medical school. Thirty-seven students entered other health-related professions, including Nursing, Pharmacy, Optometry, Dentistry, and Physical Therapy. 164 of the Rural Health Scholars have been minorities (African-American, 143; Hispanic, 4; Native American, 7; other, 10) and, of these, 10 entered UASOM while another 10 entered other medical schools.

In the case of the Rural Minority Health Scholars Program, rural minority high school graduates are recruited for a summer program including Introductory Biology, Health Disparities Seminar, field trips, and the additional requirement to shadow a health care provider in the week following the program. In all, 108 students have been enrolled (since 2001); of these, 107 progressed to undergraduate colleges. Ten students have entered medical school so far, with the majority attending USACOM; 2 students matriculated to UASOM, 1 to MUSC, while one student went to osteopathic school and 1 to an off-shore medical school.

Applications to these programs are considered from any high school student who fulfills the minimum requirements of having lived in rural Alabama for 8 years, a GPA ≥3.0 and an ACT ≥21. To date, high schools from 66 of 67 Alabama counties have had students participate in one or other or both of these programs. In addition, there are also various County Health Scholars in specific counties, comprised of 10th grade students with an interest in the health professions. These students work with local community hospitals and are exposed to health care and health care leadership in their communities.

One of the major determinants of success for students in these programs is a stable home background; students whose parents/role models/caregivers are professionals or have secure middle class employment, e.g. teachers, engineers and mill workers, are far more likely to succeed.

Rural Community Health Scholars Program

The Rural Community Health Scholars Program is a Master's degree program conducted by faculty of the UA College of Community Health Sciences in cooperation with the UA College of Human Environmental Sciences. The Rural Community Health Scholars Program recruits and nurtures students who grew up in rural Alabama, to produce health professionals who are community health leaders; others with an interest in rural community health have also been admitted. It provides students, especially minority students, opportunity to strengthen their preparation to enter medical school or other health professions. For enrollment in this MS program, a GPA of ≥3.0 is the sole academic requirement, supplemented by recommendations from their college faculty and interviews. Students who join the program following completion of their undergraduate degree take a total of 11 courses for 33 hours of credit. Five of the courses (15 hours) are required core courses, which earn the Certificate in Rural Community Health. Additional required courses include Advanced Nutrition, MCAT Preparation, and Stress Management. None of these courses are restricted only to members of this graduate program. Since 2006, 15 RCHSs have graduated with a MS specializing in Rural Community Health. Over 80% of students in the RCHSP come from schools other than UAT. Other schools with strong representation in the program include Alabama A&M, Stillman College, Tuskegee University, and UAB. Two of these graduates have entered medical school (one off shore), two entered Nursing, one entered a Physician Assistants program, one entered a Physical Therapy program, and one entered a Ph.D. program in Biology.

Rural Medical Scholars Program

A. Pre-matriculation Performance.

Rural Medical Scholars may be admitted as undergraduate college seniors or as college graduates, but either must complete virtually the same pre-matriculation curriculum to matriculate to the UASOM. Before matriculating to UASOM, the undergraduates earn the Certificate in Rural Community Health and Bachelor's degree, while graduates earn the certificate and a Master's degree focusing on Rural Community Health. The program recruits rural Alabama students who attend or attended college campuses across Alabama and elsewhere. To date, twenty-five colleges have been represented among RMSs. Forty-five percent (45%) of RMSs attended UAT. UAB, Auburn and Birmingham Southern supply an additional 32%. Prior participation in the high school or other preliminary pipeline program is not a pre-requisite for recruitment into the RMSP, but is a positive factor. Enrollment into the program requires that each student has lived in rural Alabama for at least 8 years, an MCAT of ≥ 24, and a GPA ≥ 3.3, as well as an interview revealing a commitment to rural medicine. Some students may enter the RMSP "provisionally" prior to taking or "passing" the MCAT, but entry to UASOM requires that an MCAT of ≥ 24 is achieved prior to matriculation. Interviews are conducted at UAT under the direction of the UASOM Assistant Dean for Admissions, and students have three interviews with representatives from the RMSP Admissions Subcommittee, which is composed of practicing rural physicians, minority health professionals, and faculty.

