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University of Washington School of Dentistry

Regional Initiatives in Dental Education (RIDE)
Enrollment Expansion

Feasibility Study for the Establishment of a First-Year Site at Montana State University, Bozeman
Fall 2008

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Acknowledgements

This report is an assessment of the feasibility of initiating a University of Washington School of Dentistry (UWSOD) Regional Initiatives in Dental Education (RIDE) program in Montana, to train 8 dental students per year. This study was initiated by the Montana Legislature through House Bill 522 (2005), which directed the Board of Regents/Commissioner of Higher Education to study the costs of a RIDE program for Montana. The report was prepared by Wendy Mouradian, MD, MS, Director of the UWSOD RIDE program, in conjunction with the Montana Dental Association and Montana State University-Bozeman. Two nationally-recognized experts on the finances of dental education and dental workforce issues provided consultation, L. Jackson Brown, DDS, PhD and Lawrence Meskin, DDS, PhD (authors of *The Economics of Dental Education*, American Dental Association, Chicago: 2004). In addition this study was informed by discussions with community dentists, community health centers and other stakeholders in Montana.

In addition to House Bill 522, funding for this study was provided by the University of Washington School of Dentistry, the American Dental Association Foundation through an Innovation in Education grant, and the Robert Wood Johnson Foundation through the Pipeline, Profession and Practice Program grant program.

Regional Initiatives in Dental Education (RIDE)

EXECUTIVE SUMMARY

Dentistry faces workforce shortages and especially a maldistribution of dentists. As the population in Montana has grown, the number of dentists has not increased proportionately, and many dentists are reaching retirement age, especially in small towns and rural areas. The aging population is also contributing to increased needs for dental care. Montana has no dental school of its own to assure its youth access to dental education. The University of Washington (UW) School of Dentistry (SOD) has trained dentists for 60 years with an emphasis upon excellence in general dentistry. Utilizing the 30 year "WWAMI" (Washington, Wyoming, Alaska, Montana and Idaho) model of distributed medical education, it will be possible to develop a dental education program in Montana at Montana State University (MSU) in Bozeman.

The Regional Initiatives in Dental Education (RIDE) will create access to publicly-funded dental education for 8 Montana students per year, without the major capital expenditures associated with building a dental school. The RIDE program will share resources developed for medical and other health professional students at the MSU campus, creating cost-efficiencies while enhancing inter-professional training of medical and dental students.

A first-year RIDE program at the Bozeman campus, with clinical rotations in rural and underserved communities across in other parts of Montana in later years of dental school, will facilitate wider distribution of the dental workforce to less served regions of the state. The expansion of dental education to rural and underserved areas of Montana will enhance recruitment of students from these regions, while providing additional clinical services for underserved populations at the rotation sites. RIDE will take advantage of the latest in distance learning technologies and partner with MSU (which houses the Burns' Telecommunications Center) to ensure equivalency of dental education without duplication of costly faculty resources. The program will be fully-accredited by the Council on Dental Accreditation (CODA), and students will receive their doctorate in dental surgery (DDS) from the University of Washington. If funded in the 2007-9 biennium, students would be admitted in the 2007-8 academic year and start in Bozeman in the fall of 2008.

GLOSSARY

To assist in reviewing this feasibility analysis a brief glossary of terms and abbreviations is provided.

ADA – American Dental Association

ADEA – American Dental Education Association

AHEC – Area Health Education Centers

CODA – Council on Dental Accreditation (American Dental Association)

HPSA- Health Profession Shortage Areas (federally-designated)

MSU – Montana State University

RIDE – Regional Initiatives in Dental Education

R/UOP – Rural/Underserved Opportunities Program

UWSOD – University of Washington School of Dentistry

UWSOM – University of Washington School of Medicine

WWAMI – Washington, Wyoming, Alaska, Montana, and Idaho regional medical education program

WRITE – WWAMI Rural Integrated Training Experience (a longitudinal rural training program for selected third-year medical students – will be used as a model for the four-six months of practice-based rotation for dental students)

INTRODUCTION

This report is an assessment of the feasibility of initiating a University of Washington School of Dentistry (UWSOD) Regional Initiatives in Dental Education (RIDE) program in Montana to train 8 dental students per year. This study was initiated by the Montana Legislature through House Bill 522, which directed the Board of Regents/Commissioner of Higher Education to study the costs of a RIDE program for Montana.

This report includes:

1. **Summary of the RIDE proposal** with costs and next steps
2. **Rationale** for building a RIDE program in Montana
3. **Proposed solution**, including feasibility and needed resources at MSU-Bozeman and the UWSOD
4. **Budget**
5. **Appendix**

1. SUMMARY OF RIDE PROPOSAL AND COSTS

a. Overall aim of the RIDE program:

The **mission of RIDE program in Montana** is to provide access to high quality, *publicly-funded dental education* in order to develop dentists who will make a commitment to serving the needs of rural and underserved communities in Montana.

RIDE responds to the shortages of dentists in rural and underserved communities in the face of a growing and aging population in Montana, and an aging dental workforce in the state. RIDE is consistent with a growing national trend to train dental students in community-based settings with underserved populations to increase service to these populations and wider distribution of the workforce.

The creation of a RIDE program at Montana State University-Bozeman will build on the success of the University of Washington School of Medicine (UWSOM) regional medical education programs across the states of Washington, Alaska, Montana, Idaho and Wyoming (**WWAMI)** over the past three decades.

b. Overview of the RIDE educational model:

- RIDE would train 8 students per year along with 20 medical students in the MSU WWAMI program
- The UWSOD class would increase by 8 Montana students/ year
- RIDE students would start their dental education in Montana and spend their first year at MSU-Bozeman
- Students would spend most of their second and third years in Seattle in a class of about 63 students
- Students would have two community-based rotations in Montana after their first and second years of dental school
- Dental students would have an extensive period of community-based training in Montana (4-6 months) in their fourth year
- Dental students would receive their DDS degree from the UWSOD

Other important components of the RIDE model include:

- RIDE will be based on a strong partnership between UW and MSU, the Montana Dental Association (MDA) and community dentists in private practice and at community health centers
- RIDE will be funded by a combination of Montana legislative allocation, student tuition and UW resources
- Overall students would spend about 40% of their time in Montana; about 40% of RIDE resources will be spent in Montana
- The UWSOD would take responsibility for accreditation and educational equivalency as required by the Council on Dental Accreditation (CODA) of the American Dental Association
- The UWSOD would take responsibility for monitoring outcomes of the RIDE program including educational outcomes and workforce placement
- The 8 RIDE students would be chosen by the UWSOD Admissions Committee, which would include at least 2 voting members from Montana who would interview Montana students
- Once students are accepted to the UWSOD, a commitment is made for students to complete the four years of dental school education
- Timeline: If RIDE is approved in Montana in this biennium students would be accepted in 2007-8 academic year and would matriculate at MSU-Bozeman in the fall of 2008.

c. Costs and Requirements for New Resources

The creation of the first-year RIDE site at MSU-Bozeman would occur within the existing MSU space with minor capital expenditures to accommodate dental students. It would require a) some increase in teaching faculty time at MSU-Bozeman; b) some increasing teaching faculty time at UWSOD; c) increased levels of student support and administrative services at both sites; and d) renovation of the dental student simulation clinic and upgrading of a lecture hall to include distance learning capability for the RIDE program. Other resources are being sought to accomplish the UWSOD capital projects, which are not included in the Montana RIDE budget.

Costs of the RIDE Program*

Start-up capital costs at MSU-Bozeman would be: **$230,231**
Start-up capital costs at UWSOD for Montana would be $ 0.
Start-up operating costs at MSU-Bozeman are: **$247,244**
Start-up operating costs at UWSOD Seattle campus are: **$491,070**
Total Start-up costs for MSU and UWSOD (2007-8): $968,545
RIDE Operating budget at MSU (2008-9) **$478,777**
RIDE Operating budget at UW (2008-9): **$949,304**
Total Operating costs for MSU and UWSOD (2008-9): $1,428,081
Total Biennium costs for 2007-9:* **$2,396,627**
Annual operating costs for the MSU-Bozeman RIDE component when the full cohort (32 students) is enrolled would be **$478,777** per year.
Annual operating costs for the UWSOD RIDE component when the full cohort (32 students) is enrolled would be **$1,727,919.**
Total annual operating costs would be: **$2,206,696**
Total annual operating costs would be of **$1,988,151** (minus program support from UW which is receiving tuition from students)
The costs per student per year would be **$68,959,** less than reported national average of **$78,763**[1] in 2002 dollars or approximately **$97,000** per student per year in 2008-9 dollars. This cost is achieved due to efficiencies of integration with MSU-WWAMI resources. These figures include a deduction from overall costs that reflect tuition paid by students.

**All dollars are estimated in 2008-9 dollars. An average inflation rate of 3% per year has been assumed.*

d. Next Steps

To implement this expansion next steps would include:
1) Montana approval for RIDE program
2) Capital modifications instituted at MSU-Bozeman before the fall of 2008
3) Detailed curriculum plans completed based on most current faculty and course arrangements at MSU

4) Recruitment and training of MSU-faculty for dental courses during the 2007-8 academic year
5) Recruitment and hiring of RIDE administrative infrastructure during the 2007-8 academic year
6) Immediate efforts to identify community sites and train faculty for additional dental student community rotations
7) Immediate identification of any needed regulatory modifications by the Montana Board of Dentistry

2. RATIONALE: WHY BUILD A RIDE PROGRAM IN MONTANA?

This section provides the rationale for developing a RIDE program in Montana to help protect and improve the dental health of Montana citizens. Principal reasons to initiate a RIDE program include **A) factors that predict a shortage of dentists in Montana; and B) the need to create access to publicly-funded dental education for Montana students.** It also reviews: C) National Recommendations that Address Dental Education, Dentist Shortages and Access Issues; and D) Trends in Community-Based Dental Education.

A. Factors That Predict a Shortage of Dentists in Montana:

1. The growing population of Montana
2. Aging population of Montana
    a. Oral disease impacts overall health
    b. Increase in proportion of Montanans retaining their teeth
3. Risk factors for dental disease
    a. Lack of water fluoridation
    b. Presence of groups at high risk for disease (e.g. low income, minorities, especially Native Americans)
4. Workforce capacity
    a. Numbers of dentists in Montana
    b. The age distribution of Montana dentists
    c. Montana dental workforce distribution: there is much higher need for dentists in rural and underserved areas.
    d. Changing practice patterns among young dentists.
    e. Advances in science and technology: these advances are increasing the demand for more complex restorative dental procedures (e.g., dental implants), which also strains the existing dental workforce capacity.

