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William Cathcart-Rake, M.D.

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Producing Physicians for Rural Kansas; the Early Success of the University of Kansas School of Medicine-Salina Regional Medical Campus

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Abstract

Physician workforce shortages in rural areas are well-documented problems. The University of Kansas School of Medicine (KUSM) established the Salina regional medical campus (RMC) in response to the need to train more physicians interested in primary care in rural Kansas. Since its founding in 2011, 38 students have completed their training on the Salina RMC and received their M.D. Twenty-eight graduates (74%) matched in primary care residencies; 18 (44%) in family medicine. Eleven of the first 16 graduates have finished residency and entered practice; 9 are in Kansas, and 7 of those are in rural Kansas. The Salina RMC has had early success in producing primary care physicians to serve rural Kansas, likely secondary to several factors, including: student background, curricular elements, and financial incentives.

The Salina RMC

In 2011 the University of Kansas School of Medicine (KUSM) opened a small, 4-year regional medical campus (RMC) in Salina. Salina is a community of approximately 48 000 people in a primarily agricultural region in north central Kansas, 180 miles west of the main campus in Kansas City. Eight students comprised the first class to start their medical education at the Salina RMC, and 8 students have been admitted each year since. With a total of 32 students, the Salina RMC is the smallest 4-year allopathic medical school campus in North America. The process of developing this RMC and the elements necessary for its creation have been previously documented.¹

An impetus for developing a rural medical school campus in Kansas partially originated from the 2007 Kansas Physician Workforce report detailing the undersupply and maldistribution of physicians in Kansas, especially in primary care.² The authors of the report recommended the formation of a Primary Care Enhancement Task Force to make specific proposals addressing physician workforce issues. The 2009 Robert Graham Center study of the specialty and geographic distribution of the physician workforce in the United States provided additional arguments for creation of a rural medical school campus.³ The authors lamented medical students' decreasing interest in primary care and practice in underserved and/or rural areas. To address the shortage of physicians in rural areas, the authors recommended that medical schools admit a greater proportion of students who are more likely to choose primary care, rural practice, and care of the underserved, and shift substantially more training of medical students and residents to community, rural, and underserved settings. Additionally, they recommended that

new medical schools be public, with a preference for rural locations.

The creation of the Salina RMC was one of several measures implemented by KUSM to address the documented physician workforce shortage in Kansas. Other measures included increasing the size of the medical school class on the main campus and creating a 28 students per class 4-year program at the urban Wichita RMC in addition to the 50-student per year clinical track (Years 3 and 4) established there in 1971. Founders hoped that the Salina RMC would attract students from rural Kansas who were interested in a career in primary care medicine and returning to rural Kansas to practice. Matriculation on the Salina RMC was not limited to students from rural communities, students wishing to pursue a career in primary care, or students wanting to eventually practice in a rural community. Students were first judged to be acceptable candidates for admission to KUSM before any thought was given to campus assignments. However, students were able to rank the 3 campuses in order of preference (urban Kansas City main campus, urban Wichita RMC, or the more rural Salina RMC) on their KUSM supplementary application. Campus assignment decisions were made after admissions decisions.

Salina RMC results

To date, 9 classes (a total of 72 students) have matriculated on the Salina campus. One student terminated the pursuit of a medical education before graduation. Sixty-two of the first 72 matriculants (86%) were Kansas residents, and 61 (85%) were from communities with resident populations no larger than Salina. Nineteen students (26%) were graduates of the Scholars in Rural Health program, which is a KUSM program that encourages college undergraduate students from rural

William Cathcart-Rake, M.D., Clinical Professor of Medicine, University of Kansas School of Medicine-Salina, 138 North Santa Fe, Salina, Kansas 67401; email: wcathcart-rake@kumc.edu

Corresponding author: William Cathcart-Rake, M.D., Clinical Professor of Medicine, University of Kansas School of Medicine-Salina, 138 North Santa Fe, Salina, Kansas 67401; email: wcathcart-rake@kumc.edu



Kansas to pursue careers in medicine and eventually practice in rural areas.⁴ Rural students tend to be underrepresented in medical school applications. Sixteen to 20 students are admitted to this program in their junior year of college. Successful completion of this program requires significant physician shadowing hours, completion of a research project, a satisfactory MCAT score (approximately 500), and graduation from college. Graduates of this program are guaranteed admission to KUSM but are not required to attend the rural Salina RMC, choose a primary care career, or choose to practice in rural Kansas.