During the pre-matriculation year, students recruited to the RMSP take courses designed to create a supportive peer group and to prepare them for both matriculation into medical school and for rural community health leadership. The courses range from

basic science (Fundamentals of Biochemistry and Clinical Correlations of Biochemistry) though courses that require visiting with rural community health professionals (Community Clinical Process) and a project or research experience designed to evaluate the student's mastery of concepts and skills required of rural community health. A total of 30 hours of credit via 10 courses are required for the Master's specializing in Rural Community Health, of which five are required for the 15-hour Certificate in Rural Community Health. Four of these courses are restricted to members of the RMSP. For the undergraduates, some of these courses can count towards the completion of the Bachelor's degree. The RMSP tailors course requirements for students who have already taken courses deemed to be equivalent or identical to those offered by substituting others. A grade of B or higher in all courses is required to complete the program.

It should be noted that the Rural Medical Scholars pay regular UAT tuition rates for the pre-matriculation year, whether finishing the undergraduate degree or competing the Master's program, as do Rural Community Health Scholars in the Master's program, although they are eligible for financial aid. However, the additional financial burden is an obstacle for some students, and it would be helpful if the pre-matriculation year could be covered by scholarship, and although there is a risk of students not carrying through to medical school, this is rather low judging by the data shown below.

Another possibility raised at the meeting was creating an option in the pre-matriculation year for a more inter-disciplinary 2 year program, with additional courses in, for example, Pharmacology, Immunology and Genetics, enhancing the chance of student success at preclinical sciences and Step 1, and leading to an MS/MPH degree with options to continue health professional training among various participating disciplines.

The RMSP at Tuscaloosa has been successful in identifying and recruiting students who subsequently matriculate to medical school. Since 1997, 108 out of 114 Rural Medical Scholar graduate students and 36 out of 40 undergraduates have matriculated into medical school. Thus, a total of 144 (93.5%) of 154 students enrolled in the RMSP have matriculated to medical school. Of these 144, 142 (98.6%) entered UASOM, and two entered osteopathic medical schools.

Of the total of 154 participants in the RMSP 9 are African American (5.8%), 2 are Native American, and 4 of other ethnicity. Six (6) of the 9 African American RMSs entered UASOM, while 3 did not enter medical school.

In the case of the Rural Community Health Scholars Program, i.e. the MS program designed largely to promote access to health professional programs for rural minority students possessing the Bachelor's degree, out of 23 students since 2005, 20 were African-American, while 1 was of other ethnicity. From this program, 1 student matriculated to UASOM, 1 to a DO program, 1 to an off-shore medical school, 2 to Ph.D. or doctorate programs (Biology and Physical Therapy), 1 to a Physician Assistant's program, and 2 to accelerated Nursing programs. Ways to increase the number of students from this graduate program who successfully matriculate to medical school should be investigated.

Despite the overall success of the program, it is clear from the data that the greatest drop-off in student numbers occurs between college graduation and matriculation to medical school; whereas nearly 99% of students in the high school program go on to