1. Growing Population of Montana

In 2005 the population of Montana was estimated at 935,670. As the fourth largest state in the nation - with almost 146,000 square miles - Montana is very sparsely populated. Montana is 48th in the nation in population density. About 65% of the population lives in rural areas and this proportion has remained fairly constant.

Montana Population			
	Rural	Urban	Total
Year			
1980	513,844	272,846	786,690
1990	521,188	277,877	799,065
2000	587,132	315,063	902,195
2005 (latest estimates)	609,422	326,248	935,670

Table 1. Urban-Rural Distribution of Montana Population
(From USDA Education Research Service http://www.ers.usda.gov/StateFacts/MT.htm)

According to the Census Bureau, the population of Montana has grown 19% since 1980. The population is projected to continue increasing as Figure 1 below demonstrates.

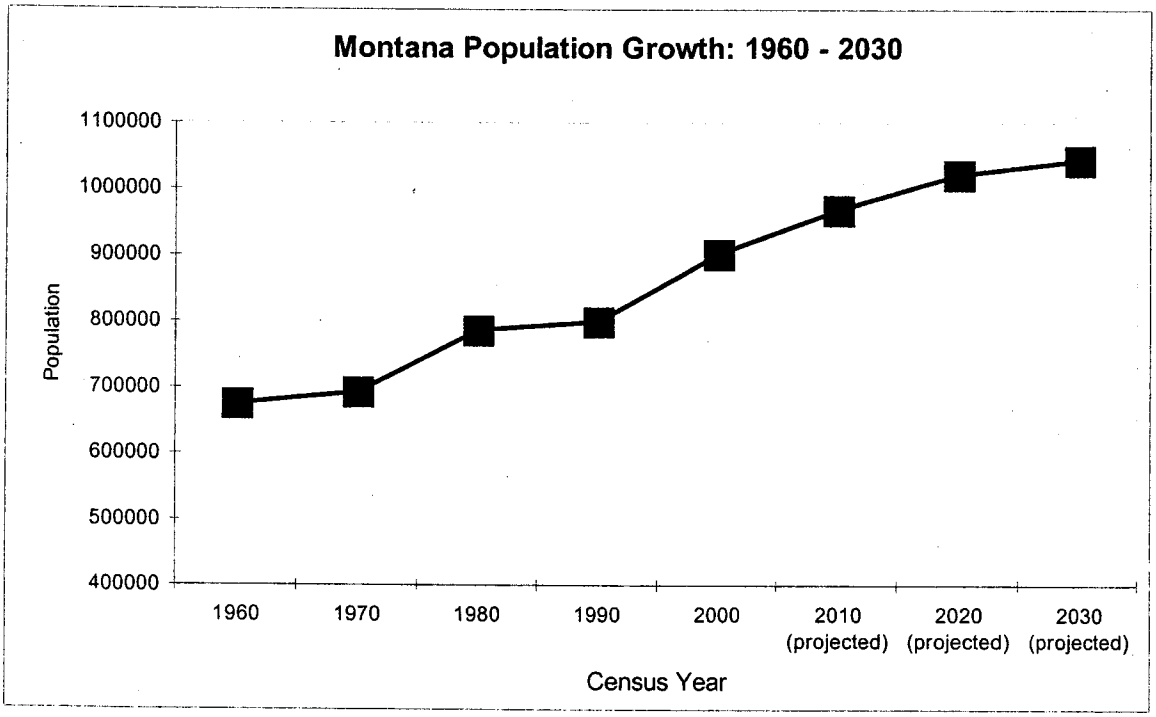

Figure 1: Projected Population Growth for Montana (data from U.S. Census Bureau)

There is no dental school in Montana. The state currently provides support to three students per year to attend dental school out-of-state (a ratio of 0.3 slots per 100,000 people – only about a fifth of the national average of 1.6 dental slots per 100,000.) As a result Montana must import dentists to meet its population needs. The current state-support for dentistry (about one WICHE slot and two University of Minnesota slots) is inadequate to replenish the supply of dentists approaching retirement age. Of surveyed dentists, 18.5% reported WICHE program support for dental school, and 6.1% had attended the University of Minnesota. The low level of support for dental education also disadvantages Montana youth who wish to attend dental school. Most dentists in Montana now come from other states: only 44% of dentists surveyed in 2000 were from Montana.

2. Aging Population of Montana

The percentage of elderly persons over age 65 living in Montana was 13.7% in 2004, 10% higher than the national average of 12.4%. As the baby boomer generation ages, the numbers of elderly will rise dramatically (see Figure 2).

Increase in proportion of Montanans retaining their teeth: More of today's elderly are keeping their teeth and continue to be at risk for dental caries and other tooth conditions. For example, in Montana the rate of edentulism (individuals over 65 years who have lost all of their natural teeth), has dropped from 29.2% in 1999, when the national average was 24.4%,[2] to 19.6% in 2004,[3] below the current national average of 20.5%. Even those individuals who have lost all their teeth still need regular oral health care for detection of oral and pharyngeal cancer and other oral conditions.

Oral disease impacts overall health: As a group, elderly people are at increased risk for oral health problems. In part this is due to increases in chronic diseases and medical therapies which affect oral health. Recent data on oral-systemic health interactions include, among others, the impact of periodontal diseases on diabetes; the association of periodontal disease with cardiovascular disease and pneumonia; and the increased risk of severe jaw disease in patients treated for osteoporosis. Patients who have received cancer therapies, or who have had organ transplants or other immune conditions are also at increased risk for oral diseases. Commonly-used medications used to treat asthma, hay fever, high blood pressure, heart conditions or depression can cause xerostomia (dry mouth), which increases the risk of tooth decay. Individuals with disabilities – of all ages – are at increased risk for oral problems. Both elderly individuals and those with disabilities may have trouble maintaining their oral hygiene due to functional limitations. It can also be very difficult for these individuals to travel long distances to access dental care.

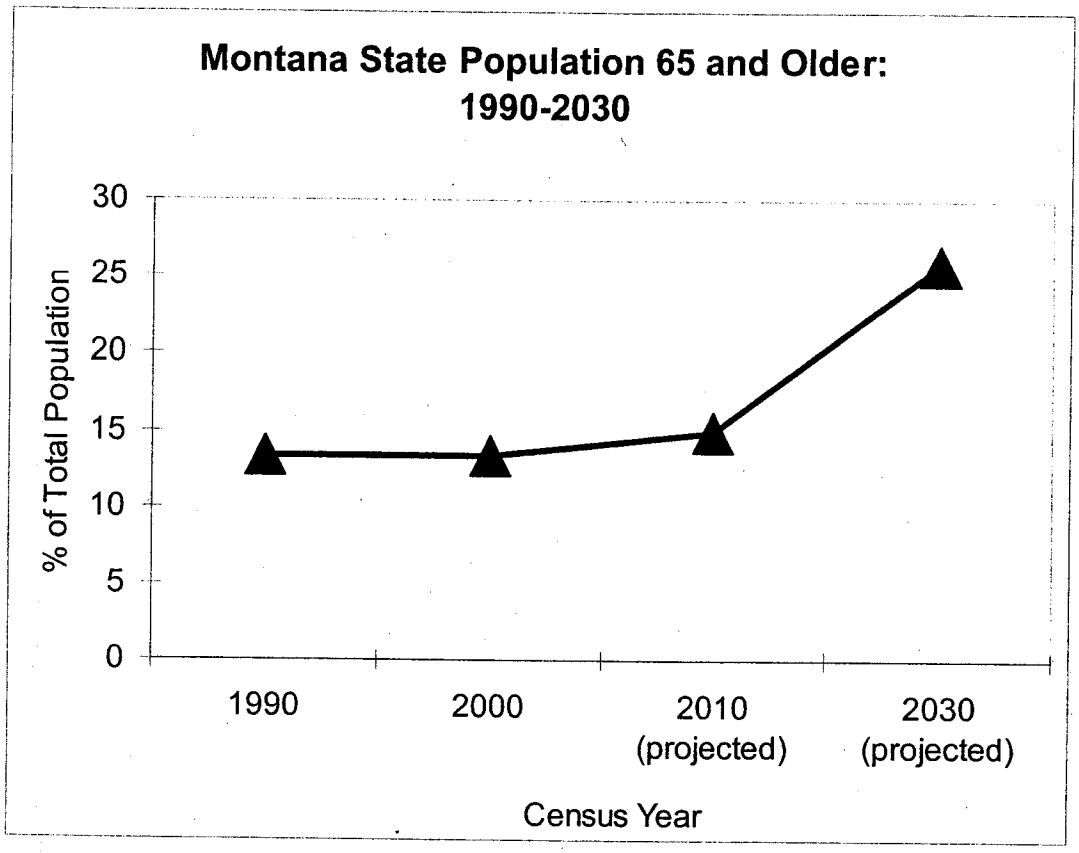

Figure 2: Projected Montana Population > 65 years (data from U.S. Census Bureau)

4. Risk Factors for Oral Disease

Populations at higher risk for dental disease include those living in areas without adequate fluoride in the water. Because of geographical factors and the sparse distribution of population (many of whom consume well water), not all Montana residents have access to optimal fluoride in the water, a known deterrent to tooth decay. According to the Centers for Disease Control and Prevention, Montana ranks 46th in the nation in percent of population served by public water systems that are fluoridated (23.8%).[4]

Other important risk factors for dental disease include poverty and minority status. An estimated 6.4% of Montana residents were American Indians in 2004.[5] Native populations have the highest rates of dental disease in the nation.[6]

Montana's 1999 total state gross product was $20 billion, 48th in the nation. Montana had a higher rate of poverty than the nation as a whole, at 14.2, compared with 12.5% in 2003. Per capita personal income for 2005 was

$28,806, placing it 42nd in the nation.[7] Low income populations have substantially greater levels of oral disease.[6]

5. Workforce Capacity

a. Numbers of dentists in Montana

A detailed Montana dental practice survey in 2000 found there were 469 dentists with active licenses in the state for a ratio of 51.9 dentists per 100,000 population compared with a national average of 63.6 per 100,000 – or one dentist for about 1500 people.[8,9] From 1991 to 2000 there was a drop of 5% in the dentist to population ratio for Montana overall; and 16.9% drop when general dentists are considered (who provide the majority of dental care).[9] The most recent data reveals a total of 482 active dentists, for a dentist to population ratio of 51.5 per 100,000. (This probably overestimates dental capacity since it includes full and part time dentists.)

