VII. STANDING COMMITTEES

A. Academic and Student Affairs Committee

WWAMI-RIDE: Addressing the Needs for Primary Care Medicine and Dentistry in the State and Region

INFORMATION ONLY

Attachments

WWAMI attachments: Allen Biosketch Map of WWAMI Region "From Concept to Culture: The WWAMI Program at the University of Washington School of Medicine" (article) "Medical Students Reach Out to Rural Communities in 'WWAMI Land"" (JAMA article) "Regional Solutions to the Physician Workforce Shortage: The WWAMI Experience" (article) RIDE attachments: Mouradian Biosketch Article from Dental Alumni News: "Regional Initiatives in Dental Education" "Classroom is among UW's Most Advanced" (article) "RIDE Swings into Second Year at Riverpoint" (article) 1st Year RUOP and Fourth Year Community Outreach Rotation Sites and Number of Student Rotations



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Dr. Suzanne Allen was appointed to the position of Vice Dean for Regional Affairs for the University of Washington School of Medicine in December of 2009. Prior to her new role as Vice Dean, Dr. Allen was the Assistant Dean for Regional Affairs and Rural Health and Idaho WWAMI Clinical Medical Education Coordinator. Following four years of active duty practicing at Ellsworth AFB and Andrews AFB, Dr. Allen joined the physician faculty at the Family Medicine Residency of Idaho in 1999. Before joining the Idaho WWAMI office in 2006, she was the Assistant Director and Medical Student Clerkship Coordinator at the Family Medicine Residency of Idaho. Dr. Allen holds a Clinical Associate Professor faculty position within the Department of Family Medicine at the University of Washington School of Medicine. Dr. Allen is committed to medical education and rural healthcare. As the Vice Dean for Regional Affairs, Dr. Allen helps with the WWAMI program and Area Health Education Centers across the Washington, Wyoming, Alaska, Montana and Idaho region.

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University of Washington School of Medicine





ARTICLE

From Concept to Culture: The WWAMI Program at the University of Washington School of Medicine

Paul G. Ramsey, MD, John B. Coombs, MD, D. Daniel Hunt, MD, Susan G. Marshall, MD, and Marjorie D. Wenrich, MPH

Abstract

Shortages of primary care physicians have historically affected rural areas more severely than urban and suburban areas. In 1970, the University of Washington School of Medicine (UWSOM) administrators and faculty initiated a four-state, community-based program to increase the number of generalist physicians throughout a predominantly rural and underserved region in the U.S. Northwest. The program developed regional medical education for three neighboring states that lacked their own medical schools, and encouraged physicians in training to practice in the region. Now serving five Northwest states (Washington, Wyoming, Alaska, Montana, and Idaho), the WWAMI program has solidified and expanded throughout its 30-year history. Factors important to success include widespread participation in and ownership of the

The need for more primary care physicians has received increased attention in recent years, particularly in the context of a managed care environment. The shortage of primary care physicians is not, however, a new problem. Rural populations have suffered from a shortage of primary care physicians for many years, and have felt the chronic shortage longer and more severely than have urban and suburban populations. This has program by the participating physicians, faculty, institutions, legislatures, and associations; partnership among constituents; educational equivalency among training sites; and development of an educational continuum with recruitment and/or training at multiple levels, including K-12, undergraduate, graduate training, residency, and practice. The program's positive influences on the UWSOM have included historically early attention to primary care and community-based clinical training and development of an ethic of closely monitored innovation. The use of new information technologies promises to further expand the ability to organize and offer medical education in the WWAMI region.

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been particularly true for the Northwest states of Washington, Wyoming, Alaska, Montana, and Idaho, which constitute one of the most rural settings in the United States. Encompassing 27% of the nation's landmass, the five states contain only 3.3% of the population (nine million of 268 million people). With historically low physician-to-population ratios, the region lost further ground in its supply of physicians after World War II as the number of generalists declined nationally. This situation worsened in the 1960s and 1970s. The problem was compounded by the fact that all of these states except Washington did not have their own medical schools. Thus, it was difficult to offer state residents the means to undertake medical careers that would encourage them to remain in their home states.

Medical education's historic focus on inpatient care exacerbated the primary care shortage in all settings. This focus did not provide a good portrait of what the practice of primary care entails and did not encourage students to consider primary care as a career. Students from predominantly rural states without medical schools who pursued physician train-

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ing elsewhere received exposure to urban, hospital-based care, which provided little incentive to return to their rural states as generalists.

The WAMI program, a regional medical education program named after the first four participating states (Washington, Alaska, Montana, and Idaho) was initiated in 1970 at the University of Washington School of Medicine (UWSOM) to increase the number of generalist physicians in the region. As originally designed, the program met dual needs: it offered medical education for states that could not fund their own medical schools, and it encouraged physicians in training to practice in the region. It also moved medical education from the urban hospital into the community setting, and in doing so, provided community-based primary care experiences for medical students.

WWAMI (Wyoming joined the program in 1996) has become an outstanding academic model of a comprehensive regional medical education program devoted to the recruitment and retention of physicians in underserved areas through a multifaceted approach.¹ Several early published articles discussed the program's inception and original goals.^{2–6} Now celebrating its 30th anniversary, the WWAMI program has expanded and evolved over time. Today, more than 3,000 physicians across five states at over 170 active community-based educational sites participate. In this article, we provide a review of the inception of the program and an overview of changes in directions and components that have occurred throughout its history.

BACKGROUND

In the early 1960s, at the same time that the shortage of primary care physicians was increasing in rural areas, the dean of UWSOM appointed a special subcommittee to consider the direction of medicine in the subsequent 20 years. The Hunter Report, submitted in 1965, visualized an expanded health care system beginning with the primary care physician and proceeding to more specialized health care personnel and facilities.⁷ The report emphasized the need for flexibility and diversity in training in order to encompass the needs of family physicians. As a result of this report, the dean initiated a number of moves toward primary care that laid the foundation for enhancing ambulatory care services and increasing primary care faculty, initiating a family medicine program, and considering the need for primary care providers regionally as well as locally.

Within the same time frame, the medical school undertook a comprehensive curriculum review. Completed in 1968, the review called for coursework in the first two years of medical school organized by interdisciplinary committees rather than departments. It also called for enhanced selflearning, flexibility, and earlier and increased exposure to patient care and social aspects of medicine. As a result of changes emanating from this review, students were able to plan their own educational programs to a greater degree than had been true in the past. Increased elective flexibility permitted the students to complete considerable work away from the urban-based medical school campus. These changes to the curriculum, in concert with the planned completion of new UWSOM facilities in 1972, made it possible to consider enrolling more students than originally planned. Recommendations from the Hunter Report and curriculum changes also led to plans for a family medicine program.

A core group of faculty and administrators undertook development of the experimental WAMI program in 1970 following informal discussions of the need for more teachers for primary care residents. Community physicians were involved in program development from the beginning. At a regional meeting, an informal discussion took place between members of the medical school and community physicians concerning logistic problems in setting up adequate generalist training within the university system. In the midst of this discussion, a physician from a small rural town in eastern Washington is credited with saying, "Send me the residents and I'll teach them." This statement initiated a plan to develop a network of peripheral resident training centers in Washington, Alaska, Montana, and Idaho, using practicing physicians as preceptors. Because a source of funds for resident training could not be found at the time, the initial plan of training residents was modified to one for training medical students.

The WAMI program's primary objectives addressed a broad set of regional needs:

- Improve the health of citizens in WAMI states through decentralized medical education.
- Increase the number of publicly supported medical school positions without major capital construction and without the addition of significant numbers of faculty.
- Increase the number of primary care physicians in the WAMI states.
- Address the maldistribution of physicians in the WAMI region.
- Broaden the educational experience of future physicians through the use of clinical resources in communities.
- Improve and expand continuing education programs for physicians and other health care professionals throughout the WAMI region and integrate these programs into an overall plan that includes undergraduate and residency training.

From its inception, the program addressed the use of an educational continuum as a means of building and reinforcing regional practices, starting with the medical school experience, continuing into residency, and then providing continuing medical education throughout clinicians' careers. The program also addressed a severe bias in medical education: the centralization of medical education within the context of the university setting to the exclusion of the communities in which most physicians practice. Although the term was not coined for many years, the WAMI program pioneered the concept of a "medical school without walls."

For training medical students from participating states, a plan was devised that encompassed training in several regional locations. That plan has changed little since its inception. In the first-year, or university, phase of the WWAMI program, students receive medical training in their states. During the first year, existing faculties and facilities are used at state universities through basic science programs and faculty. Students at WWAMI sites and many students at UWSOM in Seattle also complete clinical preceptorships one half-day each week with community physicians. During the second year, all students attend courses together at the UWSOM in Seattle to complete organ-systems classes that must be taught by both basic and clinical scientists. During the third and fourth years, which are devoted to clinical training, all students have the option of receiving some of their training in community-based sites throughout the WWAMI region. All of the required third-year clerkships are represented at the community clinical units (which are regional sites for third-year clerkships). In addition, a large number of elective clerkships are offered across the five-state region in diverse practice settings.

The program provided an opportunity for Northwest states that lacked medical schools to implement state-specific medical education without the major expenditure involved in building a medical school. The task of bringing stakeholders in participating states to agreement on goals and methods was daunting. Each state contained its own matrix of governmental and organizational components, and the cooperation of all components was essential. From each state, stakeholders included the state legislature, state and local medical associations, hospital associations, higher education boards, and colleges and universities. As a first step, faculty administrators traveled throughout the region and lobbied most of the legislators in the four states. Early on, dialogue and full partnership with each entity were emphasized. The investment and satisfaction of each stakeholder were seen as essential to the partnership. As a result of this early emphasis, partnership has become a centrally important component of the program.

In addition to the UWSOM, the state universities from the four states were invited and agreed to participate—the University of Alaska, Washington State University (WSU), the University of Idaho (UI), and Montana State University (MSU). In 1988, the UI and WSU programs were combined under a single directorship, with students from WSU program also studying at UI. The University of Wyoming joined in 1996 (modifying the acronym to WWAMI). Each university developed a contractual relationship with the UWSOM for the training of medical students.

Because new construction was not necessary and administrative and legislative agreement proceeded relatively smoothly, program implementation was rapid. A three-year unrestricted \$1 million grant from the Commonwealth Fund of New York to test the concept of regionalizing medical education was crucial to the successful initiation of the program. The federal Bureau of Health Resources Development provided additional contract support beginning in 1972. Member states commenced contributions through contracts in 1974, and by 1979 the program was self-sustaining.

Methods of selecting students have changed little since the program's inception. Applications are accepted and students admitted to the UWSOM from all participating states. Representatives of each state serve on the admission committee. The program initially brought 50–60 additional medical students into each entering class. Currently, 78 students spend their first year outside Seattle (ten in Alaska, ten in Wyoming, 18 in Idaho, 20 in Montana, and 20 at Washington State University in eastern Washington).

WAMI IN THE 1970s

Development of Academic Units at WAMI Universities

Although existing faculty from the basic sciences were available at participating universities, preparation, supervision, and development of a common curriculum across all sites were necessary to ensure comparable experiences. The concept of "single courses taught at five sites by a single regionwide faculty" guided curriculum planning and implementation. A director was appointed at each participating state university. A region-wide committee, chaired by a faculty member from UWSOM, planned the curriculum, with representatives from each university. New courses were developed at WAMI sites as necessary, and some new faculty were recruited. When existing courses were used, special sessions were held to provide a medical orientation for subject matter, and faculty from the UWSOM made frequent visits.