college, only 11% of those students finally get accepted to medical school. While several factors may play into this, not the least of which is adjustment in student interests and goals while going through the process of higher education, one major barrier, especially for students from the most underserved rural areas, is the UASOM requirement for an MCAT score ≥ 24. Clearly more students from these underserved areas could successfully matriculate into medical school with lower MCATs, and evidence obtained from AAMC and provided by the RMSP directors shows that students at other schools can be successful with MCATs as low as 15-17 and GPA≥3.0. This barrier is also recognized by the students themselves, who comment that the MCAT was the greatest hurdle to overcome in the process of matriculating into medical school. It is also clear that many potentially excellent rural candidates are lost due to low MCAT scores. However, data from the AAMC as well as UASOM experience show that students with MCAT scores at the lower end of the acceptable range are more likely to experience academic difficulty during the course of study, and in particular experience lower success rates on first take of the USMLE Step 1 examination. (However, the success rate equalizes with that of non-RMS peers after the second take, and no Rural Medical Scholar matriculating with lower range MCAT scores has been dismissed from medical school because of USMLE Step I failure.) Furthermore, these students require significant academic and social support as they transit preclinical sciences in medical school. It may therefore be beneficial to extend and focus the MCAT preparation course taken as part of the MS program and potentially open this course to those in the undergraduate program, as well as increase availability of academic and social support capabilities while completing preclinical courses. However, it would not be desirable or appropriate for the pre-matriculation year to develop solely into an MCAT preparation course. There is also a potential issue with applicants who are not oriented to rural primary care and with low MCATs seeking to exploit the rural program as an alternate entry point to medical school.

B. Performance in Medical School

Matriculation Data. The data show that the entrance MCATs of UASOM students in the rural programs are significantly (<0.001) lower than those students not in the rural program, with averages of 25.5 and 30, respectively. (This difference results from the program's design to select students from rural areas and with rural identities and intentions predictive of future practice of rural primary care, especially Family Medicine.) In individual MCAT categories, the greatest differences are in Biological and Physical sciences; differences in the verbal portion of the MCAT, while still significant, are less marked. This difference is maintained at the GPA level; rural students have an average GPA on matriculation of 3.56, whereas non-rural student GPA averages 3.7. There is no significant gender or minority difference between rural students and the non-rural student population at UASOM. It is also possible for students to join the RMS program once admitted to UASOM via the traditional route.

Of the 171 in-state students admitted to UASOM in 2011, 68 came from counties designated as Health Professional Shortage Areas. Eight non-urban counties were represented by Rural Medical Scholars; however, 32 non-urban counties of Alabama had no medical student among those admitted.

Pre-Clinical Performance. In general, Rural Medical Scholars perform significantly ($p<.05$) lower in the pre-clinical modules at UASOM as compared to their non-rural program colleagues. The mean module score for non-rural students is 88.8 as

compared to 85.5 for Rural Medical Scholars (data since inception of new curriculum, covering the period of 2007-2011). All students seem to perform better in Endocrinology and Reproductive modules than in the other pre-clinical modules, and the difference between RMSs and non-rural program peers is less pronounced, though still significant (e.g., 88.9 vs. 91.2, p=.037 for Endocrinology). However, some individual Rural Medical Scholars did extremely well in the pre-clinical years, as evidenced by the maximum scores for modules obtained by some of them. Module failure rates were also higher for Rural Medical Scholars; while there was no difference in the percentage of students failing 1 module between the two groups (5.7% vs. 3.8%, p=.254), more Rural Medical Scholars failed two or more modules as compared to the rest of the class (9.3% vs. 2.5%, p<.001). Broken down temporally, between 1997 and 2006 (before the new curriculum), 6.7% of the rural students failed >1 module as compared to 2.8% of the rest of the class (p=.051). Since the introduction of the new curriculum in 2007, this failure rate has increased for the Rural Medical Scholars (14% failed >1 module), whereas it has dropped slightly for the non-rural program students (1.8% failed >1 module), p<.001. This difference may be due to the lack of re-iteration of key concepts under the new curriculum as compared to the previous discipline-based curriculum where basic sciences were re-visited during the pathology component of the course.