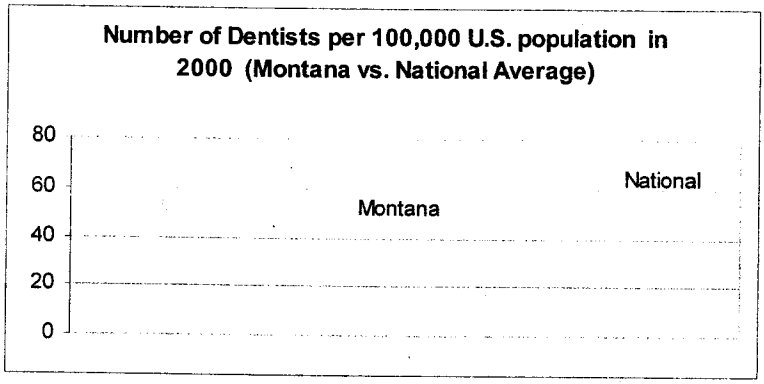

Table 1: Montana Dentists Compared with National Average

b. Age distribution of dentists in Montana

In addition, the age distribution of dentists demonstrates the skew towards an older workforce (Table 2). Montana dentists are older than the national average – 70 are 45 yrs or older, 26.7 are age 55 and older.

Age Range	Montana State Dentists	
	No.	% (US Ave)
25-34	35	9.0 (14.7)
35-44	82	21.1 (24.8)
45-54	168	43.2 (31.7)
55-64	76	19.5 (19.1)
65 & Older	28	7.2 (9.7)

Table 2: Age Distribution of Dentists

(Sources of data in Table 2: Montana Dental Workforce Analysis: Prepared by the WWAMI Center for Health Workforce Studies, University of Washington, 2001. U.S. statistics: from L. Jackson Brown, Adequacy of Current and Future Dental Workforce, ADA. Chicago: American Dental Association, Health Policy Resources Center, 2005.)

c. Montana dental workforce distribution

Clearly the dental workforce is not evenly distributed in Montana. In general, shortages are most severe in rural areas. As many as 35 of 56 counties have been identified as dental health professional shortage areas (HPSA's) (see Figure 3), and some counties have no dentists at all. According to the most recent practice data, the dentist to population ratio in all districts of Montana is lower than the national average. There is roughly one dentist per 2000 people in Montana. However the ratio across the state varies widely from a ratio of 1 per 1,582 in Kalispell (just about the national average), to 1 per 3,308 in Havre, and 1 per 3,639 in Lewistown. This estimate includes both MDA member and non-member dentists.[10] (See Figure 4 below)

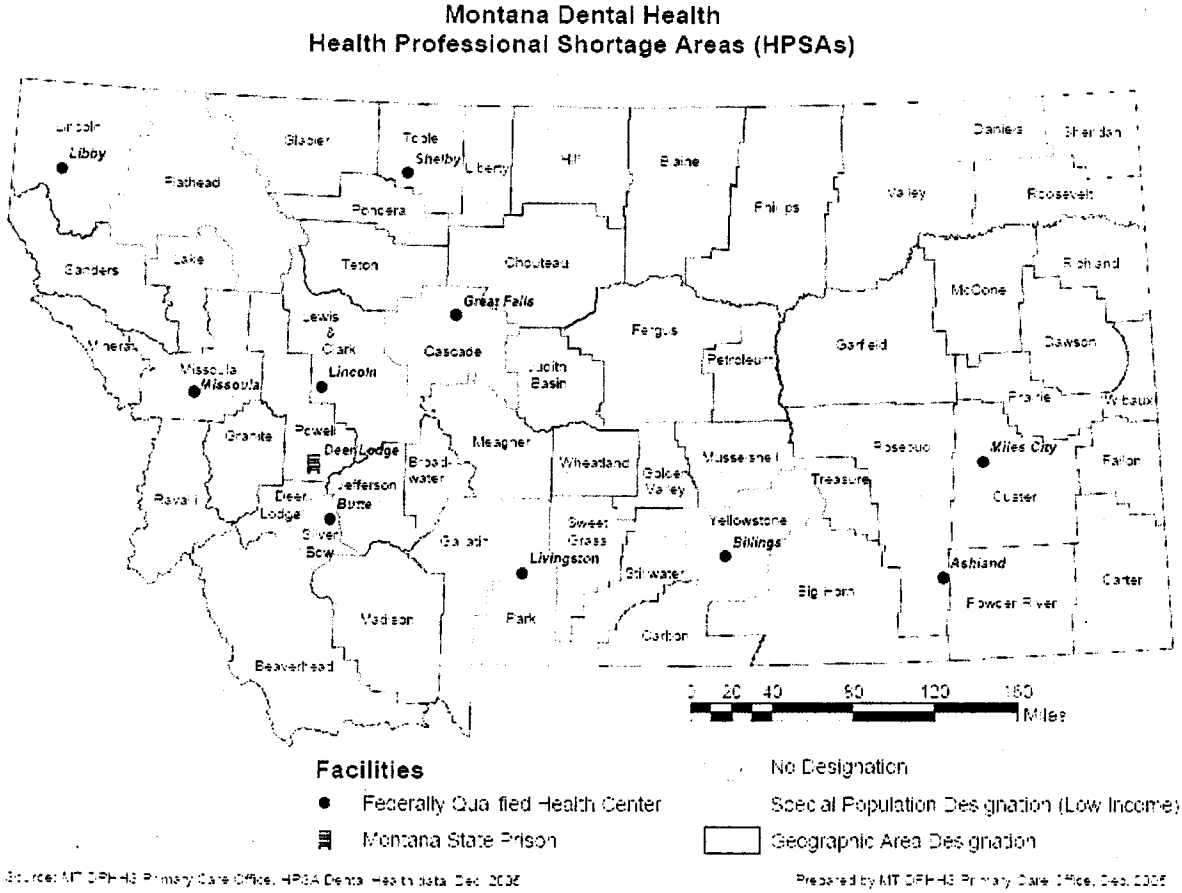

Figure 4: Dental Health Professional Shortage Areas in Montana

d. Changing practice patterns among young dentists

Dental workforce capacity is also affected by other factors including **gender**. Female dentists work fewer hours during child-bearing years.[11] Nationwide 43% of dental graduates in 2003-4 were women,[12] so the impact of gender distribution is likely to increase. In 1999, female dentists younger than 40 years old were at least five times more likely to work part time than their male counterparts. Female dentists between the ages of 40 and 59 were three times more likely to work part time.[13] As all dentists age, they are also more likely to work less. Of male dentists 60 or older, about half work part-time.

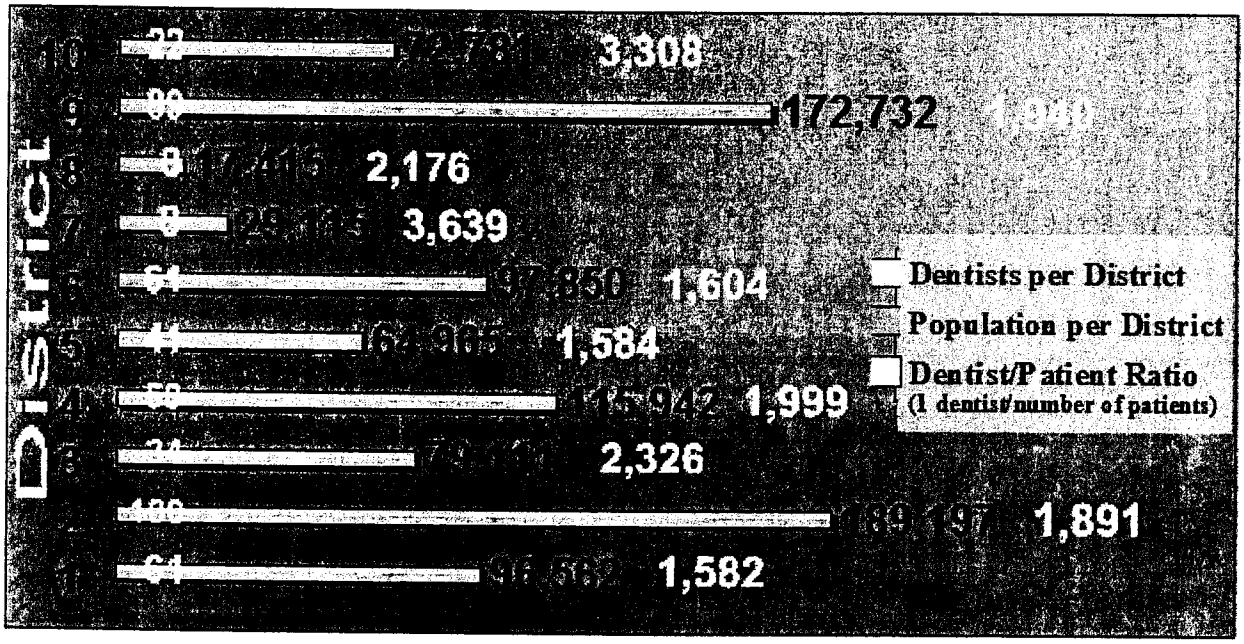

Figure 4. Dentist to Population Ratio by District

MDA Districts: 1-Kalispell, 2-Missoula, 3-Butte, 4-Great Falls, 5-Helena, 6-Bozeman, 7-Havre, 8-Lewistown, 9-Billings, 10-Eastern Montana (data provided by Montana Dental Association, 2006)

The number of dental graduates who become **specialists** also impacts the dental workforce capacity, in part because this removes students from the general dentistry workforce; and in part because students often move to other states for their specialty training, and may remain there. The number of graduates selecting specialty training has remained relatively low at UWSOD, where 85-90 percent of graduates choose primary care dentistry fields. However nationally the trend is for increasing specialization in dentistry (over 30 percent), which will decrease the overall pool of dentists practicing general dentistry.[14] In rural Montana the needs are primarily for general dentists.

e. Dentists respond to increased demand for new dental technologies

New advances in biomaterials, bioengineering and genetics are changing the face of both dentistry and medicine. In addition to the need for traditional dental services to meet the needs of growing population, there is increasing demand for dental services in new arenas such as implant and reconstructive surgeries to replace and/or restore lost structures and oral functions. With increasing availability and demand for the latest technologies, the dental workforce capacity will be pulled from the traditional and routine services necessary to maintain basic oral health.

B. Access to Publicly-Funded Dental Education for Montana Students

Without a dental school of its own, Montana must rely on other states for much of its dental workforce. Only 44% of the Montana dentists surveyed in 2000 were from Montana. The current state-support for 1 WICHE slot and 2 University of Minnesota slots is inadequate to replenish the supply of dentists approaching retirement age. Of surveyed dentists, 18.5% reported WICHE program support for dental school, and 6.1% attended the University of Minnesota. The Montana State Oral Health Plan (2006) has included, among its top recommendations, a study of the feasibility of a RIDE program for Montana.[15]

The RIDE program would provide Montana students with increased access to **publicly-supported** dental education. At least 91% of U.S. dental students graduate with debt, owing an average of $141,521 each, according to the American Dental Association.[16] Students attending private schools have a much higher debt ($175,841) than those attending public schools ($114,296). Significantly, of dental students graduating in 2005, 63% indicated their educational debt influenced their career plans. Debt has increased 34% from 2000 to 2005 (more than twice the rate that would be predicted by inflation). High levels of indebtedness may influence students to choose careers in higher income specialties rather than general dentistry, and to shy away from practicing in underserved and rural areas.