The university portion of the program was phased in, with nine students going to the University of Alaska in 1971 for a single semester of study. The other three university sites were phased in over the subsequent two years, with students attending for only one semester away from Seattle. In 1974, the program at the University of Alaska expanded to a full academic year, and in 1975, the other sites expanded to a full academic year.

Development of Community Clinical Units

The community phase of the WWAMI program covers the final two years of medical school during which students undertake clinical rotations. Beginning in 1971, clinical units were established in a number of communities to provide community-based clinical experiences and encourage more students to consider practicing in non-urban areas. The establishment of community clinical units was predicated on the knowledge that, over the previous ten years, an increasing number of well-trained specialists and generalists had migrated to moderate-sized towns in the region. These clinicians had considerable teaching experience from their postdoctoral training that was applicable to teaching medical students. The community clinical units were designed as teaching sites where groups of physicians who applied and were accepted as teachers would work in their practices with third- and fourth-year medical students. Thus, the units contracted with individual physicians rather than with hospitals. These physicians received clinical appointments to the faculty.

The opening of the first community clinical units went hand-in-hand with the development of a new Department of Family Medicine at the UWSOM. A family medicine division was established in 1970, and was converted one year later to a department. The department maintained a focus on rural medicine, and as the department developed, there was a strong sense that the teaching of rural medicine could not be accomplished in metropolitan Seattle. The first WAMI rural clerkship units were family medicine units established in 1971 at Grandview and Omak, Washington. This early use of regional locales set the stage for a family medicine program strongly oriented toward community training.

As the WAMI program developed, other academic departments became involved in the clinical portion, and a number of clerkship sites opened in the mid-1970s. The Department of Obstetrics and Gynecology conducted programs in Idaho, Alaska, and Washington; the Department of Pediatrics developed units in Washington, Idaho, and Montana; the Department of Psychiatry and Behavioral Sciences established programs in Alaska and Idaho; and the Department of Medicine initiated programs in Montana, Idaho, and Washington. Within each participating department, community clinical site coordinators were designated to oversee the program and maintain close contact with the departmental student coordinator at the Seattle campus.

The community clinical units came to serve as "hubs," or centers, from which a number of activities emanated. In addition to serving as sites for training medical students, the sites were used to train residents, who spent periods of six weeks to six months at the sites and who participated fully as members of health-care teams. The community clinical units also served as centers for continuing medical education and the training of other health-care professionals. Faculty made frequent trips to check on clerkship activities, and in the process, provided lectures and clinical consultations for community physicians. For example, between 1977 and 1978, UWSOM faculty made 325 visits to peripheral sites throughout the four states.

Educational Equivalency

Ensuring educational equivalency-that is, ensuring that the learning of students at WWAMI sites is equivalent to that of students remaining in Seattle-was a fundamental and necessary part of the program's design. An enormous amount of effort went into ensuring equivalency from the inception of the program. To achieve this goal, regional faculty members were carefully selected, common learning objectives were established, common performance assessment methods were instituted, and communication between faculty of UWSOM and teaching faculty at WAMI sites was made a priority. Common examinations were instituted for all courses across sites, and faculty, both from the UWSOM and from the participating universities, designed these tests. Annual retreats were held for course and clerkship coordinators to plan teaching activities and to ensure common course offerings. In addition, quarterly meetings were begun for site coordinators from each of the first-year university settings. These meetings brought course faculty from community sites and the university together for student performance review, curricular discussion, and administrative matters. The standard for educational equivalency was determined to be the standard achieved by the entire system rather than invoking Seattle as the "gold standard" against which all other sites were to be judged. This approach to educational equivalency and the associated retreats and regular meetings continue to the present.

The Office of Research in Medical Education, established in the late 1960s and later to become the Department of Medical Education, was assigned the role of providing statistical support for tracking graduates and developing and monitoring test-giving and evaluations to ensure equivalency. Comparisons of performances across all sites began immediately with the inception of the program.⁸⁻¹⁰ Students' performances have been assessed annually. There has not been a pattern of significant differences between the performances of students from the different campuses and types of clinical sites on national examinations. Although there have been performance differences between sites on common course examinations for some courses, these have not been large and have tended to cancel out over the years.¹¹

Residency Training

Initial discussions leading to the WAMI program focused on regional residency training programs. Although funding circumstances redirected these initial efforts to undergraduate medical education, enhancing regional residency training remained a basic program goal. In the 1970s, the UW Affiliated Family Practice Residency Network started a regional network of family practice residency programs in urban and rural locales. In the same year the network began, Family Medicine Spokane (FMS), a community-based family practice residency program, was established. The first regional affiliated site outside Washington, the Family Practice Residency of Idaho in Boise, opened in 1975. Two years later, the Boise VA Medical Center affiliated with the UWSOM, and a primary care pathway for internists was established in which residents would spend their second year at the Boise VA center.

WAMI IN THE 1980S AND 1990S

Because of the challenges inherent in incorporating medical students into ambulatory care settings in smaller communities, the WAMI founders had anticipated that the average clinical training site would remain active for about five years. They expected that periodic recruitment of new clinical training sites would be required. Contrary to this anticipated turnover, the program's structure remained stable during the early 1980s, as programs within the umbrella WAMI program underwent a period of consolidation and maturation. The satisfaction of community physicians involved in teaching medical students in their practices helped sustain the sites over time, resulting in minimal turnover. As a result, although a few new clinical sites were added, plans carefully made in the 1970s to actively recruit new sites to replace those dropping out were not put into place.

Several administrative changes occurred in the mid- to late 1980s in the first-year programs. In 1985, the Alaska site was moved from Fairbanks to Anchorage. In 1988–89, the UWSOM associate dean for academic affairs was given the title of WAMI director to unify the education of medical students regardless of the states in which students began their education. Shortly thereafter, the first-year directors in Alaska, Montana, and Idaho were given the title of assistant dean, and they reported to the associate dean for academic affairs in Seattle.

In the mid-1980s, a number of school task force reports identified lack of diversity in the entering classes as a major problem. While the balance between men and women entering medical school was reaching the 50–50 balance at that time, there were relatively few matriculants from underrepresented minority backgrounds and few from rural

backgrounds. In 1987, the UWSOM moved from a stance of actively recruiting these missing applicants to working at the college and high school levels throughout the region to increase the applicant pool. Called "working the pipeline," this effort began in earnest in 1989 with funding from The Robert Wood Johnson Foundation for a six-week summer enrichment program for minority students, described below.

Concurrent with this new direction, broader educational and regional focuses were initiated. One such focus was providing medical students earlier introductions to rural medicine. Another was continuing the development of rural and geographically diverse residency programs. A third focus was bolstering community health care infrastructures to increase positive health outcomes for rural inhabitants and to enhance working conditions for rural practitioners. And a fourth focus was providing more services that would reduce professional isolation and enhance retention of rural physicians, such as fostering continuing medical education and making telemedicine resources available.

Although many of these approaches had been visualized —and implemented—from the beginning of the WAMI program, an increased focus on interdependence among the components and the need for a comprehensive approach developed. Increased administrative decentralization supported these efforts, with individual states assuming more responsibility for enhancing health care services and initiating programs in their own states. Some advances in telecommunications facilitated the broadened program offerings. Chart 1 shows the programs, from K–12 through medical school training and residency and into the practice setting, that comprise the current educational continuum of WWAMI.

The following sections describe many of the key programs that developed to address the needs in the various areas of the educational continuum. Although some of the programs do not fall under the contractual WWAMI arrangement with participating states, they nonetheless have resulted from and contribute to the program's regional mission.

Premedical Recruitment

Throughout the 1980s and 1990s, programs were developed to encourage rural K–12 and undergraduate students to consider careers in the health sciences. In 1989, The Robert Wood Johnson Foundation funded a six-week enrichment program, the Minority Medical Education Program, for underrepresented minority college students each summer. Students come to the University of Washington campus for science courses, MCAT preparation, health care lectures, mentorship experiences, and information about medical school applications and admission. In 1990, the Medical Scholars Program began outreach work from the University of Idaho and Washington State University with rural K–12

			Medical School			Graduate		
	K–12	College	1st Year	2nd Year	3rd Year	4th Year	Medical Education	Community Practice
Area Health Education Centers (AHECs)	\checkmark	\checkmark	v	/				\checkmark
U-DOC high school programs	\checkmark							
Medical Scholars Program	\checkmark							
Ambassadors Program	\checkmark							
Minority Medical Education Program		\checkmark						
Rural Observation Experience		\checkmark						
Native American Center of Excellence		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		
WWAMI first-year sites (university phase)			\checkmark					
1/2 day/week preceptorships			\checkmark	\checkmark				
Rural/Underserved Opportunities Program (R/UOP)			v	/				
Idaho Track					\checkmark	\checkmark		
Clinical clerkships at community-based sites throughout region					\checkmark	\checkmark		
WWAMI Rural Integrated Training Experience (WRITE)					\checkmark			
UW Affiliated Family Practice Residency Network							\checkmark	
Seattle/Boise Primary Care Internist Program							\checkmark	
Psychiatry Residency Training, Spokane Track							\checkmark	
Residency rotations at community clinical units							\checkmark	
Programs for Healthy Communities (PHC)								\checkmark
WWAMI Rural Health Research Center								\checkmark
WWAMI Center for Health Workforce Studies								\checkmark
Rural Telemedicine Network								\checkmark

Chart 1. The WWAMI medical education continuum. This chart illustrates how the WWAMI (Washington, Wyoming, Alaska, Montana, Idaho) program's recruitment and retention of health care professionals are optimized (1) by developing and nurturing interest in health care during students' K–12 education, especially among students from rural and other underserved communities; (2) by carrying out multiple and complementary programs for college students, medical students, and residents through exposure to medically underserved settings, primary care, and community-based role models; and (3) by supporting existing rural medical providers through research, community development, and physician recruitment and retention services.

and undergraduate students. In this program, promising high school students from rural schools and from underrepresented minority backgrounds are exposed to health care careers in a week-long "immersion in medicine." The Ambassadors Program, established in 1993 in eastern Washington, encourages K-12 students and mid-career adults to pursue health careers in rural areas. The program links health care professionals with students interested in health careers. Idaho is currently developing an Ambassadors Program as well. The Rural Observation Experience, begun in 1996, gives students accepted to medical school the opportunity to work with rural physicians.

Adding to these efforts, federal grant funds and matching University of Washington money were used to develop sixweek high school enrichment programs, known as U-DOC, throughout the region starting in 1994. Through U-DOC, promising high school students from minority, disadvantaged, or rural backgrounds participate in summer enrichment programs in Anchorage, Alaska; Seattle, Washington; Moscow, Idaho; Bozeman, Montana; and Laramie, Wyoming. The students attend classes designed to maximize their preparation for college through sessions in science and writing and involvement with mentors from medical fields. In 1992, recognizing the special needs of Native Americans and Alaska Natives (14% of the U.S. Native American and Alaska Native populations live in the WWAMI region), the UWSOM was designated a Center of Excellence for Native Americans, based on its success in matriculating these students into medical school. The Native American Center of Excellence recruits Native American students into health care careers, facilitates research in Native American health care issues, and provides faculty development for Native American physicians.