As predicted, the difference in MCAT and module performance translated to the Step 1 success rate; the average first attempt Step 1 failure rate (cumulative from 1997-2011) for Rural Medical Scholars was 23.5%, as compared with 5.8% for the rest of the class, p<.001. The failure rate at Step 1 for both groups of students increased following transition to the new curriculum, but not significantly. Non-rural program students saw the failure rate increase from 5.5% between 1997-2006 to 6.7% between 2007 and 2011, (p=.374); Rural Medical Scholars' failure rate increased from 20% between 1996-2006 to 33.3% between 2007 and 2011, (p=.201). However, cumulative failure rates for second through fourth attempts at Step 1 were no different for the RMSP students and non-rural students; e.g., with two attempts 3.5% of RMSs vs. 2% of non-rural students failed Step 1 (p=.290). Concomitantly, first attempt pass rates for Step 1 were significantly higher for non-rural program students as opposed to Rural Medical Scholars between 1996 and 2011 (94.2% vs. 76.5%, p<.001). However, the cumulative pass rates equalized after two attempts (98% vs. 96.5%, p=.290); 99% of students from both groups passed Step 1 following 3 attempts, and essentially all students (rural and non-rural) passed Step 1 following 4 attempts. The mean Step 1 score from 1996-2011 was 219 for non-rural and 202 for rural students, with no significant impact on the scores by the transition from the old to the new curriculum for either group. Significantly, since the beginning of the program in 1996, no Rural Medical Scholar has been dismissed from school as a result of USMLE Step 1 failure.

One suggestion that came from the meeting was that, if a program were adopted to allow selected students with even lower MCAT scores to enter the program, students who could not pass Step 1 (within the three attempts allotted) could transfer to a related course of study such as Nursing, Physician's Assistant, Physical Therapy, Public Health, or Pharmacy. This would require a more interdisciplinary course of study leading to Step 1 than is current, as well as requiring agreement from other professional schools on campus or serving rural Alabama.

Scholarly Activity and Special Topics. Although all students are required to complete some form of scholarly activity during their 4 years at UASOM, Rural Medical Scholars

have recently been required to take part in scholarly activities that have a rural focus, although these opportunities are available to all students. Recent Scholarly Activity projects have included "Rural General Surgery: Should It be Incentivized?" "Cancer and the Rural Family," and "Agromedicine in the Deep South". In addition, the "Rural Medical Scholar Experience" is a Special Topic course in which a student spends time with a primary care physician practicing in rural Alabama. Currently half of the Rural Medical Scholars avail themselves of these opportunities. It is likely that the recent approval by the MEC, e.g. that specific courses aimed at rural programs students should be overseen by the rural programs, will increase the number of Rural Medical Scholars taking part in these activities. Research and experience validates the importance of maintaining a central focus for rural medicine throughout rural track students' 4 year tenure at UASOM.

Rural Medicine and Family Medicine Clerkships. Though not the focus of this review, the Rural Medicine and Family Medicine clerkships form an integral component of the rural medical education track for Rural Medical Scholars. Rural Medicine introduces important principles of population health care that underpin current primary care policies for underserved populations. The Family Medicine clerkship introduces the practice of Family Medicine in the rural context. All students on the Tuscaloosa branch campus, including Rural Medical Scholars, are required to complete the Rural Medicine Clerkship, which is conducted in parallel with the Family Medicine Clerkship over an eight-week period in rural Alabama. In this concomitant clerkship experience students are assigned to rural physician/family medicine preceptors dispersed throughout rural Alabama. This eight-week block is split longitudinally into two parts-- half the time is a traditional Family Medicine clerkship, albeit located in a rural setting, and the other half is rural Community Medicine guided by both the local preceptor and a faculty member of the Department of Community and Rural Medicine. During the Rural Medicine Clerkship students are involved in on-campus seminars and a population health experience in independent study and service learning around a community health case.

Since 2005, 159 students have been placed in 36 different counties, with 59 preceptors. The students have to present a community health case based on their rural community medicine experience, and there are additional didactic lectures. The community health case involves the students doing a community based health assessment. Students are tasked with identifying a topic or concern of interest to the local community and preparing recommendations for the community to address this topic. Information is gathered from interviews with a wide variety of individuals from the local community, ranging from health care providers, through religious leaders to local government officials and ordinary citizens, as well as from published sources. Projects have addressed a wide range of population health problems, e.g. domestic violence, obesity, Diabetes Mellitus, Hispanic worker health, hypertension, under-aged drinking, head lice, water quality, transportation, the working poor, teen pregnancy, methamphetamine addiction, to name a few. Students are also required to visit a farm and to perform an assessment of potential environmental and agricultural-related hazards observed. A faculty member visits the student in the community once, and weekly contact is required by phone, e-mail, or at seminar. Twice during the course of the clerkship the student gives a PowerPoint presentation from his/her community assessment to Community and Rural Medicine faculty and students. The first presentation is to update progress with the community assessment; the second is to present findings and recommendations related to the topic of community concern. Students are graded for their presentations and