In fact, tuition falls far short of actual costs of dental education. The American Dental Association (ADA) estimated average costs per dental student per year of $78,763, based on 2002 data.[2] Another study based on 2001 data estimated average expenditures at $84,471 per student per year.[17] With simple inflation of 3% per year, average dental school costs would be in the range of $96,000-$102,000 per student per year in 2008-9. In the face of such financial demands, a number of dental schools have closed in recent years.

The RIDE model provides access to high quality dental education at costs lower than the national average. In addition, the RIDE model avoids major capital expenditures associated with building a new dental school, as discussed on page 35.

C. National Recommendations that Address Dental Education, Dentist Shortages and Access Issues

In the *Future of Dentistry*, the American Dental Association (ADA) called for exploration of **regionalization** and other more efficient models of dental education to address rising costs of dental education. [18] ADA also reported on the national declining dentist-to-population ratio, and geographic imbalances that affect access to care.[19] The American Dental Education Association has also commented on workforce shortages and maldistribution of dentists in underserved areas. [20] It is estimated that more than 8,000 dentists are needed to fill dental health profession workforce gaps.[21] A 2004 Institute of Medicine (IOM) **report on rural health** specifically called for community-based dental education in rural areas to address dental workforce maldistribution.[22]

In 2000, *Oral Health in America: Report of the Surgeon General* highlighted the disparities in oral health and access to care for vulnerable populations, and called for re-thinking dental education to better address workforce and access issues. [23] An earlier IOM report discussed the evolving scientific evidence of oral-systemic health interactions, calling for greater integration with medicine and the health care system. [24] **Inter-professional training** of dental and medical and possibly other health professional students at MSU is another goal of the RIDE project. [25]

D. Trends in Community-Based Dental Education

Although extensive regional education as planned for the RIDE project, with students spending up to 40% of their time in community sites, has not been implemented anywhere yet, there is a national trend towards community-based dental education to encourage students to remain in underserved areas. This effort has been spurred by the Robert Wood Johnson Foundation (RWJF) Pipeline, Profession and Practice Program, of which the UWSOD is one grantee.[26] While it is too early to determine the effectiveness of the RWJF program in encouraging students to remain in underserved communities, unpublished information from the University of Colorado – which sends students to underserved sites for up to 5 months in their fourth and last year of dental school - suggests a significant portion of these students go on to work in such sites after graduation.[27] Data from the WWAMI program for regional medical education indicates that it has been effective in bringing a larger number of WWAMI-trained medical students to practice in Montana than

the national average.[28] It is expected that there will be comparable or better return rates in dentistry because of the lack of requirement for a dental residency after dental school. This greatly increases the likelihood that students will remain in the state after graduation.

Summary

A growing population and rising number of elderly in Montana - including many who have chronic illnesses impacting their oral health – both project an increased need for dental care in the state. With the current workforce capacity and distribution there are many shortages areas already, especially in rural and underserved communities. Montana dentists are also older than the national average, and many are of retirement age (108 of 482 are 60 years or older). Few water systems in Montana contain fluoride, known to prevent dental decay.

To date Montana has done little to ensure an adequate supply of dentists for the future, funding only three dental students a year out of state since 1993. This significantly disadvantages Montana students who wish to attend dental school, since they face admissions barriers in other state-supported dental schools and higher debt load in private schools.

As the only four year accredited dental school in the WWAMI states, the UWSOD proposes to respond to these factors by a strategic partnership with Montana to train 8 dental students per year at MSU and community sites in Montana, to improve workforce distribution and predicted shortages. By building on existing WWAMI infrastructure in Montana the RIDE project will avoid major capital costs and increase inter-professional training.

3. PROPOSED SOLUTION

This section presents the RIDE proposal and the resources of the UWSOD, MSU-Bozeman (including the WWAMI program), Montana Dental Association dentists, and community health centers (CHC's):

A. UWSOD resources to support a RIDE program
   1. Overview, potential to impact Montana workforce
   2. Discussion of RIDE model including mission/vision and goals
   3. UWSOD pilot student rotations in Montana
B. Montana dentists and Community Health Centers
C. MSU-Bozeman resources to host a first-year dental school RIDE program
D. Design and Logistics

A. University of Washington School of Dentistry

1. Overview: The University of Washington School of Dentistry is the only four year accredited dental school in the WWAMI region. The student body includes 217 dental students (who consistently receive high scores on National Board examinations) and 113 in graduate or advanced degree programs in such areas as hospital dentistry, pediatric dentistry, oral medicine, oral and maxillofacial surgery, endodontics, oral pathology, periodontics, prosthodontics, orthodontics and dental public health sciences. The school is served by 130 faculty and 504 affiliate (volunteer) faculty.

As an important part of the area's dental safety net, the school maintains the largest dental outpatient clinic in the state for patients who have special treatment needs or who would not otherwise have access to dental care. The dental clinics provide approximately 66,000 patient visits a year. Special clinical resources include the DECOD (Dental Education in Care of Persons with Disabilities) clinic for patients with disabilities and the Dental Fears Clinic. Affiliated hospitals and institutions where dental care is provided include University Hospital, Harborview Hospital Medical Center, and Children's Hospital and Regional Medical Center. State of the art educational resources include an internet-connected dental simulation clinic, a large health sciences library and numerous departmental libraries, fully-equipped research laboratories and dental clinic facilities with 230 chairs.

The UWSOD's mission of excellence in education, research, clinical care and outreach has kept it vitally involved with surrounding communities and many regional sites. Community-based settings are the site of many teaching, clinical service and student volunteer activities. Outreach activities have increased substantially under the leadership of Dean Martha Somerman. At the national level the UWSOD is consistently among the top dental schools in National Institutes of Health (NIH) funding. In 2005 the University of Washington was number one in NIH funding among all public institutions, and number one in funding from the National Institute of Dental and Craniofacial Research (NIDCR). UWSOD was number three among dental schools in NIDCR funding. The School hosts several large NIDCR-funded research centers, including a recently-awarded community practice-based clinical research initiative (Practice-based REsearch Collaborative in Evidence-based DENTistry - PRECEDENT), and the NW Alaska Center to Reduce Oral Health Disparities. These initiatives have expanded the network of university-community partnerships around the state and region, including in Montana.

The RIDE program has the potential to significantly impact the workforce in Montana. Since most dental students go directly from school

into practice (as compared with medical students, who must complete a minimum of three years of residency), the states/regions where students train have an advantage in capturing them. Also, rural areas need dentists who can provide primary care. About 85-90% of UWSOD graduates enter primary care dentistry fields (general and pediatric dentistry), while only 10-15% pursue specialties. This is in contrast to the national trends of increasing numbers of students choosing to enter specialties, with the ADA reporting that more than 30% of graduates entered specialties in academic year 2003-2004.[29]

There are consistently many more qualified dental student applicants than can be accepted with the current class size of 55. Since UW is a state school, the majority of students accepted (80-90%) are in-state residents, creating a disadvantage for out-of-state applicants from Montana. Increasing the enrollment with 8 slots per year designated for Montana residents will expand Montana students' opportunities for attending dental school. Interest in attending dental school has been increasing among Montana students. In 2003, 20 out of 28 students from Montana enrolled in the first year of dental school, and in 2004, 29 out of 49 applicants enrolled.[30]

2. The RIDE Model

a) RIDE Mission and Vision and Goals

The vision of the Regional Initiatives in Dental Education program is to improve the oral and overall health of the public in the Northwest region through increased access to high quality dental care.

The primary mission of RIDE is to provide access to high quality, *publicly-funded dental education* to states and regions in the Northwest in order to develop dentists who will make a commitment to serving the needs of rural and underserved communities.

The goals of the RIDE program in Montana are to:

Goal 1: Increase numbers of dentists practicing in Montana through a regional model of dental education.

Goal 2: Ensure equivalency of all UWSOD students' educational experience – including those in the RIDE program in Montana - to become competent oral health professionals.

Goal 3: Provide students with community-based experiences in Montana with diverse populations to foster cultural competency, social responsibility and professionalism.

Goal 4: Create mutually beneficial partnerships with private and public dental entities in Montana to foster dissemination of knowledge and access to high quality dental care.

Goal 5: Promote innovative, inter-professional educational experiences for dental students to foster a team approach to health care.

Goal 6: Ensure sustainability of the RIDE program and development of a flexible and responsive infrastructure in Seattle and Bozeman.

Goal 7: Develop, implement, and maintain an evaluation system for monitoring RIDE benchmark goals and objectives.

b) What the RIDE program looks like to dental students:

- **First year:** Dental students receive their first year of dental school at Montana State University in collaboration with the WWAMI medical program
- **Summer following first year:** Community rotation for four weeks (see RUOP program, described in Appendix)
- **Second year:** primarily at Seattle campus
- **Summer following second year:** Community rotation in underserved area of Montana for two-four weeks
- **Third year:** Primarily at Seattle campus
- **Fourth year:** In extended clinical rotations (four-six months) in community sites in Montana
- **RIDE students pay MSU tuition for the first year** and in-state UWSOD tuition for years 2, 3 and 4
- **RIDE students will be in a cohort of 8,** but will overlap with medical (and possibly other health professional) students. They will join a class of about 63 other dental students when they return to Seattle.
- **Student services** including counseling, financial aid and other concerns will be available at both MSU and UWSOD sites.
- **RIDE students will make use of distance learning** for certain courses in their first year, and later when they are away on clinical rotations (especially in the fourth year)

c) RIDE Curriculum

Many basic science courses can be taught with efficiencies to both medical and dental students at MSU-Bozeman. Joint instruction of medical and dental students in other important overlapping areas will include patient interviewing, communication skills, ethics and

professionalism and cultural competency. Dental-specific curriculum will be taught by dental affiliate faculty in Bozeman, or by UWSOD faculty through distance learning. The presence of other health professions training at MSU-Bozeman (nursing) provides opportunities for shared curriculum and inter-professional training. There may also be opportunities to overlap with the Dental Hygiene and Dental Assisting Programs at MSU-Great Falls College of Technology. (A more complete discussion of the RIDE curriculum plan is included in the Appendix.)

d) Dental Student Rotations in Montana

Over the past 3 years UWSOD has developed additional community-based experiences in Montana. UWSOD students have studied under dentists in Billings, Bozeman, Browning, Butte, Cut Bank, Helena and Missoula. Resources to support these rotations have come from the UWSOD, the Robert Wood Johnson Pipeline, Profession and Practice grant at the UWSOD, the Montana SEARCH program,[31] Montana Community Health Centers and Montana dentists. Although the UWSOD has a long history of community-based rotations for students, these were previously focused in Washington State. These rotations are now expanding to Montana and other WWAMI states.