Forty-one Salina RMC students (57%) elected to receive Kansas Medical Student (KMS) loans to fund all or part of their medical education. This program, offered to all KUSM students, funded by the State of Kansas and administered by KUSM, pays tuition expenses and provides a modest living allowance while the student attends medical school. Loans are totally forgiven if the recipient elects to practice primary care in one of the 100 rural counties in Kansas or the single medically underserved urban county (Wyandotte) in Kansas. For purposes of the program, primary care is defined as family medicine, general internal medicine, pediatrics, emergency medicine or geriatrics. One year of loan support is forgiven for each year of practice in a qualifying county. If the KMS loan recipient chooses not to fulfill the terms of the loan agreement, he or she must repay the full amount of the loan plus accrued interest of 15% per year on the total unpaid loan amount.

By June 2019, 5 classes (the classes of 2015-19)—a total of 38 students—completed their medical education on the Salina RMC and received their MD. All 38 graduates secured residency positions through the National Residency Match Program (NRMP). Twenty-eight (74%) of the 38 Salina RMC graduates matched to primary care residencies: 47% in family medicine, 18% in categorical internal medicine, and 8% in categorical pediatrics. Additionally, all 9 members of the Salina RMC class of 2020 have registered for the NRMP and have applied exclusively to family medicine residency programs.

During this same 5-year period, 44% of KUSM graduates on the main campus and Wichita RMC matched in primary care residencies; 17% in family medicine, 18% in internal medicine or med/peds, and 9% in pediatrics (Table 1).

	Number KUSM KC & Wichita Graduates	Number Matched in Family Medicine	% Matched in Family Medicine	Number Matched in Internal Medicine or IM/Peds, Categorical	% Matched in Internal Medicine or IM/Peds	Number Matched in Pediatrics, Categorical	% Matched in Pediatrics	Matched in Primary Care Residencies No. & (%)
2015	177	28	16%	28	16%	15	10%	71 (40%)
2016	193	32	17%	36	19%	24	13%	92 (48%)
2017	193	27	14%	36	19%	17	9%	80 (41%)
2018	198	44	22%	34	17%	19	10%	97 (49%)
2019	192	29	15%	34	18%	12	6%	75 (39%)
TOTAL	953	160	17%	168	18%	87	9%	415 (44%)

Table 1. Residency Match Data for KUSM-Kansas City (KC) and KUSM-Wichita Graduates, 2015-2019

Nationally, 38% of U.S. medical school seniors matched in primary care; 9% in family medicine, 19% in internal medicine, and 10% in pediatrics (Table 2).⁵⁻⁹

	Total No. U.S. Senior Applicant Matches	Total No. Matched in Family Medicine	% U.S. Applicants Matched in Family Medicine	Total No. Matched in Internal Medicine, categorical	% U.S. Applicants Matched in Internal Medicine	Total No. Matched in Pediatrics, categorical	% U.S. Applicants Matched in Pediatrics	% U.S. Seniors Matched in Primary Care Residencies
2015	16,932	1,405	8%	3,317	20%	1,889	11%	39%
2016	17,057	1,467	9%	3,291	19%	1,829	11%	39%
2017	17,480	1,513	9%	3,245	19%	1,849	11%	38%
2018	17,740	1,628	9%	3,195	18%	1,746	10%	37%
2019	17,763	1,601	9%	3,366	19%	1,715	10%	38%
TOTAL	86,972	7,614	9%	16,414	19%	9,028	10%	38%

Table 2. NRMP Match Data for All U.S. Graduates, 2015-19⁵⁻⁹

Eleven of the first 16 graduates (69%) of the Salina RMC (classes of 2015 and 2016) have completed residency training and started practice. Nine of the 11 (82%) are practicing in Kansas, and 7 (78%) are primary care physicians in rural Kansas. Four members of the Class of 2017 have signed contracts to practice primary care in rural Kansas communities upon completion of residency in 2020. Ten of the 11 Salina RMC graduates currently practicing in rural Kansas or committed to practice in rural Kansas starting in the summer of 2020 received KMS loans. Also noteworthy is that several Salina RMC graduates currently completing non-primary care residencies have made commitments to return to rural Kansas to practice.