quality of their written reports. Student feedback suggests that this clerkship is highly beneficial, with most students seeming to enjoy it and stressing the increased insight gained into the rural community. The clerkship is pass/fail, but quantitative scores are assigned based on student performance.

The Family Medicine Clerkship, which runs concomitantly, involves students precepting in the offices of a board certified rural family physicians and returning at intervals to campus to make a patient-based case presentation and attend didactic lectures. They are graded by the Family Medicine Department separately for this clerkship.

Students, in consultation with the directors and faculty of the Family Medicine and Rural Medicine clerkships, choose their rural placement from an approved list of preceptors. It was noted by Dr. Wheat at the meeting that preceptors are not in short supply and student placement would not be a limiting factor if there was an increase in the number of Rural Medical Scholars.

The recent decision by the UASOM MEC to require rural programs students to either complete a 2 week elective in Rural/Primary Care Medicine or a 4 week acting internship with a rural/primary care focus (that will fulfill requirements for the ambulatory care AI), as well as the decision to permit this to take place in facilities other than at UAB, is a positive move and should strengthen the ties of these students to the rural community.

Overall Clinical Performance. Once the USMLE Step 1 exam is completed, differences in performance between rural and non-rural students at UASOM are largely eradicated. An equivalent proportion of students appear to fail a single clerkship (1.1% of non-rural students, 1.7% of Rural Medical Scholars between 1997 and 2011), and no RMS failed more than 1 clerkship over the equivalent time frame (0.3% of non-rural students failed > 1 clerkship). There was no significant difference in percentage of Rural Medical Scholars and non-rural program students who failed the Step 2 exam on their first attempt (6.7% vs. 2.9%, p=.04), and no Rural Medical Scholars failed Step 2 on a second attempt, whereas the failure rate on second attempt for non-rural program students was 30.6%. Rural Step 2 total scores were a little lower at 215 for Rural Medical Scholars as compared to 227 for non-rural program peers. Also, there was no significant difference in the percentage of Rural Medical Scholars failing Step 2 CS (3.3%) as compared to non-rural program students (3.5%).

C. RMSP Medical Education Outcomes Data

Medical School Completion. The overall retention rate is 93.6% for Rural Medical Scholars and 96.6% for non-rural program students, not statistically different. A significantly greater number of Rural Medical Scholars than non-rural program students (8.6% vs. 2.6% since 1997) recycled a year or were dismissed from medical school (5% v. 0.9%). The greater proportion of these actions and larger differences with non-rural program students occurred since 2007. The most prominent underlying reason for this would appear to be academic difficulty; this has been a particular issue since the change in curriculum, with 28% of Rural Medical Scholars taking an academic leave of absence between 2007 and 2011, as compared to 6.7% under the previous discipline-based curriculum between 1997-2006. Figures for non-rural students were however steady at 3.5% over both time periods. Despite this, an equivalent percentage of students graduated in 4 years from both groups (89% for Rural Medical Scholars and 88.8% for non-rural program students between 1997 and 2011).