The success of these pilot rotations, and the logistical issues which have already been addressed in their creation, support the feasibility of developing more extensive community-based rotations for dental students. (A more complete discussion of current UWSOD clinical outreach activities is included in the Appendix).

B. Montana Dentists and Community Health Centers

The **Montana Dental Association** (MDA)[32] supports the RIDE program, and has committed to assisting with key dental educational components including the first year training in Bozeman and clinical precepting of students in community sites.

Over the years MDA and community dentists have played an active role in developing systems of care for underserved populations at community and rural sites in Montana. Community dentists work or volunteer at **community health centers** (CHCs) in Billings, Bozeman, Butte, Great Falls, Helena, Livingston and Missoula. Montana dentists working at CHCs report high patient needs, even in urban areas. Montana dentists in rural areas also report many underserved patients and high demand for care. Retiring dentists report difficulty finding young dentists to become associates or to take over their practices.

MDA members have already hosted dental students in their offices (and in some cases their homes), or acted as preceptors in community health centers. Dentists in the Bozeman area currently volunteer their efforts to the undergraduate health professions preparation program at MSU and have expressed a keen interest in expanding their educational involvement to support a RIDE program in Montana.

Significantly, the **Montana Board of Dentistry** has made regulatory changes to facilitate community dentists acting as preceptors to dental students in Montana, a necessary condition for the RIDE program.

C. MSU-Bozeman Resources to Establish a RIDE Site

1. MSU-Bozeman overview

Montana State University has a strong focus on health-sciences training and information technology infrastructure, and would require minimal accommodations to add a first-year RIDE program for eight dental students. There is already a WWAMI program at MSU-Bozeman. Existing faculty at MSU-Bozeman are available to teach the basic science courses for dental students. Most dental faculty will be drawn from the Bozeman dental community. Certain highly-technical courses (such as dental materials) will be exported to avoid costly replication of faculty resources, making use of state-of-the-art facilities at MSU's Burns Technology Center.

2. Bozeman as a regional healthcare center

Bozeman is one of the healthcare hubs in Montana, a referral center for south central Montana and Gallatin County. Serving a population of more than 78,000 in the county and surrounding areas, Bozeman is served by a well developed medical care system including the Bozeman Deaconess Hospital and related out-patient and day surgery facilities. **The dental care system in Bozeman** is well-developed. Members of the Bozeman district dental society have expressed strong support for the RIDE program and interest in increasing their involvement at MSU as clinical instructors for the RIDE program. There are sufficient dentist resources to assist with this training, including general dentists and specialists to help with various portions of the curriculum. Areas of special focus among Bozeman dentists include pediatric dentistry, oral and maxillofacial surgery, periodontics, endodontics, orthodontics, oral medicine and temporo-mandibular joint disorders. There is also a very active community health center (Community Health Partners), with branches in Bozeman and Livingston offering comprehensive medical and dental services to underserved populations.

3. Existing programs at MSU

MSU has substantial resources in the health sciences which creates a strong infrastructure for starting a RIDE program. This section describes key resources and provides links for additional information.

a) Division of Health Sciences

The main purpose of the Division of Health Sciences (DHS) is to promote, support and expand the institutional capacity to meet health-related needs for the people of Montana. The goal is to coordinate and enhance the related educational, research and service programs of Montana State University and provide outreach of these programs to the entire community. In addition to serving Montana WWAMI students, the DHS functions as the home of several important outreach organizations, including the Montana Area Health Education Center (AHEC), and the Montana Office of Rural Health (MORH). (http://www.montana.edu/dhs/).

1) WWAMI Medical School Program

The WWAMI program at MSU forms a strong base for a new RIDE program. In existence since 1973, the MSU WWAMI program trains first year medical students as part of the WWAMI program, a cooperative program of the UWSOM and Wyoming, Alaska, Montana and Idaho. WWAMI makes publicly-funded medical education accessible to students from these states by decentralizing the educational process and sharing existing facilities and personnel in universities and communities in WWAMI states.

Support of WWAMI by the State of Montana allows 20 qualified Montana residents to be admitted to the UWSOM each year. The WWAMI program goals are to 1) make publicly-funded medical education accessible to Montana residents; and 2) encourage graduates to choose careers in primary care medicine and locate their practices in rural and less served areas of the Northwest. WWAMI encourages talented students in the WWAMI states, especially minority students, to enter the field of medicine. After the first year, WWAMI students join their classmates on the Seattle campus. They typically fulfill third and fourth year clinical rotations back in WWAMI sites, including those in rural and underserved areas. (http://www.montana.edu/wwwwami/)

WWAMI outcomes:
To date, the WWAMI program has exceeded the national rates of returning students to practice where they go to medical school (40%). Approximately half of Montana students trained through the WWAMI program return to the state; if other WWAMI students are included the number of students returning to fill workforce needs is 55-60%. A constraining factor on medical student return to Montana is that there is

only one residency program in the state, the Montana Family Medicine Residency in Billings.

2) Montana Area Health Education Centers (AHEC)
The Montana AHEC assists with placement of medical and dental students in community rotations and other important community linkages. The mission of the Montana AHEC is "to improve the supply and distribution of health care professionals, with an emphasis on primary care, through community/academic educational partnerships, to increase access to quality health care." In collaboration with all AHECs, the Montana AHEC forms linkages between healthcare units to the benefit of underserved and rural communities to foster and encourage collaborative community-based health programs, increase the number of minority and underserved youth entering health education programs, and help implement collaborative community-based, multidisciplinary education and training for health professionals and health professions students. (http://healthinfo.montana.edu/ahec.html)

3) Montana Office of Rural Health
Designated in 1992 as a program of Montana State University, the Montana Office of Rural Health carries out the following missions: (1) collecting and disseminating information within the state, (2) improving recruitment and retention of health professionals into rural areas, (3) providing technical assistance to attract more federal, state, and foundation funding for rural health, and (4) coordinating rural health interests and activities across the state. The Montana Office of Rural Health and the Montana Area Health Education Center (AHEC) are housed together, administered through the Division of Health Sciences and located at Montana State University in Bozeman. (http://healthinfo.montana.edu/orh.html)

b) Health Professions Advising

Montana State University provides health professions advisors for students interested in applying to various health professions programs, including dental training programs. This program will provide a natural pipeline for students wishing to apply to the RIDE program. On average MSU graduates applying to dental schools had a 74 percent acceptance rate, which is above the national average. Various opportunities are offered to students to gain health professions exposure in the local community and meet with speakers from national pre-health organizations. Community dentists from the Bozeman area have contributed to the instruction and advising of pre-dental students. Students have an opportunity to meet with the Director of Health Professions Advising to review admissions requirements of the health professions to better plan their undergraduate educational experiences. Multiple on-line resources are also available to students

including dental school admissions guidelines. (http://www.montana.edu/dhs/hpa/)

c) The Burns Technology Center

The Burns Technology Center will play an important role in linking RIDE students to the UWSOD to receive equivalent education in certain key dental subjects. The Burns Technology Center (BTC) was created in 1993 to develop and demonstrate cost-effective telecommunications applications and distant learning strategies. Established based on Senator Burns' vision of using telecommunications to overcome the limits of physical and cultural isolation, the BTC extends the university into the homes and communities of every Montanan as well as across and beyond the U.S. The major technology components include video conferencing capability, satellite downlink capability, high tech meeting and class rooms. (http://eu.montana.edu/btc/)

d) Department of Health and Human Development

Linkages for RIDE courses may be formed with faculty in the Department of Health and Human Development (DHHD). For example, nutrition forms a key component of dental health, and this is a key area of instruction in the DHHD. This Department prepares students for various careers, including community health, consumer science, dietetics, exercise science, early childhood education, family and consumer sciences, family science, food and nutrition, health promotion, kinesiology, nutrition science, and pre-physical therapy. Students interested in teaching can pursue programs in family and consumer sciences secondary teaching, and health enhancement (health and physical education) teaching K-12. Graduate degrees are also offered. (http://www.montana.edu/ehhd/hhd/academicprograms.htm)

e) College of Nursing

MSU College of Nursing faculty may also be assisting with science courses for RIDE students. The Montana State University College of Nursing is the oldest state-supported institution offering nursing education in Montana and the only institution offering master's degrees in nursing. Licensed Practical Nurses (LPNs) can attain baccalaureate education from the College in becoming registered nurses. The College also offers distance graduate program in the areas of rural nursing practice, theory development and research, and for the preparation of health care providers to serve rural states. (http://www.montana.edu/wwwnu/academic/index.htm)

f) MSU–Great Falls College of Technology Dental Hygiene Program and Dental Assistant Certificate

It may be possible to link RIDE dental students with dental hygiene students and faculty for certain components of their education. UWSOD students have participated in a "dental team experience" with dental hygiene and dental assisting students in Spokane, Washington, and it may be possible to recreate this highly successful rotation in Great Falls. The Great Falls campus offers a two-year Associate of Applied Science Degree in Dental Hygiene and a Dental Assistant Certificate Program. Each year, 14 new students are accepted to the Dental Hygiene Program with priority given to Montana residents and up to 18 students are accepted in the Dental Assistant Certification Program.
(http://www.msugf.edu/academics/healthsci/Programs/DentalAssistantCert.htm
(http://www.msugf.edu/academics/healthsci/programs/DentalHygiene.htm)

g) Distance Degree and Certificate Programs

Montana State University supports a growing variety of online certificate and degree programs for an existing undergraduate degree or professional development. Extended University works closely with campus colleges, departments and Montana's K-12 and business communities to nurture and grow online learning and training degree and certificate programs. Health Problems of Aging and Preparing for Bioterrorism are offered as online non-credit courses via the distance education program.
(http://eu.montana.edu/Distance/)

h) Center for Biofilm Engineering (CBE)-MSU College of Engineering

The Center for Biofilm Engineering (CBE) consists of multidisciplinary research teams seeking solutions to, and applications for, industrially relevant problems and potentials of microbial biofilm formation. The CBE provides students with research experiences in the biofilm field and opportunity to learn from world-recognized leaders. This has strong application to dental science. For example, CBE-sponsored dental research projects often address dental issues: Xie, H., G.S. Cook, J.W. Costerton, G. Bruce, T.M. Rose, and R.J. Lamont, "Intergeneric Communication in Dental Plaque Biofilms," J. Bacteriol., 182(24):7067-7069 (2000).
(http://www.erc.montana.edu/default.htm)

D. Design and Logistics

This section describes some of the mechanics of establishing a first-year dental educational site in Bozeman, and the projected timeline. The design and logistics information provide the assumptions needed for the detailed budget in Section 4 (p 36) below.