Discussion

Rural physician workforce shortages are not limited to Kansas, and KUSM is not the only medical school attempting to address the issues of fewer medical students choosing primary care practice and/or rural practice. Other medical schools in the United States and foreign countries have studied these issues and created programs designed to increase the rural physician supply. The University of Minnesota, Jefferson Medical College, Washington University, and the State University of New York are among the U.S. medical schools to document programs addressing the rural workforce shortage.¹⁰⁻¹⁴

The multitude of factors influencing a medical student's decision to pursue a primary care career and/or practice in a rural area must be considered in any discussion of how to address rural physician shortages. In a review of the factors influencing a physician's decision to practice in a rural location, Ballance et al¹⁵ stressed the importance of programs that attract rural students to medical school and increase their competitiveness for medical school admission and of rural experiences during medical school and residency. Goodfellow et al¹⁶ conducted a systematic review of the medical literature to determine the criteria associated with a primary care physician's decision to locate in an underserved urban or rural area. Factors identified included: 1) personal characteristics, attributes, or background; 2) debt or financial incentives; 3) medical school curricula and programs; and 4)

graduate medical education (GME) programs. Isaac et al¹⁷ surveyed students enrolled in the Rural Clinical School program at the University of New South Wales in Australia regarding their interest in rural careers. Factors associated with an intent to practice in a rural location included: 1) rural background, 2) two or more previous years at a Rural Clinical School, and 3) preference for a rural internship. Curran and Rourke¹⁸ and Woloschuk and Tarrant¹⁹ noted similar factors related to attracting physicians to rural practice locations in Canada: 1) physician characteristics (rural background and interest in family medicine), 2) training environments (rural locations), and 3) a rural training curriculum.

In a 1992 report of which medical schools produce rural physicians, Rosenblatt et al²⁰ noted that 12 medical schools accounted for over a quarter of all physicians entering rural practice. The authors identified 4 medical school variables strongly associated with a tendency to produce rural physicians: 1) location in a rural state, 2) public ownership, 3) greater production of family physicians, and 4) smaller amounts of NIH funding. In 2015 Chen et al²¹ published an updated report regarding which medical schools produce rural physicians. They found the proportion and number of physicians entering rural practice remained stable, and there had been no significant changes in the list of MD-granting medical schools producing rural physicians in the 23 years since the Rosenblatt study.²⁰ However, several DO-granting schools were identified that began contributing relatively high percentages of rural physicians during that time. The study also found that rural family medicine training programs were significant contributors to the rural physician workforce. Brooks et al²² reviewed 21 quantitative articles analyzing recruitment and retention of primary care physicians in rural areas from 1990 to 2000. The authors analyzed pre-medical school, medical school, and residency training factors contributing to the choice of rural practice. Six studies analyzed pre-medical school factors. Rural upbringing and the students' desire to become a family physician were the 2 factors positively associated with physicians' practicing in rural communities. Fifteen studies analyzed factors related to medical school training that influenced a student's decision to pursue rural practice. Unfortunately, in contrast to pre-medical school factors, no universal themes were deduced; however, specialized rural curricula and rotations and recruitment of students interested in careers as generalists were cited in some studies as factors increasing rural physician recruitment and retention. Finally, the authors emphasized that the postgraduate residency experience was an important factor leading to the decision to practice in a rural area. Graduates of family medicine residency programs chose rural practice at a higher rate than other specialties, and rural residency tracks and programs increased the likelihood of producing physicians recruited to a rural practice.