Medical School Programs

The Rural/Underserved Opportunities Program (R/UOP), begun in 1989, offers medical students an elective summer fellowship between their first and second years to work in rural or underserved urban areas within the WWAMI region. The program gives students early exposure to primary care medicine in underserved settings. Each student is matched with a preceptor, and receives a stipend and housing for the four-week fellowship. In the first year of the program, 23 students were placed with rural preceptors. In recent years, about 80–100 students have been placed each summer (a third to half of each medical school class). By 2000, a total of 800 students and over 300 primary preceptors had participated.

Since 1994, third-year Idaho medical students have been able to choose to complete all of their third-year training requirements and selected fourth-year elective opportunities in Idaho. This track program stemmed from student interest and the Idaho legislature's desire to see more students return to Idaho to practice. Besides the third-year required clerkships, approximately 25 electives are available for fourth-year students. In 1997, both Alaska and eastern Washington began track programs as well.

One of the unanticipated developments associated with strong regional training sites that have functioned for 20 to 30 years has been that once-small towns housing these sites have grown, leaving fewer training sites in truly rural areas. This change was a contributing factor in the development of the WWAMI Rural Integrated Training Experience (WRITE), a program initiated in 1996 that trains medical students in towns much smaller than those at the mature clerkship sites. This experimental program, which gives some third-year medical students six months of extended education in rural community practices, provides sustained exposure to rural medicine and a rural lifestyle. Exemplary teaching sites are selected to host students, and community physicians and clinical faculty serve as teachers. Each student completes a substantial portion of the third-year clerkship requirements at a WRITE site. Prior to the WRITE experience, the student completes six weeks of obstetricsgynecology, eight weeks of inpatient internal medicine, six weeks of surgery, three weeks of pediatrics, and three weeks of psychiatry. For a January-through-June WRITE rotation, students earn credit for six weeks of family medicine, four weeks of ambulatory internal medicine, three weeks of pediatrics, three weeks of psychiatry, and four weeks of an elective. Using activity logs certified by the preceptor and departmental knowledge of the practice location, each department determines whether the experience fulfilled the hospital-based and ambulatory care components of the basic clerkships. The program has been phased in slowly in order to ensure appropriate progress and evaluation. There are currently ten active WRITE sites throughout the WWAMI region.

Residency Training

The UW-affiliated Family Practice Residency Network has expanded since its inception, with the opening of new residency training programs throughout the 1980s and 1990s. Among regional sites, the Idaho State University Family Practice Residency Program, based in Pocatello, opened in 1992, with the mission of training physicians for rural practice in Idaho. Central Washington Family Medicine in Yakima, accredited since 1993, serves an underserved and ethnically diverse population. Family Medicine of Southwest Washington in Vancouver was established in 1995. The first residents were accepted to Montana Family Medicine Residency in Billings in 1996, and Anchorage Family Practice Residency accepted its first residents in 1997. In the Anchorage program, one six-week block in the second year of residency is spent in Bethel, Alaska, at the Yukon-Kuskokwim Delta Regional Hospital, the hub for health care for the Yup'ik Eskimo population. By 1999, there were 16 affiliated family medicine sites throughout the WWAMI region in rural and urban areas. It is anticipated that further affiliations will emerge as a result of Wyoming's entry into the WWAMI program.

Three programs in the Family Practice Residency Network have rural training tracks. Family Medicine Spokane, a 27resident community-based family practice residency program established in 1972, has a rural training track with sites in Colville and Goldendale, Washington. Started in 1986, the Spokane rural training track was the first rural track in the nation. Of the 17 graduates through 1999, 14 (82%) are practicing in rural areas. Family Practice Residency of Idaho in Boise is a 27-resident program established in 1974 to train health care providers for rural and underserved areas. Its rural training track in Caldwell, Idaho, was initiated in 1995 and has two graduates through 1999, both now in rural practices. Montana Family Practice Residency in Billings has a rural training track in Glasgow, Montana, with one resident per year matched to the track. Four of the track's five graduates as of 1999 joined rural practices in underserved areas and the fifth works with the Indian Health Service.

In addition to rural rotations and tracks through the Family Practice Residency Network, other University of Washington residency programs offer rotations at community clinical units. Since 1973, all residents in the Department of Pediatrics have completed a two-month rotation at Yakima/ Toppenish, Washington, Port Angeles, Washington, Pocatello, Idaho, Great Falls, Montana, several sites in Alaska, or other rural sites. In the Department of Medicine, 20 residents complete clinical rotations each year in eastern Washington, Wyoming, Alaska, or Montana. In addition, ten residents in the Seattle/Boise Primary Care Internist Program each year spend their second residency year at the Boise VA Medical Center in Idaho. The Department of Psychiatry and Behavioral Sciences established a separate track in Spokane in 1991. The ten residents in the Spokane track divide their time equally between Seattle and Spokane, with elective opportunities in rural psychiatry in Montana, Wyoming, or Alaska.

Community Practice

Area Health Education Centers. Several programs started in the 1980s focus on enhancing the practices of health care professionals in rural areas. In 1985, the University of Washington initiated sponsorship of the region's federally funded Area Health Education Center (AHEC) program. Five AHEC centers were phased into operation beginning in 1985. A sixth center was added in Wyoming in 1994. In addition, the Rural Alaska AHEC and the AHEC at Washington State University Spokane received funds in the 1990s through the new federal Health Education and Training Center. This program was designed to address health personnel shortages and health systems needs of communities with special needs that could not be met through traditional or existing programs.

AHEC Centers and Offices of Rural Health in individual states serve as personnel clearing houses, link communities with health care professionals seeking new locations, and advise towns on recruitment. For practicing physicians and health care personnel, AHECs arrange continuing medical education courses, maintain learning resource centers, and work with Programs for Healthy Communities to strengthen local health care systems. To encourage careers in underserved areas, the six interdisciplinary centers, in cooperation with the region's health professions training programs, place students in all disciplines in rural and underserved areas for parts of their training. The program office also assists in placement of medical students in the Rural/Underserved Opportunities Program.

WWAMI Research Centers. The WWAMI Rural Health Research Center, established in 1985, is one of five federally funded policy-oriented rural health research centers in the nation. Based in the UWSOM's Department of Family Medicine, the Center performs research on rural and underserved health care issues. The Center has published and distributed 56 working papers based on its research. Over 100 articles have been published in peer-reviewed journals. Topics focus on areas that may enhance knowledge about rural practices, such as rural hospital utilization, access to obstetric care in rural areas, and rural hospital closure.

The WWAMI Center for Health Workforce Studies was established in 1998 with funding from the Bureau of Health Profession's (BHP's) National Center for Health Workforce Information and Analysis. One of four regional centers funded, its goals are: to conduct high-quality and policyrelevant health research in collaboration with the BHP and WWAMI state agencies; to provide expert guidance to local, state, regional, and national policymakers on health workforce issues; to build an accessible knowledge base on workforce methodology, issues, and findings; and to disseminate results to facilitate appropriate state and federal workforce policies. The widely interdisciplinary Center has collaborators from medicine, nursing, dentistry, public health, the allied health professions, pharmacy, and social work. The Center emphasizes research on state workforce issues in underserved rural and urban areas of the WWAMI region.

Programs for Healthy Communities. Programs for Healthy Communities began in 1989 to help rural communities stabilize their health systems through a variety of approaches. The program grew out of the Rural Hospital Project, a research program funded by the Kellogg Foundation in 1983. Programs for Healthy Communities, located in the dean's office of the UWSOM, has ties to the region through long-standing partnerships with WWAMI-affiliated universities and the regional AHECs. The core effort of Programs for Healthy Communities is the Community Health Systems Development program. This program's team, based in the Department of Family Medicine, conducts community assessments, market surveys, management and financial studies, and other analyses to assist local community leaders in developing long-range plans for improvements of health systems. In addition, technical assistance is offered in such areas as governance, planning, marketing, administration, and financial management. The Community Health Systems Development program has applied this community-based approach in over 70 settings in the WWAMI region. Programs for Healthy Communities also serves as home to the WWAMI Rural Telemedicine Network, begun in 1995,

which links six rural communities to rural consultants at the University of Washington with two-way interactive compressed video transmissions.

RETURN RATES AND SATISFACTION WITH THE PROGRAM

Medical Students

Large numbers of students and residents have participated in the WWAMI program since its inception. As shown in Table 1, a total of 6,732 medical student clerkships were completed at WWAMI sites between 1970 and 1999. Compared with the average national "return rate" for state medical schools of 41.5%, students who attend UWSOM from Idaho, Montana, and Alaska have high practice return rates to their states, as shown in Table 2. (Wyoming joined the WWAMI program only recently; return rates are not yet available.) When considering the number of UW graduates who have gone on to practice in those states, the percentages are even higher. The WWAMI program, along with other influencing factors, has resulted in a strong commitment among UW graduates to primary care fields. Of the 1999 graduating class, 55% entered primary-care training, indicating a strong likelihood of pursuing a career in primary care.

Residency Training

Among all UWSOM and affiliated residency programs, 2,581 residents completed portions of their training at WWAMI regional sites between 1970 and 1999. A total of 1,465 residents graduated from the UW Affiliated Family Practice Residency Network between 1973 and 1999. According to a 1997 alumni survey, approximately 21% practiced in rural communities of less than 10,000 population and 31% practiced in communities of less than 25,000.¹² A total of 21% of Network graduates in this same graduate follow-up survey were practicing in designated underserved practices (including urban and rural underserved areas). Seventy-four percent were practicing in Washington, Alaska, Montana, Idaho, or Wyoming. Among the 24 graduates to date from rural training tracks, 20 (83%) were in rural practices.

Satisfaction of Medical Students and Clinical Faculty

In the graduation survey completed annually by medical school graduates for the Association of American Medical Colleges, results are available for UWSOM graduates between 1994 and 1998. In response to the question, "Please comment on what you perceive to be the strengths of your

Table 1

Numbers of Medical Students and Residents Trained at WWAMI Regional Sites, 1970–1999*

Specialty	Medical Students	Residents
Family medicine	2,464	1,893
Internal medicine	832	443
Pediatrics	1,154	185
Obstetrics-gynecology	1,639	4
Psychiatry	527	56
Surgery	46	0
Rehabilitation medicine	70	0

Table 2

Statistics about Graduates from the University of Washington School of Medicine Who Practice in WWAMI States, 1973–1998*

	Idaho	Montana	Alaska
No. state WWAMI graduates in practice	243	292	149
No. state WWAMI graduates who returned to practice in			
home state	107	119	76
State WWAMI graduate return rate No. pop-state LIW graduates	44%	41%	51%
who practice in state Total return rate	66 71%	31 51%	30 71%

*Return rates for Washington and Wyoming are not included. Statistics concerning return rates have been maintained only for states with contracts for medical education through the WWAMI program. Because the first Wyoming class graduated in 2001, return rates are not yet available for that state. From the annual AAMC senior survey, 85% or more of University of Washington School of Medicine graduating seniors have consistently expressed the intention to practice within the five-state region after completion of training.

medical school," UWSOM graduates most frequently cited the WWAMI program. The strength cited second most frequently by UWSOM graduates was the emphasis on and high proportion of graduates in primary care; the strength cited third most frequently was the wide variety of clinical patient populations and variety of hospitals.