1. Establish RIDE Site at MSU Bozeman

a) Matriculate 8 dental students at MSU-Bozeman

Dental students would begin their education in Bozeman at the MSU campus. They would be selected from a pool of candidates from Montana applying to the UWSOD. Representatives from Montana would be added to the UWSOD Admissions Committee and would review Montana candidates. Resources will be needed for Montana representatives to participate in the Admissions process on a yearly basis. In the first year these representatives will need special calibration and training in the Admissions process.

The RIDE program will take advantage of some shared operations with the WWAMI site administrative infrastructure (including the Director, gross anatomy lab assistant, student services and operating costs.) In addition a dental program coordinator (1.0FTE) will be needed to oversee the dental components along with a regional dental director (0.5FTE). A dental technician (0.5 FTE) will support the dental student needs in the dental anatomy, dental occlusion and dental materials courses, and ensure appropriate materials are always available for these courses. There will also be some small investments in office furniture, computers, etc for the Montana regional RIDE director and assistants.

b) Ensure adequate MSU basic science and pre-clinical dental faculty

There are extensive basic science teaching resources at MSU. In most courses dental students will overlap with medical students, creating both cost efficiencies and interdisciplinary training opportunities. Course modifications will be required in certain subjects to adapt material for dental students, and additional funding will be needed to accomplish this. A full review of the curriculum and any associated additional costs has been carried out by MSU faculty with suggestions for all required courses.

Dental and medical students will also overlap in key pre-clinical courses in the area of patient interviewing and history-taking, ethics and professionalism and cultural competency. Dental instructors will be added to this mix to ensure adequate discussion of these topics as they relate to dentistry.

c) Ensure adequate dental science faculty at MSU

In addition to the basic sciences dental students require instruction in dental-specific sciences. Currently a number of Bozeman area dentists teach the pre-dental courses for undergraduates at MSU, and the RIDE

program will draw on these affiliate faculty to form the base for the additional required instruction. Faculty resources will be needed to support this instruction.

d) Utilize Distance Learning Instruction

The RIDE program will also make use of **distance learning** facilities at the MSU Burns Technology Center (BTC). Distance learning will be utilized for certain highly technical course content that will be exported from UWSOD in Seattle, to ensure that students have the latest available scientific information, while avoiding costly duplication of specialized faculty. The BTC allows for renting video-conferencing facilities by the hour including technical support, an ideal arrangement for RIDE instruction that will not require additional expenditures for costly equipment and additional staff.

In later years, when students are on clinical rotations in Montana, technology will be used to keep them in touch with course material offered in Seattle. Internet technologies will also allow affiliate faculty to consult with faculty in Seattle as well as receive UWSOD continuing education courses.

Finally, student, faculty, course evaluations and other course-related communications will be carried out online to optimize efficiency of the educational process.

e) Analysis of MSU Bozeman facilities

The Bozeman campus facilities include substantial space including classrooms, laboratories, offices and related facilities. Beyond the shared facilities with WWAMI medical students, which will need some additions (e.g., gross anatomy lockers, histology microscopes, etc), dental students in the RIDE program will have two specific needs during their first year of education: 1) a distance-learning enabled wet lab space with water, air, gas and vacuum, for the dental anatomy, occlusion and dental materials courses; and 2) a clinical facility with dental chairs for use by students in the spring of their first year as they start performing dental exams and taking impressions.

Both needs can be met with minimal capital investment. First, there is an MSU laboratory that could be modified to fit the needs of the dental lab space with distance learning capability. This will allow students at MSU to participate in these major activities along with their Seattle classmates; and for MSU instructors to work with Seattle-based faculty in these key dental courses. Certain pieces of equipment will be added to support laboratory instruction in dental materials and dental anatomy (Complete financial estimates are included in the Budget on p. 36).

Second, there is a dental clinic on campus that serves students that might serve as a site. Other facilities include the Community Health Partners dental clinic and numerous dental offices in the area. It may also be possible to utilize the MSU-Great Falls School of Dental Hygiene for a few sessions.

f) Ensure equivalency of MSU first-year curriculum

The MSU-Bozeman RIDE teaching program would be conducted on a semester basis for both medical and dental students, in keeping with the MSU academic calendar. The complete UWSOD curriculum for first-year dental courses appears in the Appendix.

Equivalent course content will be offered at the MSU-Bozeman campus to meet course learning objectives and the Council on Dental Accreditation (CODA) requirements. Dental curriculum would be delivered by three pathways: (a) overlapping with medical students, (b) with other health science students at MSU, or (c) by distance learning, with local faculty back-up. (Final arrangements for each course will be made by MSU and UWSOD faculty based on faculty resources at the time of program implementation.) All dental courses will be under the general supervision of UWSOD faculty who will work with the Bozeman instructors and the RIDE director on-site to ensure educational equivalency that meets CODA requirements.

g) Potential Benefit to MSU research opportunities

In general the association of regional universities and the UW WWAMI program has resulted in increased interactions and enhanced research opportunities. Since both the UW and MSU are research-intensive institutions it is likely that the establishment of a RIDE program will lead to increased scholarship and collaboration. The world-famous Biofilms Institute in Bozeman is another strong site for possible research collaboration.

2. Expand involvement of dentists and community sites

In addition to dental affiliate faculty essential for establishing the first year RIDE program at MSU, dentists throughout the region will be needed as preceptors for students after their first and second year, and for the more extensive fourth year clinical rotations. There are dentists providing care for underserved patients within the Bozeman community (in community health centers and in private offices) and in more rural areas of the region, who can serve as preceptors for dental students. These affiliate faculty members will be valuable role models for students, demonstrating both community engagement and the lifestyle opportunities of these communities.

Resources will be required for logistics of student rotations, and to support community dentists engaged in extensive precepting. In addition, all sites will be visited and evaluated regularly by RIDE faculty to ensure suitability for clinical instruction. Community faculty will in most cases require calibration and instruction to ensure optimal educational experiences for dental students and faculty alike.

These relationships will also benefit the clinicians by increasing access to UW library resources, faculty development and continuing education opportunities. These community-based rotations will support the important workforce goals of RIDE, and contribute services for patients lacking access to dental care.

Selection of community sites will be determined based on quality of the educational experience, need for workforce, availability of dentists to be faculty preceptors and adequate logistical arrangements for students (housing etc).

3. Expand UWSOD capacity for 8 Montana RIDE students

a) Faculty and Teaching-Related Resources

Adding more students to the instruction-intense environment of dental school will require additional proportionate clinical faculty time. Dental students must be prepared to start practice by the end of school, as a residency is not required; thus students are all monitored very closely. Since RIDE students will be spending four-six months in community sites during their fourth year, their work prior to these rotations must be supervised even more carefully.

First-year dental courses in Bozeman will require close involvement by UWSOD faculty in addition to MSU faculty to ensure educational equivalency and coordination. Courses taught by distance learning will also require faculty resources as course materials are developed and web methodologies tested. This applies to first-year courses, but also to courses which students away on clinical rotations may miss, particularly in the fourth year.

Dental students will be in community rotations at the start of their second and third years and for 4-6 months during their fourth year. It will be necessary to identify and select clinical sites for rotations and faculty-preceptors for dental students. All of these rotations will require funding for living and travel for students, as well as teaching-related expenses. These include calibration of new affiliate faculty, regional site visits and continuing faculty educational activities.

New clinical affiliate faculty functioning as preceptors for dental student experiences will need faculty development in teaching methods, as well as familiarity with the educational approaches and learning objectives at the UWSOD in order to ensure educational equivalency and good experiences for faculty and students alike. Training will be carried out in both Seattle and in regional sites with UWSOD faculty.

Students will first participate in community-based rotations at the start of their second year. Students will spend four weeks in a "RUOP" (rural underserved opportunities program) pre-clinical experience - similar to that offered in the UWSOM (described in the Appendix). At the beginning of the third year students will again participate in another two to four week rotation, this time able to deliver some dental care. Finally in their fourth year they will spend approximately four-six months in an intensive general dentistry experience (somewhat similar to the six month medical student WRITE rotation – WWAMI Rural Integrated Training Experience). All clinical rotations will be overseen by a Montana dentist who will be an affiliate dental faculty member (half-time). In general these clinical experiences will emphasize delivery of comprehensive dentistry in rural and underserved areas. Additional opportunities for other rotations – such as pediatric dentistry or oral and maxillofacial surgery may also be explored.

All of these rotations will require funding for living and travel for students, as well as teaching-related expenses. Calibration of new affiliate faculty, regional site visits and monitoring of educational experiences will be needed as well.

b) Staff time at UWSOD

Staff time will need to be increased proportionately in order to support the additional required Admissions process, student counseling and other services and coordination for what will eventually be 32 additional students. Liability issues for students on rotation, compliance issues, and the establishment of formal affiliation agreements with clinical sites will also be necessary. All new affiliate faculty will be formally credentialed by UWSOD departments. Clinical instruction will require the support of additional dental assistants and staff in the dental clinics.

c) RIDE administration, evaluation, data-tracking

A RIDE office at the UWSOD will be formally established including an overall director (0.35 FTE), a dental director (0.5 FTE) to oversee all dental educational components, an administrator (0.5 FTE) and program coordinator (0.5 FTE) to oversee the all the financial, academic and logistic arrangements for the RIDE program. This office will also support a portion of an educational evaluation specialist and a portion of a data-entry person.

The RIDE plan also includes data tracking of student demographics, academic performance, educational experiences, future career plans, and eventual location and type of practice – all necessary for evaluation of programmatic goals and outcomes. Online evaluation systems for students and faculty will also be developed. Modifications of the existing data tracking systems and website at the UWSOD will be required to accomplish these more extensive objectives. Resources for program evaluation are included in administrative costs.

d) Analysis of UWSOD-Seattle facilities

Dental student activities in the second year of dental school especially utilize the UWSOD state-of-the-art simulation clinic (D165). Ideally this space will undergo remodeling to ensure optimal facilities for the additional students. In order to offer synchronous and asynchronous distance learning capabilities a large health sciences classroom will be upgraded. Additional resources are being sought for these capital expenses.

4. Proposed Timeline

If approved by the Montana legislature, the additional 8 students would be accepted in the 2007-8 admissions cycle. The modest MSU capital modifications would be instituted during this phase-in year, and the RIDE infrastructure set in place in Bozeman and Seattle, along with faculty calibration and accreditation. Students would start at Bozeman in the fall of 2008. Capital improvements in distance learning facilities would need to take place in Seattle in 2007-8 to be ready for the first year cohort. If expansion of the UWSOD dental simulation clinic is undertaken, it would need to be ready for RIDE students when they join their colleagues in Seattle in the fall of 2009.