In summary, multiple factors are associated with a physician's decision to practice in a rural location: 1) a rural background;

2) training in a rural location; 3) inclusion of rural curricula in the medical school educational program; 4) family medicine residency, especially when located in rural areas or providing rural tracks; and 5) financial incentives. The Salina RMC is rural and attracts students from rural communities with a strong desire for a career in family medicine upon entering medical school. The majority of these students do not change their minds during medical school. Being a rural campus, students are continuously exposed to the rewards and challenges of rural practice and are mentored by rural practitioners on the faculty. Although there is not a formal rural medicine curriculum at the Salina RMC, starting in the first year of medical school all students attend educational sessions facilitated by rural physicians. All students spend at least 4 weeks in year 3 at the local family medicine residency program (Smoky Hill), which has a mission to train physicians for rural practice and spend a minimum of 4 weeks in year 4 with a rural primary care physician in communities other than Salina. It is hoped that the more opportunities medical students are given to work with rural physicians, the more likely they will like what they see and choose a career in rural medicine. Conversely, students have less exposure to urban life and practice and the desire to live and work in such an environment may be less. Finally, the State of Kansas offers financial incentives to students committed to practicing primary care in underserved areas of the state, and the majority of Salina RMC students have benefited from this program. Unfortunately, there is no guarantee that a physician will remain in a rural community long-term once the service commitment is fulfilled. Sempowski²³ reviewed the effectiveness of financial incentives in exchange for rural and underserved area return-of-service commitments. Although financial incentives were effective recruitment tools, the one prospective cohort study he reviewed revealed that physicians who voluntarily chose rural practice were more likely to stay long-term compared to those who chose rural practice as the result of financial incentives. Perhaps Pathman et al²⁴ correctly summarized the issue of preparing and retaining rural physicians: "physicians who are prepared to be rural physicians, particularly those who are prepared for small-town living, stay longer in their rural practices."

Conclusions

Although the numbers are small, the Salina RMC has had a dramatic impact on the production of primary care physicians who stay in or return to Kansas, especially rural communities. Several factors may contribute to Salina RMC's success, including: 1) KMS loan forgiveness, 2) family ties, 3) returning to rural communities similar to those of their childhood, 4) ample opportunities to work with rural practitioners during medical school, 5) an appreciation for the challenges and rewards of rural practice developed during their undergraduate medical education years at the Salina RMC, 6) not establishing ties in an urban area, and 7) specializing in

family medicine and other primary care specialties. Undoubtedly, the terms of forgiveness of a KMS loan are powerful incentives for recipient physicians to practice primary care in rural Kansas. Nevertheless, for the medical student who knows he or she wants to become a primary care practitioner in rural Kansas regardless of finances, receiving a KMS loan is a rational decision, and is not the driver of the student's specialty and practice location choices. From 2015-19, nearly one-half of Salina RMC graduates matched in family medicine residency programs, five-fold greater than the match rate for all U.S. seniors participating in the NRMP, nearly three-fold greater than the match rate in family medicine for the other two KUSM campuses, and three-fold greater than the match rate into family medicine among the graduates from 29 RMCs reported by Liaw, et al.²⁵ As noted, enrollment on the Salina RMC is not limited to students raised in rural communities or committed to primary care and/or rural practice; however, the rural Salina RMC may be the campus of choice for students with rural backgrounds who want to become primary care physicians and return to a rural community to practice. It is entirely possible that, if the graduates of the Salina RMC students had attended the main Kansas City campus or the Wichita RMC, they would have made the same residency and practice choices; however, it is also quite possible that a medical education on an urban campus could have resulted in different specialty and practice location choices.

Although it is still young, and its production of rural primary care physicians to date is no guarantee of future results, KUSM is optimistic that the Salina RMC will stay true to its mission and make even greater strides in expanding healthcare access for rural Kansans. The success of the Salina RMC in training physicians who choose rural practice provides evidence—and hopefully inspiration—for other medical schools to support similar programs. Programs like KMS may be financially difficult for other medical schools to duplicate; however, many of the elements the Salina RMC has identified that influence a medical student's choice of rural primary care can be duplicated by medical schools, especially geographically rural RMCs.

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