In 1995, a one-time survey was mailed to 386 WAMI faculty who had working relationships with the UWSOM to determine their attitudes toward the evolution of the WAMI curriculum and program and satisfaction with their working

relationships with the UWSOM. A total of 184 clinicians (approximately 50%) responded. Faculty were asked to rate their satisfaction with their experiences as WAMI participants, using a 1–4 Likert scale (1 = very satisfied, 2 = generally satisfied, 3 = generally dissatisfied, and 4 = very dissatisfied). Ninety-five percent of the respondents were "very" or "generally" satisfied with their experiences. When asked to rate general teaching issues on a four-point scale rating from 1 (agree strongly) to 4 (disagree strongly), 62% responded "agree strongly," or "agree" to a statement that the overall core course content was well defined; 71% to a statement that they were comfortable with the evaluation system used to grade students; and 87% to a statement that they had the flexibility to add something unique to the course/ clerkship/preceptorship.

IMPLICATIONS OF THE WWAMI PROGRAM

In the 1960s, UWSOM undertook two reflective exercises, one directed outward toward the future of medicine and the other directed inward toward the adequacy of the curriculum. These two exercises had far-reaching results. The Hunter Report, the product of the first exercise, foresaw the renewed importance of primary care for the future of medicine. The report of the comprehensive curriculum review called for enhanced self-learning and flexibility, and earlier and increased exposure to patient care and social aspects of medicine. Taken together, these two documents set new directions for the school of medicine. One of the key results of this self-reflection was initiation of the WAMI program. The program addressed regional medical needs but simultaneously addressed the expansion of medical education into the community.

The program has provided opportunities for medical education for large numbers of residents of states without medical schools. The return rates of students to the WWAMI states indicate that the program has been successful. WWAMI students have returned to their home states at rates exceeding the national average for a state school, and most important, have returned often to pursue practice in underserved settings. Apart from what the program may have accomplished for the region, the WWAMI program has been a defining experience for UWSOM. The program has created excellent relations between academic and community physicians, providing them with joint and complementary functions. The result has been a close collegial relationship between academic and community clinicians that transcends the usual "town-gown" dichotomy. The program has permitted the UWSOM to fully develop an ethic of guided innovation-the willingness to try out new ideas and approaches while systematically and continuously testing their efficacy. The WWAMI program provided the school

with an early example of the value of self-reflection; in fact, the school is currently in the third year of a comprehensive curriculum review that may once again redefine some of its directions. Earlier than most other medical schools, the WWAMI program set a tradition of focusing on primary care in addition to biomedical research, creating the opportunity to excel as a "bimodal school."¹³ The program established a clear emphasis on community-based teaching and moved clinical education out of the hospital long before changes in the health care environment set the stage for all medical schools to make that move.

Why has the program worked? A talented, energetic, and visionary initial group of faculty, both at the medical school and throughout the WAMI states, deserves the credit. By systematically canvassing the states and lobbying for the experiment, the WAMI founders provided firm ground upon which to build a program. The resulting degree of cooperation among participants that has characterized the 30-year history of the program has been maintained across a broad partnership of diverse stakeholders, including state legislatures, state government officials, medical societies, state higher education boards, community physicians, universities, and hospital associations. Strong esprit de corps among faculty, clinicians, administrators, and legislators and a strong focus on participation in and ownership of the program have characterized the WWAMI program from its inception. A talented and dedicated cadre of regional faculty has been the norm. The immediate and sustained attention to educational equivalency was also an important factor.

A concern among many early skeptics was that the clinical experience for medical students at rural WWAMI sites would not be comparable to that at the university-based clinical sites. Such concerns focused on the different type of clinical encounters in rural settings, with more ambulatory than inpatient exposure, and the inability to control the level of teaching when community practitioners are used. To ensure that educational equivalency was the norm, common examinations were instituted, course learning objectives were developed with universal applications, and performance was measured and monitored on an ongoing basis. Frequent contact between faculty, students, and community clinicians at WWAMI sites was also encouraged to assess the level of the learning experience. As a result, faculty visit WWAMI clinical sites on a regularly scheduled basis to evaluate the educational experience, confer with students and clinicians, and offer consultations and continuing medical education for the rural sites. In addition, WWAMI coordinators come to the Seattle campus quarterly for grading meetings, and regular retreats and conferences are held, as means to ensure educational equivalency. Ironically, the early concerns about potentially excessive ambulatory care experience in the rural setting have gone by the wayside with the decline in hospital

care and increases in ambulatory care in all settings. Extensive testing performed annually has shown consistently comparable performances between Seattle-based and non– Seattle-based students on common UWSOM exams and National Board examinations.

The WAMI founders saw the value of an educational continuum, starting with medical school, continuing through residency training, and then progressing through the lifetime of the practitioner via continuing medical education. The concept of a continuum evolved further in the 1980s and 1990s. The program's educational continuum now focuses on developing health care resources regionally through maintaining a presence at all levels of education. This includes K-12 and undergraduate recruitment of students for possible rural medical careers, and programs that support rural practitioners and the facilities upon which they depend.

The concept of a continuum has expanded in other ways as well. A career continuum defines the importance of recruiting and training different kinds of practitioners-physicians, physician assistants, and others-to work in rural settings. The MEDEX program to train physician assistants developed simultaneously with the WAMI program and has a strong regional orientation.¹⁴ An academic continuum means that all aspects of the school of medicine mission are incorporated into the regional program: education, clinical work, research, and community service. In fact, the bimodal strength of the school has led to strong interest in and focus on research in some of the WWAMI sites, including especially well-regarded research programs at the Boise VA Medical Center, the University of Alaska, and the University of Idaho. A geographic continuum defines the region as ranging across five states and spanning inner city, urban, suburban, and rural environments, without a hierarchy defining one environment as of greater educational or service importance than any other. For example, in the R/UOP program, students can work with preceptors in either rural or inner-city settings, and other programs provide experiences in innercity medicine as well. Finally, in the newest frontier, a communication continuum defines the extent to which technology has transformed the realm of communication regionally. Where mail, telephones, and periodic visits once provided the primary connections between urban and rural sites, electronic teaching-learning and telecommunications increasingly link the UWSOM campus in Seattle with sites throughout the region. The vast physical frontier that characterizes the WWAMI region is aptly symbolic of the frontier that will serve the region in upcoming years through critical telecommunication links that bring patients, students, residents, and clinicians in rural settings into the urban classroom and exam room, and vice versa. Just as the WAMI program in the 1970s broke down the traditional walls of medical schools and moved medical training out of the tertiary care center and into the regional community, so may information technology permit the WWAMI program and others like it to move even farther. Telecommunication links that will close distances give promise of adding the concept of "virtual WWAMI" to that of the "medical school without walls" that has come to play such an important part in the culture of the University of Washington School of Medicine.

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Medical Students Reach Out to Rural Communities in "WWAMI Land"

Rebecca Voelker

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Medical Students Reach Out to Rural Communities in "WWAMI Land"

Rebecca Voelker

RMED WITH A COLLECTION OF "Got Milk?" advertisements and brittle cow bones she gathered from a ranch in Montana, Sarah Hollopeter set out on what for her was one of the most tantalizing aspects of medical school: teaching seventh and eighth grade students in Hailey, Idaho, about the debilitating effects of osteoporosis.

the debilitating effects of osteoporosis. For Hollopeter, an Idaho native who received her medical degree in June from the University of Washington School of Medicine (UWSOM), the disease is personal; she has seen its adverse effects in relatives. So she decided to focus on osteoporosis prevention during a special third-year program that sends medical students for 6 months of extended education in selected rural and medically underserved areas.

During her time in Hailey, Hollopeter also helped women in the community receive bone density testing by convincing the local hospital to give discounts on screening with its underused dual-energy x-ray absortiometry scanner.

Working in rural communities, says Hollopeter, was by far her favorite part of medical school. "I got to be part of patients' lives, and that's why I want to be a physician."

MEDICAL EDUCATION CO-OP

The opportunities that Hollopeter and hundreds of other UWSOM students have had to gain hands-on experience in rural community service can be traced back to a state medical association meeting in the late 1960s. There, a group of community and academic physicians decided it was time for decisive action to improve rural communities' health care by addressing the



Medical students can opt for a summer program in which they work with physician-mentors in rural areas. Student Sylvana Bennett and program director Roger Rosenblatt, MD, MPH (right), visit preceptor Clark Fultz, DO, at the latter's clinic in Cut Bank, Mont.

short supply and poor distribution of physicians in Washington, Alaska, Montana, and Idaho.

Believing education was a key to shoring up supply and distribution deficiencies, they laid the foundation for a collaboration in which UWSOM would serve as the hub of a multistate medical education cooperative. In the four-state region, only Washington had a medical school.

In 1971, a core group of faculty launched what is now known as WWAMI (named for Washington, Alaska, Montana, and Idaho; Wyoming joined in 1996), a regional experiment in decentralized, community-based medicine that has endured and thrived for more than three decades. In 2002, the WWAMI program was a major factor in the Association of American Medical Colleges' recognition of UWSOM with its Outstanding Community Service Award.

"We have created a program that allows us to directly provide community service and teach the next generation what community service means how it fits into your practice and your professional life," says John Coombs, MD, associate dean of regional affairs, rural health, and graduate medical education at UWSOM.

Choice, outreach, and opportunity are overriding themes in WWAMI's educational components. The program allows medical students to work side by side with rural physicians, while making publicly funded medical education available to students from states in the region that have no medical school.

Through WWAMI, students from the five-state area spend their first year of medical school in their home state. Besides the University of Washington, participating schools are the University of Wyoming, Washington State University, University of Alaska, Montana State University, and the University of Idaho. The second year is at UWSOM in Seattle, and during the third and fourth years, students can stay in Seattle or choose from some 30 clerkship sites scattered across the five-state region.

The WWAMI program is unique in many ways, chief among them being the strong collaboration among universities in five states that make up 27% of the US landmass but contain only 3.3% of the country's population. Despite the vast geographic divide and array of sites where students fulfill academic

452 JAMA, July 23/30, 2003—Vol 290, No. 4 (Reprinted)

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requirements, WWAMI maintains educational equivalency. Across all the participating universities, "the courses are the same, the credits are the same, and the final exams are the same," says Dwight Phillips, PhD, interim director of the Montana WWAMI program and professor of anatomy at Montana State University.

Taxpayers and state legislatures have collaborated, too. Wyoming, Alaska, Montana, and Idaho support WWAMI by providing tuition subsidies. Students from those four states pay their own in-state tuition for the first year, and then they pay UWSOM's in-state student tuition for the next 3 years. Their home states make up the difference in the cost of out-of-state tuition for the second, third, and fourth years.

"The critical piece here is that a medical student from Montana would not have access to a publicly supported education without WWAMI," says Coombs.

BRING YOUR SUITCASE

For many, the result is a uniquely peripatetic medical school experience. Conceivably, a student could spend his or her first year in Anchorage, Alaska, the second in Seattle, and then travel to such sites as Whitefish, Mont; Rock Springs, Wyo; or Omak, Wash, for the clinical clerkships. WWAMI also includes 98 sites where students can spend up to 6 weeks getting hands-on experience during the summer after their first year, and 10 sites where third-year students like Hollopeter spend 6 months in an extended education program. If the list of required medical school supplies doesn't include a suitcase, it probably should.