Residency Data. In line with the goals of the program, a far greater proportion of Rural Medical Scholars, as opposed to non-rural program students, graduating from UASOM entered a primary care specialty needed for the Primary Care Health Professional Shortage Areas (HPSAs) of rural Alabama. The greatest difference was in Family Medicine, where 49.5% of Rural Medical Scholars, but only 7.8% of non-rural program students, entered residency since 1997, $p<.001$. Of the remaining Rural Medical Scholars, 5.5% entered Internal Medicine, 8.3% entered Pediatrics, and 4.8% Ob/Gyn. In the 2012 residency match process, 5 out of 11 Rural Medical Scholars matched in Family Medicine, and 2 additional RMSs matched in Pediatrics and Internal Medicine. Of the remaining 4 students, 1 matched in Anesthesiology, 1 in Diagnostic Radiology, and 2 in Surgery. The primary care matches were distributed between Tuscaloosa (4), UAB (1), University of Mississippi (1) University of Tennessee, Memphis (1), and University of Tennessee, Chattanooga (1). Two additional RMSP students from the class of 2011 also matched into Family Medicine in 2012. Thus, 7 of 13 (53.8%) matches among Rural Medical Scholars were to Family Medicine, as opposed to 17 of 183 (9.3%) Family Medicine matches by the remainder of the class (including Rural Medical Programs students), $p <.001$. This array of residency selection is highly significant in that Family Medicine is the sole specialty shown to distribute to rural areas in proportion to the population's dispersion.

Long Term Outcomes. About 2 million people or 40% of Alabama's population are rural**.** As of February 2012, 88.6% of RMSP graduates currently practice in Alabama with 54.5% practicing in a rural Alabama location. In contrast, 47.9% of non-rural students practice in Alabama with only 7.3% locating in a rural Alabama location. These differences are highly significant ($p<.001$). In terms of addressing needed primary care, 30 out of 42 RMSP students (71%) practice in a designated Health Professional Shortage Area. However, the dispersion of the home counties of Rural Medical Scholars and, consequently, the distribution of their practice sites, do not favor the most educationally and economically depressed areas of the state, including the Black Belt.

These summary findings are very favorable (and significant at $p<.001$) with 49.5% (45/91) of Rural Medical Scholars entering Family Medicine, 88.6% of RMSP residency graduates practicing in Alabama, and 54.5% practicing in rural Alabama compared to non-rural program students with 7.8% in family medicine, 47.9% in Alabama, and 7.3% in rural Alabama. Comparable data from the rural medical education programs at Jefferson Medical College (PA), University of Minnesota-Duluth, and University of Illinois-Rockford show that 41.1% of their joint rural student pool became rural physicians nationwide. The program appears poised now to address the next step of meeting the requirements for primary care physicians in the more isolated HPSAs of rural Alabama.

Additional Information/Financial Support

The rural health programs are dependent on grant support, although there is salary support for faculty. Current grant support totals approximately $660,000, and six administrative staff members are supported. The vast majority of funding comes from the state legislature via the Alabama Family Practice Rural Health Board, with a current appropriation of $440,000 for FY 2012. Remaining funds are provided by the Appalachian Regional Commission and the University of Mississippi Delta Regional

Institute. Smaller amounts from a wide variety of county based programs and initiatives, as well as some federally funded programs, also contribute. However, while state funded initiatives have been relatively stable, funding from other programs is more volatile and so fluctuation in future program funds is a concern that may impact on potential initiatives.

Overall Evaluation of RMSP

The main focus of this review is to examine the Rural Medical Scholars Program as it operates at the University of Alabama, Tuscaloosa and to determine how an already successful program can be made even better. For example, how can it better meet the needs of rural Alabama for primary care physicians and how can it better support rural students through the academic and social challenges of medical education? Areas on which to focus include increasing the number of RHS/RMHS students who enroll into the RMSP program either as college seniors or as graduate students, increasing the number who attain required MCAT scores for matriculation into UASOM or other medical schools, providing support to help these students through the challenging pre-clinical years while maintaining the requirement for academic rigor, and maintaining students' commitment to rural medicine while in medical school.