E. Alternative Proposals to RIDE

During the feasibility phase of the RIDE program, consultation was sought on RIDE and other financial models for dental education in Montana. In particular, the authors of *The Economics of Dental Education*,[1] L. Jackson Brown and Lawrence H. Meskin, national experts on dental workforce and finances of dental education, served as consultants to the RIDE project, reviewing the model used for determining the costs of a RIDE program in Montana, and assessing alternative dental education proposals. Other options for increasing access to dental education for Montana students reviewed include:

1. Building a small dental school for Montana. This option is much more costly. Capital expenditures alone were estimated at approximately $17 million for 8 students a year in 2008-9 dollars (based on the new campus for the University of Colorado School of Dentistry 2005, which included donated land

and existing faculty - see Appendix). Other new schools of dentistry under construction have also estimated start-up costs:

- East Carolina University: $90 million (50 students per class) [33]
- UNC Chapel Hill: $125 million for expansion of 81 to 100 students per year and capital costs for a new building (19 students more per class).[33]
- Arizona dental school (with Midwestern University): $140 million (100 students per class) [34]

2. Funding more WICHE slots or seats in other dental schools. These options are less costly. However, they do not build educational capacity in Montana, or engage Montana dentists in addressing workforce issues. All training is out of state, and students going to another state for dental school are much less likely to return to Montana. No additional services are provided for Montana residents in underserved communities.

Summary

The establishment of a first-year site for dental students at MSU-Bozeman with a RIDE program geared to the needs of Montana would be a key step towards establishing a pipeline of dental students to meet workforce needs in the state. The opportunity to partner with the WWAMI program at MSU in the establishment of a first-year site allows a financially feasible model to be proposed for a modest-sized cohort of dental students. The interdisciplinary opportunities for integration with medical students and possibly other health professional students are very appealing, and in line with all recent health professions reports. There is strong interest from Montana dentists, community health centers and MSU faculty and administration in exploring such a collaboration. Challenges include the resources that will need to be invested in order to implement the program, and the work to establish the infrastructure of training sites across the state.

Regional Initiatives in Dental Education Budget

Note: Figures below include an inflation rate @3% to bring 2006 costs to FY 08/09 level.

Start-Up Budget (2007-8)

A. Start-up Operating Costs – Montana State University (MSU)		
Dentistry instruction – faculty recruitment, appointment, curriculum development	100,483	
MSU WWAMI costs for initiating RIDE program including operations	57,704	
0.25 Montana RIDE regional director, 0.5 program coordinator, 0.25 dental technician	89,057	
MSU Startup Operating Costs Subtotal		**$247,244**
Start up Capital Costs – MSU		
Dental equipment	21,855	
Gross anatomy lab	39,065	
Microscopy/histology/lockers	40,096	
Offices	7,813	
Wet Lab (Lewis 205) distance learning equipment	103,918	
Wet Lab (Lewis 205) facilities	17,484	
MSU Total Start-up Capital Costs		**$230,231**
Subtotal MSU Start-Up Costs		**$477,475**
B. UW School of Dentistry (UWSOD) Start-up Operating Costs		
Instruction – course development and initiation of distance learning protocol	87,935	
Dentistry R/UOP	17,484	
RIDE program salaries: 0.35 director, 0.25 dental director 0.5 administrator, 0.5 program coordinator	213,082	
RIDE program operations	21,855	

0.25 Evaluation consultant, 0.10 database technician, 0.25 audio visual technician	42,016	
UW SOD support services: admissions, student services, classroom services, etc.	54,363	
Montana admissions committee calibration	9,290	
Shared dental school operations	6,800	
Compliance, risk management, external advisory board	38,245	
UWSOD Start-up Operating Costs		**$491,070**
MSU Subtotal Start up Costs – Capital and Operating Costs		**$477,475**
TOTAL START-UP COSTS 2007-8		**$968,545**

Implementation Year Budget (2008-9)

C. MSU Implementation Year Budget

Dental student instruction (including basic and dental sciences, distance learning, Burns Center fees)	210,255	
MSU WWAMI costs for facilitating RIDE program -student services, operations, etc	90,407	
0.5 Montana RIDE regional director, 1.0 program coordinator, 0.5 dental technician	178,115	
MSU Total Annual Operating Budget		**$478,777**

D. UWSOD Implementation Year Budget

Instruction and distance learning	192,776
Dentistry R/UOP	34,967
Dentistry WRITE/Community Rotations/Clerkships	80,842
RIDE program salaries: 0.35 director, 0.5 dental director 0.5 administrator, 0.5 program coordinator, and operations	275,914
RIDE clinical rotation coordinator (Montana dentist, 0.5 FTE)	81,954

0.5 Evaluation consultant, 0.2 database technician, 0.5 audio visual technician	84,033	
UW SOD support services: admissions, student services, etc.	108,726	
Shared dental school operations	13,600	
Compliance, risk management and external advisory board	76,492	
UWSOD Operating Costs implementation year		**$949,304**
MSU Operating Costs implementation year		**$478,777**
TOTAL IMPLEMENTATION YEAR COSTS 2008-9		**$1,428,081**

E. First Biennium Request (MSU and UWSOD)

MSU Operating & Capital Costs – 1st Biennium	**$956,252**	
UWSOD Operating Costs – 1st Biennium	**$1,440,374**	
TOTAL		**$2,396,626**

Fully Operational Annual Budget (2011-12)

F. MSU Fully Operational Annual Budget – 2011-12

Dental instruction (including all basic sciences), distance learning and Burns Center fees	210,255	
Dentistry specific coordination and administration	178,115	
Shared administration and operations with MSU/WWAMI	90,407	
MSU Total Annual Operating Budget		**$478,777**

G. University of Washington School of Dentistry Fully Operational Annual Budget – 2011-12

Ongoing costs for the second through fourth year program in Seattle and Bozeman include:

Instruction and Distance Learning	768,709
Dentistry WRITE/community rotations/clerkships	220,693
Dentistry R/UOP	34,967
RIDE program salaries: 0.35 director, 0.5 dental director 0.5 administrator, 0.5 program coordinator, and operations	275,914
Montana RIDE rotation facilitator, 0.5 FTE	81,954
0.5 Evaluation consultant, 0.2 database technician, 0.5 audio visual technician	84,033
UW SOD support services: admissions, student services, etc.	108,7260
Shared operations	13,600
Compliance, risk management and external advisory board	76,492
Classroom services and clinic operations	62,832
UWSOD Operating Costs	**$1,727,919**
MSU Operating Costs	**$478,777**
Total Operating Costs For Program	**$2,206,696**
Total Operating Costs For Program less UW Program Support	**$1,988,151**

H. Overview of yearly costs (in 2008-9 dollars) until program is fully operational: (These numbers subtract student tuition paid to UW from costs)

Year	2007-8	2008-9	2009-10	2010-11	2011-12	2012-13
students	Admit	8	16	24	32	32
Costs/ student		178,510	105,665	76,638	62,130	62,130 68,959*
Total	968,545	1,428,081	1,690,485	1,839,318	1,988,151	1,988,151

*Note, reported costs of dental student education per year range from $96,000 - $102,000 dollars per student per year, in 2008-9 dollars, used in this report. (Ref. 1, 19).

Appendix

A. Curriculum for MSU-Bozeman

1. Courses which dental / medical students will take together

Semester	Medical School Curriculum	Equivalent Dental School Curriculum
Fall	MEDS 510 Micro Anatomy (Hist)	BSTR 530 and 541 (Anatomy and Embryology for Dental Students and Microscopic Anatomy)
	MEDS 511 Anatomy (Gross)	
	MEDS 513 Intro Clinical Med I	ORALM 513, 514, 515, 516, 517 (Communication Skills, Cultural Competency, Interviewing and History-Taking, Introduction to the Physical Exam) – with break-out groups with dental instructors
Spring	MEDS 522 Intro Clinical Med II	
	MEDS 531 Head, Neck, Ear and Throat Anatomy	Portions of this will address BSTR 431 (Introduction to Neuroanatomy
	MEDS 532 Nervous System	

2. Courses with overlap with other health science courses at MSU. Certain basic science courses do not perfectly overlap with those taught to medical students due to differing course content and/or credit hours. These courses will be taught by MSU faculty, either from the WWAMI program, or from Nursing or other disciplines at MSU. Resources will be needed to support instruction in these areas.

- Human Physiology (PBIO 405-6): A portion can be covered in MEDS 512 Mechanisms in Cellular Physiology
- General Pathology (PATH 444)
- Molecular Microbiology and Oral Diseases (ORALB 520): A portion can be covered in MEDS 520 Cell and Tissue Response to Injury

3. Dental Specific Courses. These will be taught by local affiliate dental faculty or exported from UWSOD via distance learning methods.

- Periodontics (PERIO 517)
- Operative Dentistry (RESD 519)

- Dental Anatomy and Occlusion (RESD 515, 516, 517)
- Social and Historical Perspectives in Dentistry (DPHS 510)
- Introduction to Material Science and Dental Materials and Applied Dental Materials (RESD 510, 511)
- Development, Structure and Function of Oral Tissues (ORALB 510)
- Introduction to Clinical Dentistry (DENT 610)

4. Dental Student Curriculum. The UWSOD first year curriculum is outlined below:

Quarter 1 (Autumn, First Year)

Course	*Description*
BSTR 530	Anatomy and Embryology for Dental Students
BSTR 541	Microscopic Anatomy
PBIO 405	Human Physiology
RESD 515	Dental Anatomy

Quarter 2 (Winter, First Year)

Course	*Description*
BSTR 431	Introduction to Neuranatomy
DENT 610	Introduction to Clinical Dentistry
DPHS 510	Social and Historical Perspectives in Dentistry
ORALB 510	Development, Structure and Function of Oral Tissues
ORALM 513	Communications Skills I - Techniques
ORALM 514	Communications Skills II - Cultural Competency
ORALM 515	Communications Skills III -Interviewing & History-Taking
ORALM 516	Physical Examination I
PATH 444	General Pathology
PBIO 406	Human Physiology
RESD 510	Dental Materials Science
RESD 516	Introduction to Occlusion

Quarter 3 (spring, First Year)

Course	*Description*
ORALB 510	Development, Structure and Function of Oral Tissues
ORALB 520	Molecular Microbiology and Oral Diseases
ORALM 517	Physical Examination II
PATH 44	General Pathology
PERIO 517	Introduction to Periodontics
RESD 510	Introduction to Dental Materials

RESD 511	Applied Dental Materials
RESD 517	Functional Analysis of Occlusion
RESD 519	Operative Dentistry

B. Summary of Current University of Washington School of Dentistry Outreach Programs

Robert Wood Johnson (RWJ) Pipeline, Profession and Practice: Community-Based Dental Education Grant

RIDE builds on many outreach activities of the UWSOD including those supported by the Robert Wood Johnson *RWJ Pipeline, Profession and Practice*[35] grant (9/02-9/07) housed at the UWSOD. Synergistic with RIDE activities, the RWJ grant has specifically focused on developing community-based experiences for fourth year dental students and enhancing the pipeline of dental students from minority and underserved communities.