For individuals who do not want the adventure to end with graduation, UWSOM's Affiliated Family Practice Residency network has programs in 16 sites scattered throughout what students and program leaders affectionately refer to as "WWAMI Land."

Keeping students academically, clinically, and emotionally grounded over vast geographic distances is no small challenge, says Erika Goldstein, MD, director of UWSOM Colleges and chair of introductory clinical medicine courses. The college system that Goldstein directs is only a year old, comprising six colleges—each represents a WWAMI region and is named for a geographic wonder, like the Snake River in Idaho or Mt Rainier in Washington. The 30 faculty members are divided among the colleges, and each one acts as an advisor to six students. College faculty meet weekly with students during their second year, when all are in Seattle.

"The structure of the colleges goes a long way in helping to overcome the potential downside of the distances," says Goldstein. Some may feel lost once they leave the structured academic environment. "We want to make sure that their clinical skills are launched correctly, and that they stay on their agenda," she explains. That can mean explaining how one rotation feeds into the next, or soothing students who find it difficult to deal with dying patients. "This way, each student has a mentor," says Goldstein.

Mentors come in many varieties, including some 3000 community physicians who have volunteered as WWAMI preceptors and in other capacities during the past 3 decades. Students say the preceptors help them learn clinical skills and feel welcome in the community. Preceptors say students help them by challenging conventional wisdom.

"The students make us question and rethink what we've naturally come to do," says Ron Miller, MD, a family physician and WWAMI preceptor in Whitefish, Mont. For example, a student who had just finished a psychiatric rotation reminded Miller and the other primary care physicians in their practice to exclude bipolar disorder before considering diagnoses of unipolar depression. It is an important concern in Miller's practice. "We see a lot of depression," he says.

Landing in a rural Northwest community "can be an amazing culture shock" for medical students, says Roger Rosenblatt, MD, MPH, director of WWAMI's summer Rural/Underserved Opportunities Program (R/UOP) for students who have just finished their first year. Sometimes the student housing lacks indoor plumbing. Students can also find themselves in some unexpected situations. During her R/UOP experience last summer, Mary Pan frequented the casinos and bars of Belgrade, Mont, on the advice of her preceptor. The reason: to pass out flyers announcing public presentations on the importance of screening for breast and cervical cancers that Pan would give at local senior and community centers. "It wasn't all that intimidating," says Pan.

Community work also brings out students' creativity. While teaching a school health class in Sandpoint, Idaho, as part of the extended 6-month WWAMI Rural Integrated Training Experience (WRITE) program, Jimmy Beck used M&M candies to demonstrate the effect of antidepressants on neurons and neurotransmitters.

RETURNING HOME

One of WWAMI's guiding principles is that the more training students receive in their home state, the more likely they are to return to practice after residency. The principle is particularly important in Alaska, says Tom Nighswander, MD, MPH, clinical education coordinator of the Alaska WWAMI program.

"Training Alaska Natives is a paramount issue," says Nighswander. In the last decade, he estimates that 20% of the first-year students in the Alaska WWAMI program have been Alaska Natives. Since the late 1970s and early 1980s, corporations owned and operated by Alaska Natives have supplanted the US Indian Health Service in the operation of hospitals and clinics. "The Indian Health Service is pretty much obsolete" in Alaska, he explains.

What's more, Nighswander says, the US Department of Labor has estimated that the state will need 200 new physicians and 4000 new nurses in the next 10 years. Harold Johnston, MD, program director of the Alaska Family Practice Residency, which is owned by Providence Hospital in Anchorage and affiliated with WWAMI, says that about 75% of Alaska is medically underserved.

"Without the rural programs in the WWAMI region," Johnston says, "we would be more seriously underserved than we already are."

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Regional Solutions to the Physician Workforce Shortage: The WWAMI Experience

Tom E. Norris, MD, John B. Coombs, MD, Peter House, MHA, Sylvia Moore, PhD, RD, Marjorie D. Wenrich, MPH, and Paul G. Ramsey, MD

Abstract

With major medical organizations predicting a national shortage of physicians in coming years, a number of institutional models are being considered to increase the numbers of medical students. At a time when the cost of building new medical schools is extremely expensive, many medical schools are considering alternative methods for expansion. One method is regional expansion. The University of Washington School of Medicine (UWSOM) has used regional expansion to extend medical education across five states without the need to build new medical schools or campuses. The

Physician workforce predictions have influenced the expansion and contraction of the number and the capacities of medical schools throughout the history of

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WWAMI program (the acronym for Washington, Wyoming, Alaska, Montana, Idaho), which was developed in the early 1970s, uses existing state universities in five states for first-year education, the Seattle campus for second-year education, and clinical sites across all five states for clinical education. Advantages of regional expansion include increasing enrollment in a cost-effective fashion, increasing clinical training opportunities, responding to health care needs of surrounding regions and underserved populations. and providing new opportunities for community-based physicians to enhance

U.S. medical education. Recently, influential medical organizations have called for a 15% increase in medical school enrollment by 2015,^{1–3} and some discussions call for a 30% increase.⁴

Strategies to address anticipated workforce shortages in the early 21st century included expanding medical school enrollment and graduate medical education (GME) positions, as well as increasing the number of medical schools and residency programs, especially in underserved areas.³

Federal policies and subsidies fueled the expansion of medical school growth in the 1960s and 1970s. Such subsidies are not being seen in the current period, so the costs of expansion will be a major problem. In efforts to be cost-effective, medical schools have developed alternative models for expansion, such as regional campuses, collaborative arrangements, and incorporation of community-based faculty into teaching roles.

In this article, we review past medical school expansions and key models to address projected shortages. In particular, we describe how the University of Washington School of Medicine (UWSOM) uses a regional model, the their practice satisfaction. Challenges include finding basic-science faculty at regional sites with backgrounds appropriate to medical students, achieving educational equivalence across sites, and initiating new research programs. UWSOM's successful longterm regional development, recent expansion to Wyoming in 1997, and current consideration of adding a firstyear site in Spokane, Washington, indicate that regional expansion is a viable option for expanding medical education.

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WWAMI (the acronym for Washington, Wyoming, Montana, Alaska, Montana, Idaho) program to provide medical education for a five-state area without construction of new medical schools.

Historical Fluctuations in Numbers and Enrollments of Medical Schools

Physician workforce predictions have varied widely over the last 60 years. From concern about physician shortages after World War II through the 1970s, to predictions of surpluses in subsequent decades, to current concerns about likely future shortages, workforce predictions have influenced expansion and contraction patterns of existing schools and development of new schools. Throughout the history of medical education, the nation has lacked an optimal number, mix, and geographic distribution of physicians. The maldistribution of physicians has affected rural areas disproportionately, and there has been a consistent need for primary care physicians in rural settings for many decades.

The number of medical schools has also varied widely (Figure 1). In 1910, there were 131 U.S. medical schools.⁵ The

Page 1 of 6



Figure 1 Number of allopathic medical schools in the United States from 1910 to the present.

Flexner Report, released in that year and calling for quality over quantity, led to substantial closures. By 1930, 76 medical schools remained, and the national physician-to-population ratio declined. Before and after World War II, new medical schools were built, including UWSOM.6 Later, demand for physician education increased, both from applicants seeking spots in medical school and from patients in underserved regions. In the late 1950s, a shortfall of nearly 40,000 physicians by 1975 was predicted; recommendations called for increases in medical-school graduates from 7,400 per year to 11,000 per year.⁶ Congress responded favorably, providing federal matching funds for construction of new facilities for existing schools that increased their entering class sizes.

Construction of new medical schools, coupled with larger enrollments at existing schools, increased the numbers of physicians nationally. Medical schools built between 1960 and 1980 were primarily community-based medical schools, often created to train primary care physicians.^{5,7} By 1980, 125 medical schools were operating—nearly the number in existence at the time of the Flexner Report. Florida State University College of Medicine, which opened in 2001, has been cited as the first new allopathic medical school in 20 years.⁸

Contemporary Calls and Plans for Increases in Enrollments

Current calls for expanding medical school enrollments emanate from physician workforce trend analyses by influential national organizations, including the Association of American Medical Colleges (AAMC), the American Medical Association (AMA), and the Council on Graduate Medical Education (COGME).^{1–3} Shortages are predicted for both primary care physicians and specialists. National recommendations

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call for development of medical school and residency positions in or adjacent to physician shortage/underserved areas, in undersupplied specialties, and in areas of rapid growth.^{1,3} A recent report from COGME calls for a 15% increase in total enrollment in U.S. medical schools from their 2002 levels over the next decade and an increase in the number of physicians entering residency training each year from approximately 24,000 in 2002 to 27,000 in 2015.² The current level of activity at medical schools is likely to yield an increase of 5% to 8% in additional graduates by 2015.⁹

Models for Expansion

Anticipated models for expansion include increasing existing medical school enrollment, building new schools, and adding campuses or regional sites. A 2004 survey of deans at the 125 allopathic medical schools demonstrated that 31% of the 118 responding schools had already expanded or would definitely or probably expand class size in the next six years, which would result in a 4% increase in graduates.^{10,11} Another 20% of deans (23 schools) said an increase was "possible"; 47% (55 schools) responded "definitely" or "probably not."

The 2005 entering class had more than 17,000 students, a 2.1% increase over 2004 figures, indicating that enrollment increases are under way.12 Twenty-two allopathic schools expanded class size by at least 5%; seven of these expanded firstyear enrollment by more than 10%.12 Based on information from deans, the AAMC concluded that by 2010, the nation's allopathic schools are likely to increase the number of graduates by at least 4.5% (to 17,278) and by as much as by 7.3% (to 17,928).9 Barriers cited to increasing enrollment included concerns about high and unrecoupable costs, especially among public schools dependent on tight state budgets, not

enough preceptors in ambulatory settings, and limited labs, study space, and clinical training sites.

Among 56 medical schools indicating a "definite" or "probable" enrollment increase, expansion of existing facilities was the most likely method.¹¹ Sixty-six percent (37 schools) chose new clinical affiliations as a mechanism to increase enrollment. Fifty-two percent (29 schools) were considering expansion of existing campuses to accommodate enrollment expansion. Nineteen (34%) considered this a definite option. Sixteen schools (29%) reported a new satellite/ regional campus as an expansion option, and five (3%) called this option definite. Below, we discuss regional expansion as an option and our own experiences with that approach.

Regional Expansion: History and Opportunities

Status of regional expansion

A 2003 AAMC report on regional campuses cited a number of existing definitions of regional campuses.13 By the definition used in the report (geographically separate and not the medical school's primary clinical site for education; has administrative ties to the dean's office and not simply a department tie; and offers at least four required third-year clerkships), 41 regional campuses were identified at 25 medical schools. Several others were slated to open in subsequent years. Twenty-five medical schools (which will be 27 by the time this article is published) had at least two campuses: a main campus and one or more regional clinical campuses, where third- and fourth-year medical students are educated. The report did not cover in detail those with regional basic-science campuses within existing state universities.