Strengths

It is clear that the Rural Medical Scholars Program as operated out of the University of Alabama, Tuscaloosa has been largely successful in achieving its primary goal of providing primary care physicians for rural Alabama (where 54.5% of RMSP graduates practice), and it compares very favorably with the rural medical education programs in other states. This program has resulted in UASOM being ranked in the top 12 nationally for Rural Medicine by *US News & World Reports*, which is an outstanding achievement. The success of the program is due in no small part to the enthusiasm and commitment of the Director, Dr. John Wheat, and his colleagues at UAT, Drs. Brandon and Leeper and Mses. Guin and Moore. This group clearly works well together and their participation should be seen as a distinct strength. Another strength is the initiation of students into health-related careers at the high-school level via the RHS and RMHS programs. It is encouraging that nearly all students enrolled in the program progress to college. The recent vote of the UASOM Medical Education Committee that Scholarly Activity for rural students at Tuscaloosa should be directed by Dr. Wheat and his colleagues, and that RMSP students will be required to either complete a 2 week elective in rural/Primary Care Medicine or a 4 week Acting Internship with a rural/primary care focus are additional strengths. The decision that the 4 week Acting Internship can also fulfill requirements for the Ambulatory Care AI and that this can take place in facilities other than at UAB should also strengthen the ties of the RMSP students with the rural communities. Rural Medical Scholars do as well as their non-rural counterparts once they have progressed to the clinical years and complete medical school at the same rate. The rural programs also enjoy broad support in the legislature, which has translated to stable funding, at least in part.

The Tuscaloosa branch campus has proven to be a strength for the RMSP-- published data show that students at the branch campus are multiple times as likely as main campus students to pursue Family Medicine. One strength of this branch campus experience is the curriculum with a Rural (Community) Medicine clerkship that

introduces elements of community-based Public Health and Preventive Medicine that are central to evolving medical care policies for the health of underserved populations, including collaborative work to address community health problems.

Weaknesses

As evidenced above, the main barriers to increasing the number of Rural Medical Scholars and, ultimately, rural physicians, are the academic hurdles of the MCAT, the pre-clinical curriculum at UASOM, and the USMLE Step 1 exam. Attaining an MCAT of 24 as required for matriculation into UASOM is difficult for many and impossible for some. However, while some medical schools do admit students with lower MCATs, the degree of academic support these students require during the pre-clinical years is not currently being provided at UASOM. Furthermore, because distress with culture shock often plays out in the academic arena, students from rural cultures share with minority students the need for more social support than is currently available. Although not confined to rural students, a disproportionate number of Rural Medical Scholars experience academic difficulty and fail more than one module, necessitating recycling through the first or second years prior to taking Step 1. UME identifies students at risk of failing Step 1 using an algorithm based on the student's MCAT, course performance, and performance on an NBME shelf exam, and Medical Student Services works extensively with these individuals to prepare them for Step 1. If necessary, students can also attend specialized intensive Step 1 review courses held outside of UASOM. The fact that all Rural Medical Scholars have passed Step 1, with the vast majority doing so after 1 or 2 attempts, suggests that the Rural Medical Scholars Program, with academic support as needed, is effective preparation for USMLE Step 1 Examination. One possibility to increase the number of rural students successfully matriculating to UASOM might be to provide an intensive MCAT instruction course either as part of the RMSP program or in addition to it, during the associated Master's degree program; an MCAT review course is already provided for some students in this program. This course could take the form of an on-line, video-instruction or residential course; potentially, this could be supported by scholarship funds for deserving candidates. Alternate strategies might be:

a) Limit recruitment to those students whose academic backgrounds suggest that they will be likely to do well on the MCAT based on their GPA or ACT scores. However, research and experience indicate that these "talented" students are less likely to pursue primary care and rural practice, and there are very few such students found among the most needful rural communities of Alabama, or
b) Expand the current MS program with a two-year full-time curriculum option to better prepare those "at-risk" among the Rural Medical Scholars and other Master's students for pre-clinical studies at UASOM.

There is the weakness in attracting rural minority candidates and others from severely depressed rural communities into the Rural Medical Scholars Program after they have completed pre-matriculation pipeline programs.