These resources have added to the substantial outreach efforts in place at the UWSOD, allowing students to participate in both pre-clinical (RUOP) and clinical rotations in more than 30 sites across WWAMI states.

The RWJ Pipeline grant has afforded the UWSOD considerable experience that has benefited the RIDE program including how to outsource curricular elements, the preparation of students for community rotations, evaluation of external experiences, relationships with community faculty, affiliation agreements, travel/housing, and other issues. This project has assisted with the placement and provided financial resources to pilot the dental team experience (DTE) in Spokane (see below).

The Spokane-based Dental Team Experience (DTE)

This innovative model of community-based dental education was created in Spokane in the spring of 2005. Co-sponsored by a broad coalition of community partners (the Department of Dental Hygiene at Eastern Washington University, the Spokane District Dental Society, Spokane Community College Dental Assisting Program, the Community Health Association of Spokane (CHAS), and the UWSOD RWJ and RIDE projects, this pilot created teams of students from dentistry, dental hygiene and dental assisting to work in community sites providing care for underserved patients. Team-building activities, observing in offices

of local dentists and participating in community activities augmented this experience. The pilot was highly-rated by both students and community faculty, and was repeated in 2006 with even more success.

Given that there is an MSU program in Dental Hygiene and also instruction in Dental Assisting in Great Falls, it may be possible to create a similar experience for RIDE students in Montana.

RUOP (Rural / Underserved Opportunities Program)

In 2005, UWSOD piloted a dental Rural/Urban Underserved Opportunities Program (R/UOP), a four-week elective immersion experience for students between their first and second years of dental school. This popular program was originally set up in the UWSOM, and RUOP coordinators assisted the SOD in establishing its initial RUOP pilot. The goal of the program is to increase the number of medical and dental practitioners choosing to practice in underserved and rural areas of the Northwest. These experiences provide students with a chance to see how medicine and dentistry are practiced in rural and underserved communities early in their professional school experience, while their preferences for practice specialty and location are forming. It also exposes them to the life style of practitioners and other aspects of community life.

Partial funding and help with program logistics have been provided by the Area Health Education Centers in Washington, Wyoming, Alaska, Montana and Idaho, the SEARCH program in Montana (see below), along with RWJ and RIDE projects. Native Health corporations and other entities have contributed to the funding of these students in Alaska.

Clinical preceptors donate their time to ensure a highly unique and individualized learning experience. The students receive a small stipend and reimbursement for their travel and living expenses. The student evaluation of this experience has been overwhelmingly positive, and after the pilot with 6 students in 2005, some 17 students were able to participate in the RUOP experiences in 2006.

SEARCH

For the past two years the UWSOD has worked collaboratively with the SEARCH program in Montana (funded by the National Health Service Corps, HRSA Bureau of Primary Health Care)[31] to place dental students for two to four weeks in underserved clinical sites in Montana in an

effort to encourage their location to these areas after graduation. All students who have participated in this program have reported positive experiences with their community dental mentors. Both RUOP and SEARCH experiences have reinforced UWSOD determination to provide such community-based rotations early when students are forming practice preferences and attitudes towards community-based care.

Pediatric Dentistry Rotations

The required fourth year pediatric dentistry rotations occur at outreach sites serving underserved communities. In Washington State UWSOD students have rotated in many sites around the state including Yakima Valley Farm Workers Clinics in Walla Walla, Toppenish, Grandview, Yakima and Spokane; Yakima Neighborhood Health Services; Yakama Nation Indian Health Services in Toppenish; Interfaith Community Health Center in Bellingham; High Point Dental, Sea Mar Dental Clinic in Seattle and Occupation Skills Center SeaTac Smiles in Burien. Pediatric dental rotations will be arranged for Montana RIDE students within their state, possibly as part of their 4-6 months community-based rotations in the fourth year.

Dental Education in Care of Persons with Disabilities (DECOD)

Meeting the needs of a very vulnerable group of citizens, DECOD is a special UWSOD program designed to treat persons with severe disabilities and to prepare dental professionals to meet the special oral health needs of this population. This program provides clinical care within the UWSOD and in outreach locations. Third and fourth year dental students also accompany faculty and provide community-based care in Walla Walla, Bremerton, Snohomish and King Country. Sites where care is provided include nursing homes, adult day care centers and private homes. A nationally-acclaimed model for the care of persons with disabilities, DECOD also hosts community-based dentists and graduate students wishing to obtain additional training and experience with this population.

Geriatric Outreach Experiences

Both third and fourth year dental students travel with UWSOD faculty to off-site locations for geriatric clinical rotations that include Foss Nursing Home, [36] Village Dental Clinic,[37] Veterans' Administration Hospital Dental Clinic and the Downtown (Seattle) Public Health Dental Clinic. Students also use portable dental equipment to deliver oral health care as part of the Mobile Geriatric Dental Service [38] at local

adult day health centers used by frail elders in the Seattle area. Because of the great need for dental care among vulnerable elders, additional rotations were recently developed in partnership with local sites, the State's Department of Health and Department of Social and Health Service (DSHS) Aging and Disability Services.

Other Student Volunteer and Outreach Activities

In addition to the above activities, UWSOD students participate in a number of other volunteer efforts, both on-going and one time events, some of which provide interdisciplinary experiences with medical and other health science students. Among others are "Community Dentistry" a very busy volunteer clinic held at Kaiser Permanente in Longview, and SPARX (Student Providers Aspiring to Rural and underserved eXperiences – a UW health science student event and funded by Washington AHEC). Dental students have provided oral health exams at the Latina Health Fair, and oral hygiene instruction to homeless shelter residents of the Aloha Inn. "Give Kids a Smile" is a well-attended yearly event supported in part by the Washington State Dental Association. Recently, protective mouth guards were made for children by dental students and faculty. Husky Smiles - conceived and operated by students - currently sends students to eight Women, Infant and Children (WIC) sites in King County, and two sites in Eastern Washington to provide preventive oral health care and education to children and their parents. Husky Smiles has previously received grant funding from the Washington Dental Service Foundation, the Seattle/King County Dental Society and matching funds from the State Department of Social and Health Services.

List of Current Outreach Experiences

a) Pre-Clinical Rotations for Dental Students – second year

In 2006 UWSOD students have participated in pre-clinical experiences at the sites below listed sites.

Sites/States	**Duration**
Native Alaska Medical Center (NAMC)	4 weeks
Yukon Kuskokwim Health Corp. (YKHC) Bethel	4 weeks
Bristol Bay Health Corp (BBHC)-Dillingham	2 weeks
Southeast Alaska Health Consortium (SEARHC) - Juneau	4 weeks
I.H.S. Ketchikan	4 weeks
Western Washington-Seamar	4 weeks
Western Washington-Tulalip	4 weeks
Eastern Washington-Othello	4 weeks
Eastern Washington-Yakima	4 weeks
Eastern Washington-Yakima	4 weeks
Eastern Washington-Spokane	4 weeks
Montana-Cut Bank	4 weeks
Montana-Helena CHC	2 weeks
Montana –Bozeman CHC	4 weeks
Montana- Butte CHC	4 weeks
Montana- Billings	4 weeks
Montana –Browning I.H.S.	4 weeks
Montana –Missoula CHC	4 weeks
Community Health Center of Central Wyoming-Casper, Wyoming	4 weeks

b) Clinical Rotations for Dental Students –The RIDE program will formally establish programs for extended fourth year "comprehensive dentistry" experiences for all RIDE students in Montana. Current community-based rotation sites for UWSOD Students include the following:

Sites for Comprehensive Care (Fourth year)	Duration	# of students
Spokane Dental Team Experience- Eastern Washington University, Spokane Community College, & Community Health of Bozeman	3.5 weeks	3
Ellensburg-Yakima Valley Farm Workers Clinic	2-3 weeks	7
Butte Community Health Center	3-4 weeks	2
Montana Dental Clinics	3-4 weeks	2
Native Alaska Medical Center	4 weeks	1
Idaho State University-Pocatello	2 weeks	1
45th Street Clinic - Seattle		9
SeaTac Occupational Skills Center	2 weeks	7
Pediatric Dentistry Sites – Eastern Washington, Bellingham, Seattle		
Yakima Valley Farm Workers Clinic (one rotation at Toppenish, Grandview, Walla Walla, Yakima, Bozeman, Yakima Neighborhood Health Services, Yakama Nation I.H.S., Interfaith, High Point Dental, SeaTac Occupational Skills Center or SeaMar)	2 weeks	55
ECOH (Early Childhood Oral Health) at Roosevelt Medical Center	2 1/2 days	55
Geriatric - Seattle Foss, Veterans, Mobile Geriatric, Downtown Public Health	3	55
DECOD (Patient with Disabilities) – Seattle and Washington state UWSOD clinic, Provail, Keiro Nursing Home, Mt St Vincent, Snohomish, Bremerton Frances H.M. Center, Walla Walla Adult Day Center, and/or Homebound Care	Averages 3.1 days	55
Hospital Dentistry - Seattle Harborview Medical Center, Children's Hospital and Regional Medical Center	8.5 days	55

C. Cost Estimates for Construction and Operation of a New Dental School

These cost estimates are based on the expenses required for construction and operation of the University of Colorado School of Dentistry. The estimates are for two sizes of dental schools. The larger school has a total class of 80 students (20 per year) and the smaller school has a total class size of 32 students (8 per year). This latter is the size of the contemplated Montana State University / University of Washington program.

	School Class Size	
(2008-9 dollars)	**80 students**	**32 students**
	66% of Colorado	40% of Colorado
Building Capital Expense	$28,031,000	$16,989,000
Recurring Costs		
Operating Expenses	$8,416,000	$5,101,000
CS&A	$1,767,000	$1,071,000
Debt service	$964,000	$584,000
Total Recurring Expenses	$9,504,000	$5,760,000
Less		
Clinic Income (# Students * $7,300)	$584,000	$234,000
Tuition (# Students * $19,000)	$1,520,000	$608,000
Net Recurring Costs	$7,400,000	$4,918,000
Net Recurring Costs per Student	$92,500	$153,700

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