Six medical schools were cited as having basic-science branch campuses without clinical activity: Indiana University School of Medicine, with eight branch campuses; David Geffen School of Medicine at UCLA, with one branch campus; University of California, San Francisco, School of Medicine, with one branch campus; University of Illinois at Chicago College of Medicine, with one branch campus that is also a clinical branch campus; University of Minnesota Medical School, with one branch campus;

Page 2 of 6

and the University of Washington School of Medicine, with five branch campuses.

Advantages of regional expansion

Branch, or regional, campuses were seen as increasing enrollment in a costeffective fashion, increasing clinical training opportunities and sites, especially ambulatory training sites, expanding graduate medical education (resulting in the need for more teaching patients), and responding to health care needs of surrounding regions and underserved populations.¹³

A major detriment to starting a new medical school is the cost. The 1970 Carnegie Commission on Higher Education called for a 50% increase in the number of first-year medical students by 1978, and called for nine new university health-science centers.13 Six of the nine cities cited as needing new medical schools opted instead to develop regional, or branch, campuses. As the AAMC report notes, this underscores the difficulties in starting new medical schools, including high start-up costs, local and state politics, and reluctance of existing medical schools to support new competition.¹³ The most recent medical school to be built, at Florida State University, cost \$155.5 million for facilities and operating revenue.8 The state annual operational funding at full roll-out is expected to be \$38 million a year.

Models of regional expansion

Although the AAMC report focused on regional campuses that offer at least four required third-year clerkships, there are a number of regional models. The most common teaches basic sciences at a central medical school and offers clerkships at regional centers. Examples include Florida State University College of Medicine, University of North Dakota School of Medicine and Health Sciences, University of South Dakota School of Medicine, and Michigan State University College of Human Medicine.

Another model involves offering part or the entire basic science curriculum regionally with clerkships both centrally and regionally. Indiana University has eight branch campuses for medical education that provide first- and secondyear medical school programs; all students complete clinical training at the Indianapolis campus.

> A-3.5/206-10 6/10/10

The University of Washington's WWAMI model represents another variation. Firstyear basic sciences are offered at the Seattle campus and five regional campuses; students attend their home state campus. For the second year, all medical students train in Seattle. In the third and fourth years, clerkship sites are located in Seattle and throughout the five-state region; medical students choose where they complete their rotations. The section below describes WWAMI in more detail, including consideration of plans for further expansion.

WWAMI Expansion: Past, Present, and Future

History of WWAMI and infrastructure

The WWAMI program's inception, history, and development have been described elsewhere in detail.¹⁴ Briefly, the regional program was developed in the early 1970s as a cost-effective solution to health provider and health care shortages in Northwest states without medical schools. The program increased the number of publicly supported medical school positions in a wellestablished, high-quality medical school (UWSOM) without the major capital construction associated with building new medical schools and without adding significant numbers of new faculty. The primary care focus and significant time each student spends in his or her home state increases the likelihood of returning to practice in one's home state. Each WWAMI state has well-regarded state universities from which most basic science faculty can be drawn for teaching first-year medical students. The different components of the program are described below.

First-year program. Existing state universities serve as first-year academic basic-science sites. These include the University of Alaska at Anchorage (Anchorage—10 students trained per year), Montana State University (Bozeman—20 students), the University of Idaho (Moscow—18 students), and University of Wyoming (Laramie—14 students). Washington residents spend their first year at the Seattle campus (100 students) or at Washington State University-Pullman (20 students), in which case they study with their classmates at nearby University of Idaho. Second-year program. Students from each regional first-year basic science campus train in Seattle at the UWSOM campus, receiving intensive contact with clinically based academic physicians and physician-scientists in basic-science classes in the integrated organ-system structure. All students receive an intensive introduction to clinical medicine (a continuation of a first-year course at regional campuses) that brings them to the bedside for one half-day each week, working with a faculty mentor and small group of medical students.15 Faculty mentors maintain contact with their student groups until graduation.

Community-clinical units. UWSOM has affiliations with over 3,000 individual physicians in over 170 active communitybased educational sites throughout the five states to teach students in the required and elective clerkships. Settings include community clinics, private practices, and affiliated hospitals. Students choose a combination of states and sites for required and elective clerkships; some spend most of their time in Seattle, others spend considerable or most of their time at regional community sites. Clerkships are hospital-based, ambulatory-practice based, or a combination.

Some states have developed "tracks" or clinical education centers where students complete most or all of their third-year clinical education within a single state. Such tracks are currently offered in Boise, Spokane, and Anchorage, and will eventually be offered in Montana.

Expansion to Wyoming

The first addition of a new academic site since the program's inception was at the University of Wyoming in Laramie. This site began in 1997, training 10 students per year. The regional campus developed in the context of an existing College of Health Sciences established in 1984. The Wyoming legislature has expanded its support of the program by passing a bill increasing Wyoming's participation.¹⁶ The bill allows the state to increase its portion of the WWAMI program to as many as 16 students by 2007. Clinical training sites in Wyoming begin in 1998.

The successful involvement of Wyoming physicians across multiple clinical sites resulted from early attention to building partnerships and formal agreements with

Page 3 of 6



Figure 2 Results from the 2000 University of Washington WWAMI Faculty Survey. Ratings by 238 faculty throughout the five-state region of the impact of teaching students on various aspects of clinical practice at regional WWAMI sites. Faculty included those at first-year sites, clerkships, and residencies, and clinical preceptors throughout the region. Respondents were asked to rate each item on a 1–9 scale with categories ranging from *strongly negative* to *neutral* to *strongly positive*.

the Wyoming Medical Society and the University of Wyoming. A Wyoming physician has been hired to work as the clinical coordinator. The visibility of WWAMI students serving in clinics and hospitals across Wyoming has strengthened support from the Wyoming legislature, and Wyoming views WWAMI as its medical school.

WWAMI Expansion: Interest, Plans, and Challenges

Expansion in existing regional sites

Periodically, the WWAMI states have expressed interest in expanding the number of medical students at their firstyear sites. Discussions on possible expansion have occurred recently in Wyoming (expansion now under way), Montana, Idaho, and Alaska.

Current interest in a new first-year site

In 2003, the community in Spokane, eastern Washington's largest city, started a dialogue with the UWSOM for a new first-year site there. Initially interested in a separately accredited school of medicine, the community became more interested over time in joining WWAMI. The community identified the goals of increasing the number of physicians trained in the Spokane area, thereby increasing the supply of physicians in the

> A-3.5/206-10 6/10/10

state, with particular emphasis on Spokane and eastern Washington; responding to the need to train physicians for underserved rural areas in Washington; and increasing local support for biomedical research and, correspondingly, increasing economic development and new industry. UWSOM's dean called for a feasibility study, now completed; on July 21, 2006, a formal announcement of intent to seek state funding for this expansion was released by the University of Washington, UWSOM, Washington State University, and legislative leaders. A new site would initially accommodate an additional 20 students per year.

Challenges associated with initiating a new site

WWAMI regional administrators have identified several challenges to consider when initiating a new regional site:

Creating basic-science programs away from the medical school site. Preclinical medical students require faculty with scholarly backgrounds who can teach these students the clinical implications of the basic science subjects they are learning. Medical students, both preclinical and clinical, are a different student population from graduate students and residents, and appropriate instructors must be identified. This sometimes means recruiting outside of existing faculty.

Financial and physical plant challenges.

Total costs to initiate and implement a regional site are not nearly as extensive as those needed to start a new medical school, but start-up costs and educational space still must be considered. In Spokane, which has a relatively new and not fully occupied health sciences campus, capital expenditures are needed to initiate a willed-body program, upgrade the gross anatomy lab, provide microscopy/histology materials, recruit faculty, and provide funds for six new faculty, lab leases, equipment, and lab personnel. Research space must be identified to recruit basic science faculty. The program would also expand needs at the Seattle campus. Start-up and operating costs involve expansion of lecture halls, small-group teaching, and teaching and anatomy spaces to accommodate second-year Spokane students. This may or may not be needed for other medical schools, but the UWSOM has reached the limit of its ability to accommodate medical students in existing facilities.

For expanded clinical education, sites for an additional 20 students per year must be identified throughout the five states; presumably, the majority will be in the Spokane region. In an age of increased productivity demands on clinicians, finding community-based clinical teachers to serve as preceptors and clerkship instructors is challenging. This strong commitment requires teaching skills and willingness to undergo faculty development training.

Research at regional sites. The new medical schools created in the 1960s reported difficulty being accepted by their traditional counterparts, in part because of their preoccupation with educational issues and modest funding of research.7,13 Many regional clinical campuses, which focus almost entirely on clinical teaching with little or no research enterprise, faced similar challenges. In the WWAMI states, expectations for research activities have grown and are an important part of the program for regional partners. In 2002, the total external research funding for WWAMI faculty ranged from \$2.5 million to \$14 million per year per site from a variety of

Page 4 of 6



Students' reactions to the regional program are consistently positive, as judged by graduating students' responses to the open-ended question, "Please comment on what you perceive to be the strengths of your medical school," tabulated from the AAMC graduation questionnaire for the years 1995 through 1998 and 2002. The WWAMI program, with its first-year and clerkship components considered together, received the highest number of positive comments for three of the five years, and the second most comments for the other two years. Comments in 1999-2001 and 2003-2005 were similar to these.

Summing Up

Medical schools will likely expand over the next 10 years, whether through expansion of existing schools, construction of new schools, or development of regional campuses and programs. Based on surveys of medical school deans, it appears likely that all those models will be utilized. Construction of schools is an enormous undertaking that frequently costs over \$100 million; high start-up costs and extended development time are inevitable.8 However, there may be compelling reasons in some settings to initiate new schools. Expansion in existing space works well when space, facilities, teachers, and clinical teaching sites permit or resources are available for expansion. Another option is regional expansion.

The University of Washington School of Medicine WWAMI program has expanded medical education into four surrounding states. Regional expansion was completed without construction of new buildings, campuses, or centers. The program relies on collaborative relationships with existing state universities and faculties for preclinical basic-science education, and on volunteer regional clinicians for clinical education. Participating clinicians hold clinical faculty status and receive the benefits, training, and requirements commensurate with that status; they teach, monitor, and mentor students in

Page 5 of 6



Figure 3 Results from the 2005 University of Washington WWAMI Faculty Survey. Ratings by 259 faculty throughout the five-state region of the impact of teaching students on various aspects of clinical practice at regional WWAMI sites. Faculty included those at first-year sites, clerkships, and residencies, and clinical preceptors throughout the region. Respondents were asked to rate each item on a 1–5 scale with categories ranging from *strongly negative* to *neutral* to *strongly positive*. The 2005 survey contained two items, *keeping current* and *computer literacy*, that were not used in the 2000 survey (see Figure 2).

federal and private sources. As a result of these successes, conduct of research has become an expectation among WWAMI first-year sites, along with the expectation of related regional economic development.

Educational equivalency. A significant challenge in expanding or establishing a regional site is ensuring educational equivalency, mandated by the Liaison Committee on Medical Education. UWSOM embraced equivalency upon inception of the WWAMI program and has focused on it consistently. The University of Washington Department of Medical Education tracks students closely and helps assure and demonstrate educational equivalency.14,17 Frequent meetings and trips by UWSOM faculty to first-year and clinical sites, along with annual retreats, are mechanisms for training and ensuring equivalency of approach. Careful evaluation occurs through common exams across all sites and at regular grading and curriculum meetings with clerkship directors and teachers from all sites.