In terms of clerkships, which are not the primary focus of this review (currently under review by the Clinical Committee of the MEC), it is unclear what if any rural clinical competencies are required and/or how a student should be able to demonstrate their proficiency. As noted above, a strength of the program is the Rural Medicine Clerkship, which introduces students to population health principles that are central to the provision of rural primary care as envisioned by current and evolving national health policy;

however competencies relative to the community diagnostic exercise and project should be clarified with respect to their utility in rural medical care and standards established.

An additional weakness lies in establishing a line of faculty succession at Tuscaloosa. While not an imminent problem, this will become a factor as time progresses. At present no clear successor to Dr. Wheat and other key members of his team have been identified; if program success is to be maintained, this should be considered by the program director.

Opportunities

Several opportunities exist to enhance the current rural program. One possibility to increase the number of rural students successfully matriculating to UASOM might be to provide access to an intensive MCAT instruction course either as part of the RMSP program or in addition to it, during the associated Master's degree program; an MCAT course is already provided for graduates in the program. This course could take the form of an on-line, video-instruction or residential course; potentially, this could be supported by scholarship funds for deserving candidates. One suggested alternate strategy of recruiting talented students who are likely to do well on the MCAT (based on their GPA or ACT scores) to the program, could form the basis of a study to see how such students admitted to the RMSP in the past faired academically and to what degree they have contributed to primary and rural health care. Another alternative might be to expand the current MS program with a two-year full-time curriculum option to better prepare those "at-risk" among the Rural Medical Scholars and other Master's students for pre-clinical studies at UASOM. This could be accomplished by the addition of more rigorous science courses in areas such as Immunology, Pharmacology and Genetics. This will clearly require the involvement of additional faculty at the University of Alabama and further development of the MS program. It may also be possible to coordinate with the Assistant Dean for Minority Affairs (Dr. Anjanetta Foster), in developing a more rigorous and focused pre-matriculation program for these students. Community/county financial support may be available or potentially could be solicited to support such initiatives. Students should also be given the opportunity to acquire/develop the skills associated with standardized test-taking. Additional opportunities might include further refining the two first pre-clinical years such that individual credits from these courses could be acceptable to other health-related professional schools allowing students to easily transfer if they cannot pass Step 1 – although the high pass rate for Rural Medical Scholars after the second attempt would suggest that this is not likely to be necessary, unless students are admitted with progressively lower MCAT scores. However, it should be noted that performance on the MCAT does not guarantee that these students will not experience academic problems during the pre-clinical course.

There is an opportunity to establish a more comprehensive program for recruiting rural minority students and those from the most depressed rural counties and to consider forming a bridge program from the pre-matriculation pipeline programs, perhaps via the associated MS program.

The agricultural community has also expressed interest in supporting a medical initiative aimed at serving their needs with reference to work-related injuries and environmental hazards. This could operate along with input from local extension agents and health and safety representatives. Telemedicine could also be exploited to enhance the rural experience.

Threats

Continuing threats to the program include the potential loss of funding, although, the RMSP is seen as valuable by the state legislature and state support is likely to continue. However, the level of this support may drop and in any case, needs to be supported by external grants. Any expansion in the program will need to identify additional new sources of revenue if they are to be successful. Increasing tuition costs will also deter some students from pursuing the pre-matriculation year or associated MS at UAT.

A new osteopathy school (ACOM) in Dothan is scheduled to admit its first class of 150 students in 2013. The primary stated goal of this institution is to provide primary care physicians for rural Alabama and the surrounding multi-state region and is likely to attract rural students. No information is currently available as to entrance MCAT requirements, but they are likely to be <24, in line with the average MCAT for schools of osteopathy of 24 and overall GPA of 3.3. In contrast, average MCAT scores of the RMSP and UABSOM are 25.5 and 30, and respective GPAs are 3.56 and 3.7. However, the differential cost of attending a private DO school vs. the cost of a public medical school, the availability of scholarships, and the greater familiarity of students with allopathic schools will likely lead all qualifying applicants to prefer the UASOM programs.