Challenges and rewards for regional

clinical faculty. Volunteer faculty must meet their own clinical practice needs and achieve satisfaction and value from faculty activities. To that end, UWSOM conducted surveys of regional clinically-

> A-3.5/206-10 6/10/10

based volunteer faculty in 2000 and 2005 to assess challenges and satisfaction associated with clinical teaching.

Community-based clinical faculty experience both rewards and challenges (see Figures 2 and 3). Survey responses from 268 faculty from throughout the five-state reason in 2000 indicated that the negative impacts of teaching students were relatively minimal compared with the positive impacts. In 2000, the greatest negative impact was on productivity (27% rated a negative impact), followed by workload (26% rated a negative impact). Income was third; 16% rated the impact on their incomes of teaching students as negative. In 2005, 44% of 259 respondents assessed a negative impact of teaching students on workload, 37% assessed a negative impact on productivity, and 28% assessed a negative impact on income.

Across both the 2000 and 2005 surveys, the greatest positive impact was seen in achieving professional goals (85% in 2000 and 88% in 2005 rated serving as a clinical teacher in the WWAMI program as having a strong positive impact on professional goals in their practices). In 2000, other areas in which clinical faculty assessed a positive impact on their practices were office operations and staff (60%), patient care (58%), and colleague their practices, whether hospital-based or practice-based. Several University of Washington affiliate hospitals located regionally, such as the Boise Veterans Administration Hospital in Boise, Idaho, permit more concentrated basic and elective clerkship activities in and around that site.

Key challenges to the regional model also represent strengths. Those that we have encountered include (1) meeting the unique needs of each region; (2) ensuring educational equivalence; and (3)maintaining interest in, attention to, and unity among program participants across a diverse geographic spread. While preserving this unity is a challenge, we have evidence that, on the whole, our volunteer faculty greatly benefit from their work with WWAMI. The positive effects of teaching students on clinical practice generate loyalty among regional volunteer faculty, as do the clear signs that the WWAMI program is having a positive effect on correcting shortages and maldistribution of physicians in these rural states. These elements, in turn, strengthen the entire WWAMI program.

The WWAMI program was developed to respond to the needs of the surrounding states, all of which were medically underserved and none of which had their own medical schools. Participating states aimed to have medical students return to practice in their home states, and this has been achieved. UWSOM has a high retention rate for students who ultimately practice in their home states. Return rates of students in each of the WWAMI states have been well above the national average. State needs change over time, as evidenced by the Spokane community's interest in a new first-year WWAMI site. The nature of those interests may shift; one of the Spokane community's interests, in addition to increasing the number of future physicians in their region, is promoting biomedical research and related areas as an economic priority for their region. Thus, considering a new site in Spokane must strongly consider this aspect of regional campus development planning.

A focus on partnership among all participants is a key factor in the WWAMI program's success. Continued evolution of the program is another important factor, with careful

> A-3.5/206-10 6/10/10

development of new ideas, such as the WRITE program (which stands for WWAMI Rural Integrated Training Experience), which gives a small number of students sustained exposure to a rural community in third year.¹⁴ This evolution helps keep the program fresh and contemporary. The focus and evolutionary development of an educational continuum that considers the needs of undergraduate medical education, graduate medical education, continuing education, and recruitment to health careers in K-12, has helped maintain strong interest in and awareness of the relevance of the program to regional communities.

The Value of Regional Approaches

The reasons to consider regional campuses and regional programs are many. At the top of the list is their costeffectiveness, making use of and carefully building on existing resources to assure a combination of high quality and low cost. Given the important challenge of containing health care costs, efficiency and cost-effectiveness are imperative. Building on an existing successful program has the potential to save money, spread the strengths and lessons of that program to new regions, and build community and cohesion region-wide. The enthusiasm of the medical students in the WWAMI program for the education they receive and the enthusiasm of the regional WWAMI faculty for the way the program helps them stay current and develop and enhance collegial relationships speaks to the success of that program and of the regional education approach it embodies.

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Dr Mouradian oversees the implementation the School of Dentistry's new distributed community-based model for dental education in eastern Washington based on the "WWAMI" model. Launched in 2007, the program targets the training of dental students for work in rural and underserved communities. RIDE is an interdisciplinary collaboration of UW Schools of Dentistry and Medicine, Eastern Washington University, and Washington State University. A product of WWAMI training herself, Dr Mouradian practiced primary care pediatrics in a rural community in Washington for a number of years.

Dr Mouradian has worked at the interface of medicine and dentistry for 19 years and is a nationally recognized expert in this area. She was the recipient of national awards for her role organizing and chairing a

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Surgeon General's Conference on Children and Oral Health in June, 2000 and has been oral health advisor to the American Academy of Pediatrics since 2001. Previously, Dr. Mouradian was Director of the Craniofacial Program at Children's Hospital in Seattle.

Dr. Mouradian has graduate degrees from Columbia University and the Massachusetts Institute of Technology and undergraduate degree from Wellesley College. She completed a Fellowship in Developmental Pediatrics and a Certificate in Health Care Ethics at the UW, and was a 2006-7 fellow in the Executive Leadership in Academic Medicine (ELAM). Her research interests include rural health workforce studies, ethics and policy in the provision of oral health care to children, quality of life for children with craniofacial conditions and inter-professional education.

Regional Initiatives in Dental Education

In most of rural Washington, finding professional dental care is a challenge. But in 2012, when the University of Washington's new RIDE (Regional Initiatives in Dental Education) program produces its first crop of eight dentists, people in remote areas of the state may begin to enjoy easier access to oral care.

That's the chief goal of RIDE, the first program of its kind in the nation, which the state legislature voted to fund last April. RIDE students will spend roughly two of their four years of dental school away from Seattle, taking classes through a facility in Spokane jointly owned by Washington State and Eastern Washington Universities, and doing clinical training with dentist-mentors at a variety of remote sites. By exposing students early to dentists who are providing care in underserved communities, RIDE hopes to encourage students to seek similar practice opportunities... Approval of RIDE by Governor Gregoire and the legislature this spring was the culmination of four years of hard work by a team of dentists and educators from around the state. Paradoxically, the driving force behind the effort was someone who is not a dentist but a physician: Dr. Wendy Mouradian, who now directs the RIDE program from her position as Clinical Professor of Pediatric Dentistry, Pedatrics and Dental Public Health Sciences.

"Without her," says Dr. Richard McCoy, former chair of the University of Washington School of Dentistry's restorative dentistry department and an early backer of RIDE, "this would never have gotten off the ground." Other key supporters of the RIDE program have included the Washington State Dental Association (WSDA), Washington Dental Service, and Spokane District Dental Society among others. But Mouradian has been the faculty member pulling it all together.

So just who is this "upstart physician," as she jokingly describes herself? And how did she help get RIDE underway?

First a little background...

RIDE attempts to alleviate a set of problems that have been building for years.

Dentists, as a rule, have historically preferred working in more heavily populated areas, where patients are easier to come by and fees may be higher. This pattern leaves many areas of the nation underserved for dental care, forcing residents to either forego dentistry or have to travel long distances to seek treatment.

Washington State is no different. Only the areas around the larger cities–Seattle, Everett, Bellingham, Spokane, Port Angeles, and Portland, Oregon–have a sufficient supply of dentists. Pend Oreille County, for example, in the far northeastern corner of Washington, has about 12,000 people scattered throughout its 1,425 square miles, with only two dentists to serve them. (King County, by comparison, has six times as many dentists per capita.)

Washington's population has steadily increased since 1945, from 2 million to more than 6 million today. Yet the growth in dentistry hasn't kept up with the demand for dental services. In addition to this shortage, about half of Washington's dentists are predicted to retire by 2013, which will make the number of dentists in the region even more scarce.

In 2003, Mouradian, then a developmental pediatrician in the UW School of Medicine, approached University of Washington School of Dentistry Dean Martha Somerman and suggested building on the results of an early feasibility study conducted by UW faculty members to find solutions to the problem of dentist shortages. The school was fortunate to have this "running start", which in the past faced obstacles around timing and funding. Dean Somerman, who had already identified a WWAMI-like program as a possibility early in her tenure at the school, readily agreed with the proposal.

Mouradian's knowledge about dental needs in rural areas isn't as odd as you might think, given her background. Growing up in New York City, "I had dentistry for dinner," she quips. Her dad was a dentist and as a result her first job as a teenager was working in his office during summer vacations. But rather than join him in that profession, she was pulled to the medical side by the influence of her two uncles, both doctors, one of whom shared an office with her dad.

That made a big impression on her. And so did her experience as the Director of the Craniofacial Program at Seattle Children's Hospital, a position she held from 1994 to 1998. There were team members from more than a dozen disciplines, working on patients with cleft lip and palate and other craniofacial anomalies, incorporating such specialties as oral and maxillofacial surgery, orthodontics, speech and language therapy, audiology and pediatrics. Though most of the children's medical needs were met at the hospital, she noticed that many of them had advanced tooth decay and other dental problems – problems that had been over-looked by physicians.

"Will RIDE succeed in attracting dentists to underserved areas? That's the million dollar question. Today only 1 in 25 dental school graduates choose to practice in rural areas, or about two per graduating class the size of the UW's. If only half of the RIDE graduates wind up working in remote communities, that will contribute substantially to the access issues in rural communities."

A-3.7/206-10 6/10/10 Page 2 of 4



Her familiarity with dental issues was one reason she was recruited to organize and chair the U.S. Surgeon General's Conference on Children's Oral Health, held in Washington D.C. in 2000. That was another eye-opening experience for her. "I began to see more clearly that on a policy level there was a disconnect between medicine and dentistry. Physicians were 'Oh, hmm, okay, oral health, that's about brushing your teeth. Medical and dental integration was almost non-existent." Since then Mouradian has fought hard to make that integration happen, weaving oral health into general medical education.

A big part of the reason RIDE got off the ground was Mouradian's ability to form a network of medical and dental resources, both people and programs. As a pediatrics resident, she'd participated in WWAMI, a 30-year-old program the University of Washington Medical School has used to in educate doctors in areas that have no medical schools. (The acronym stands for Washington, Wyoming, Alaska , Montana, Idaho). Students spend time at both the UW Seattle campus as well as extended "clerkships" in other states, under the supervision of practicing doctors. Both she and Somerman realized that they could use the WWAMI model and many of its facilities and methods for a similar program for dental school students. Fortuitously the WWAMI program also decided to create a new site in Spokane which will start at the same time as the RIDE program thus cutting costs and providing interdisciplinary training opportunities. "The precedent of the highly successful WWAMI program was essential for launching the RIDE program," Mouradian said. "What WWAMI has learned is that community-based education works. Students can learn outside of the 'ivory tower,' and that this can be verified by equivalency on national board scores and other measures. The School of Medicine has also learned that there is a huge reciprocal benefit of community good will and continuing education that develops from inviting community practitioners into the educational process. And students do in fact return to these regions at higher rates than the national average. Although dental education is different from medical education in many respects, our pilot experiences with community-based education and the experiences of other dental schools with similar experiences suggest that dental outcomes can be comparable."

Jim Sledge is a Spokane dentist who has been working for years to get more of a UW School of Dentistry presence in that city, and has campaigned for RIDE. He describes how RIDE differs from approaches used in other parts of the country: "The shortage of dental professionals in underserved areas is nationwide. Other schools have attempted to expose students to those areas for a couple of weeks on rotations during their 4th year. RIDE's approach is different in that we are borrowing from the WWAMI experience, which shows that a longer exposure to a rural area increases the possibility that a student will go back to a rural community once they are ready to practice.

"The precedent of the highly successful WWAMI program was essential for launching the RIDE program...The School of Medicine has also learned that there is a huge reciprocal benefit of community goodwill and continuing education that develops from inviting community practitioners into the educational process. And students do in fact return to these regions at higher rates than the national average."

8



L to R: Dean Martha Somerman, Dr. Wendy Mouradian, State Rep. Ross Hunter and Rick Crinzi ('72)



Spokane, WA - Riverpoint Campus

"RIDE students will spend their first year in Spokane in an unusual but stimulating environment that puts them in classes with medical, nursing, physical therapy, and hygiene students. The hope is that they all will benefit from collaboration and more holistic approach to health because of it. Then they will spend most of their 4th year in Eastern Washington, many of whom are UW dental alumni, in different clinical settings that will expose them to rural communities as well as community health clinics. They will be performing many more procedures than their Seattle colleagues by the end of their 4th year." Mouradian concluded, "Without their help and support, and that of the Spokane District and Washington State Dental Societies, we could never carry out this program."

Will RIDE succeed in attracting dentists to underserved areas? That's the million dollar question. Today only 1 in 25 dental school graduates choose to practice in rural areas, or about two per graduating class the size of the UW's. If only half of the RIDE graduates wind up working in remote communities, that will contribute substantially to the access issues in rural communities.

Besides its immediate impact of improving oral health in remote areas, RIDE may also have an effect on both the medical and dental professions over time. By mixing medical and dental students in the same classes during the first year, a feature of the RIDE program and through the sharing of ideas and concepts, the image of dentistry as "brushing your teeth" may slowly begin to shift to its rightful position as an integral part of overall health.

Relying on rural dentists to serve as mentors for RIDE students will benefit to dentists — by keeping them abreast of new ideas and engaging them in the training of the next generation of dentists — and students alike, by affording them ample real-world experiences.

Another effect RIDE will have is to provide a different model for dental school students to follow, one that exposes students to community dentists who have lived their ideals and provided care for the underserved.

"I think there are dentists who view their role as a health professional especially rewarding and valuable," said Mouradian. "Certainly there are idealistic people who enter medicine and dentistry. But we have to go out of our way to show them that there are other role models out there. We have to say in dental schools, 'Hey, providing care in an underserved community may be one of the most rewarding professional experiences you have.' "

More information is available online: www.dental.washington.edu/RIDE

A-3.7/206-10 6/10/10





RIDE classroom is among UW's most advanced

BY ERIN LODI / UWTV

ONE OF THE UW'S MOST ADVANCED classrooms is helping to blaze new trails in dental education.

Room T-733 in the Health Sciences Center is the technological linchpin of the Regional Initiatives in Dental Education program, linking students and instructors in Seattle to those at Spokane's Riverpoint campus.

New tools like automated highdefinition cameras, an integrated audio system and comprehensive recording mechanisms take the distance education experience for RIDE students far beyond a simple teleconference.

Dr. David Pitts, Associate Professor of Endodontics and Director of Educational Technology for RIDE, first approached UWTV engineers for assistance in connecting students on opposite sides of the state.

The engineers designed and managed the installation of distance learn-A-3.8/206-10 6/10/10 ing technology in the classroom, including four cameras, two aimed at the instructor and two that focus on students and other participants. Automatic processes allow for seamless transitions between camera views.

Sixty microphones allow every student, or additional instructor, in the 120-seat room to be heard. The automated system picks up the speaker's voice while a camera automatically focuses on the face.

"Nothing quite like this has been done before in the School of Dentistry," Dr. Pitts said.

Two flat-panel television screens hang from the middle of the ceiling, allowing the instructor to view PowerPoint slides or other materials, as well as video of the Spokane classroom, without turning around to see the two screens behind them at the front of the room. Additional presentations are incorporated into the video output, allowing students in Spokane to continue viewing the video stream of their instructor speaking or another student posing a question, while PowerPoint slides are displayed simultaneously.

Like any complex system, the equipment requires maintenance, but automation eliminates the need for manual camera or audio control. At times, a technician is stationed in the control room to monitor the connection to the Spokane class, though these functions can also be performed by the instructor through touch-screen controls at the podium.

In addition to the interactive live experience, Mediasite, a video streaming and archiving system, also records the lectures, incorporating any PowerPoint or other presentations, which are then made available to students who are either unable to attend a class or who wish to review a class.

"It's working beautifully," Dr. Pitts said. "I had no idea it would be this capable."

RIDE students are adapting quickly. "They are desirous of using technology," said Dr. Wendy Mouradian, RIDE director and Associate Dean for Regional Affairs and Curriculum, who added that the streamed lectures are very popular among students. "This has been highly successful."

The new high-tech classroom is not limited to use by the RIDE program; other students and instructors are also taking advantage of the equipment. "It seems like every week we think of another opportunity to utilize these distance learning resources," Dr. Mouradian said.

Page 1 of 1

news

RIDE swings into second year at Riverpoint

THE REGIONAL INITIATIVES IN DENTAL Education (RIDE) program kicked off its orientation for a new cohort of eight students on Aug. 10 at the Eastern Washington University Riverpoint Campus, RIDE's Spokane hub.

It marked the start of the second year for RIDE, which operates in conjunction with the UW School of Medicine's regional WWAMI (Washington, Wyoming, Alaska, Montana, Idaho) program. RIDE students spend their first year at Riverpoint, where they study alongside medical and dental hygiene students. They spend second and third year at the School of Dentistry in Seattle, and a large portion of their fourth-year education will take place in community health settings in Eastern Washington.

Welcoming students at orientation were Dean Martha Somerman and Dr. Wendy Mouradian, RIDE Director and the School of Dentistry's Associate Dean of Regional Affairs and Curriculum.

"We have a huge problem with access to care, and you're going to be part of the solution," Dean Somerman said. Dr. Mouradian added, "Part of the subtext here is to mix medicine and dentistry together."

Students also heard from Dr. Pete Eveland, Associate Dean for Student Affairs at the UW School of Medicine; Dr. Art DiMarco, RIDE Director at Riverpoint; and Dr. Ken Roberts, Director of WWAMI at Riverpoint.

Also on hand was Dr. Sue Coldwell, UW Dentistry's Associate Dean of Student Life and Admissions. She told students, "We need you to think not only about the mouth being part of the A-3.9/206-10

6/10/10

body, but also how dentistry is part of society and part of the health system."

Others taking part in the orientation included Dr. Jim Sledge, RIDE Regional Clinical Director; Dr. Richard McCoy, Professor Emeritus of Restorative Dentistry; Dr. John Evans, Clinical Associate Professor of Oral & Maxillofacial Surgery; Dr. Linda Higley, RIDE Counselor; Dr. Bea Gandara, Clinical Associate Professor of Oral Medicine, and Dr. David Pitts, RIDE ingly well," said Dr. DiMarco, who said no major changes were contemplated in the wake of the first year's experience. Class of 2012 students who were interviewed during the spring also voiced their satisfaction with the program.

Student Patty Martin said the distance-learning format has not been a hindrance, and at times can be an advantage. Students can go back for repeat viewings of recorded lectures, she



Dr. Art DiMarco (in suit), RIDE director at Riverpoint, chats with students in the program's first cohort.

Director of Educational Technology, among other staff from the School of Dentistry and EWU.

The orientation included a course schedule overview, a student panel discussion, and a discussion of professionalism and ethics by Drs. Evans and Mouradian.

Other activities held during orientation week included a library orientation, a team-building river-float event, an ICM (Introduction to Clinical Medicine and Dentistry) course orientation and the first meeting of the Anatomy and Embryology course.

"This program is working amaz-

noted, and during live remote lectures they can also obtain more clarification when needed from RIDE faculty at Riverpoint.

"I'm understanding the material well, I think — more so than if I were just getting it once," she said. She also said that Spokane District Dental Society (SDDS) members had been very welcoming toward RIDE students, and that she'd enjoyed going to SDDS meetings.

Dr. Mouradian added, "We are really excited about welcoming the class of 2013 to Riverpoint and integrating the inaugural cohort to the Seattle campus."

Page 1 of 1

1st Year RUOP and Fourth Year Community Outreach Rotation Sites and Number of Student Rotations

	1 st Year RUOP	# of Students	4 th Year	# of Students
Idaho		" of brudents	- I cui	n or or dutents
Pocatello			2005 2007	11
Tocatello			2003, 2007	2
XX/			Iotai	4
wyoming	2007	1		
Casper	2007	1		
	Total	1		
Washington				
Bellingham			2008, 2009, 2010	1, 1, 1
Bremerton	2008	1		
Centralia	2007	1		
CHAS Spokane	2006, 2009	1,1		
Chelan			2008	1
Colville	2009, 2010	1, 2	2008, 2009, 2010	1, 2, 3
Moses Lake	2010	1		
Okanogan	2009, 2010	1,1	2010	1
Omak	2007	1		
Othello	2006, 2007, 2009, 2010	1, 1, 1, 2	2007, 2008, 2009	6, 1, 1
Pasco	2009, 2010	1,1		
Port Angeles	2009	1		
Puyallup			2007	1
SeaMar	2006, 2007	1,1	2008	1
Seattle Harborview			2007	1
Seattle Neighborcare			2009, 2010	1.1
Smilemobile			2007. 2009	1.1
Spokane DTE			2007, 2008, 2009	3.3.3
Tacoma	2007	1	2009	1
Tulalin	2006	1	2009	-
Union Gan	2007	1		
YVFWC Ellensburg.		-	2007, 2008, 2009,	5. 1. 2. 1
Walla Walla, Yakima			2010	-, -, -, -
	Total	24	Total	45
Montana				
Billings	2004, 2006	1.1	2010	1
Bozeman	2006, 2007, 2009	1.1.1	2008, 2009	1.1
Browning	2005	1		
Butte	2006, 2007	1.1	2007, 2008	1.1
Casper	2007	1		
Cutbank	2006	1		
Helena	2004, 2005	1,1	2007	1
Missoula	2004, 2005	1.1	2010	1
	Total	14	Total	7
Alaska				
Anchorage ANMC	2006, 2007, 2008, 2009, 2010	1, 1, 1, 1, 1	2007	1
Bethel	2006, 2007, 2008, 2009, 2010	1, 1, 1, 2, 3	2007	2
Dillingham	2010	1 1		
Foirborks	2000, 2007	1,1		
	2002 2007 2009	1 1 1	2007 2000 2010	1 1 1
Julicau Kotobikon	2000, 2007, 2000	1, 1, 1 1 1	2007, 2009, 2010	1, 1, 1
Ketchikan Sidvo	2000, 2007	1,1 1 1	2007	4
ыка	2009, 2010 T-4-1	1, 1	T	0
Sub totals	l otal	<u>43</u> <u>6</u> 2	lotal	0
Total Datations		04		124
TOTAL INOLATIONS	1	1		144