Opportunities, Assessment and Issues for a 2+2 School of Veterinary Medicine at South Dakota State University

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Executive Summary

Food animal veterinarians are a critical component to an adequate food supply and continued economic growth in animal agriculture in South Dakota and the United States. Over the past five years, all segments of the food animal industry have grown in South Dakota, including, beef, dairy, swine and poultry sectors. This trend is predicted to continue. The South Dakota Department of Agriculture is proactively recruiting animal agriculture to the state. New processing capacity in the beef, dairy, poultry and pork sectors is currently expanding. Adequate availability of veterinary services is pivotal to maintaining animal and public health. South Dakota has an economic interest in ensuring a supply of highly skilled and locally knowledgeable veterinary expertise.

In the Fall of 2014, the Dean of the College of Veterinary Medicine at the University of Minnesota-St. Paul (UMN) contacted the South Dakota State University (SDSU) Veterinary and Biomedical Sciences Department (VBSD) with an invitation to explore the joint development of a 2+2 Veterinary Medical degree program. If accepted, SDSU would establish a School of Veterinary Medicine (SVM) to attract more students interested in food animal veterinary medicine to the UMN program. Following the current model for similar programs, students would spend the first two years of Veterinary School at SDSU and the final two years at the UMN with the primary intent of improving the long-term supply of food animal veterinarians to the agriculture industries of our respective states. In response to UMN's inquiry, the SDSU VBSD created a School of Veterinary Medicine Task Force to evaluate the opportunity.

South Dakota State University (SDSU) has the capacity to leverage its position, as a leading educator of students in the agricultural sciences to help fulfill South Dakota's food animal veterinary manpower needs. By partnering with the University of Minnesota, College of Veterinary Medicine (UMN-CVM), SDSU can provide the first two years of veterinary education with the final two years of education delivered at UMN-SVM, a so-called 2+2 veterinary program. The SDSU College of Agriculture and Biological Sciences has a large and sustainable number of students in several undergraduate and graduate majors who could add value to their SDSU education with veterinary studies.

Several Land Grant universities have created 2+2 SVM programs, successfully meeting their stated missions, and serve as effective resources for comparative analysis of a similar program at SDSU. Members of the task force initiated discussions and made several on-site visits with faculty, students, and administrators at the UMN to assess needs, as well as visiting the 2+2 programs at the University of Nebraska-Lincoln/Iowa State University College of Veterinary Medicine (CVM); Utah State University/Washington State University CVM; and the University of Alaska-Fairbanks/Colorado State University CVM.

An SDSU 2+2 SVM would need to provide a high-quality professional veterinary medical education by meeting the American Veterinary Medical Association (AVMA) accreditation and admission standards identical to the UMN College of Veterinary Medicine. The core veterinary medical curriculum for the first two years at SDSU would be the same as UMN's: 47 required credits in the first year and 59 required credits the second year, plus six credits in the first two years in electives (112 total credits per student). The task force envisions that the core instruction would be done at SDSU, involving both VBSD and multiple SDSU departments and colleges. Minor exceptions would include very specialized clinical or UMN orientation courses that may be taught through distance education.

Historically, 10-12 South Dakota students are enrolled each year in one of 30 professional Veterinary Medicine Colleges across the country (Appendix 3, page 37). However, South Dakota student enrollments in the last 2 years have been 6. Currently, 24 (6 students/year X 4 years) South Dakota students attend the Iowa State University (ISU) College of Veterinary Medicine and receive funding from the State of South Dakota that reimburses the difference between in-state and out-of-state tuition (total expenditure

$150,000/class, or $600,000 total investment/year). Tax revenues from the sale of animal endoparasiticides and ectoparasiticides currently fund the tuition buy-down, but could be invested in an SDSU 2+2 SVM, covering approximately 1/3 of the total yearly running cost of the program.

In accordance with the program's emphasis on food animal veterinary training, an early admission program, referred to as the Veterinary Food Animal Scholars Track (VetFAST) could be implemented to identify students with food animal interests and experience as they enter college. Such a program may reduce student debt associated with post-secondary education, as participating students would begin SVM study after three years of undergraduate study rather than after four years, effectively eliminating costs associated with the fourth year of a standard Bachelor's degree. Students would be able to complete a BS degree simultaneously.

The pro forma used in the financial modeling of this opportunity is based on 20 students per cohort. Providing the required course offerings for the first two years of a 2+2 SVM with the UMN would require an additional 4.3 teaching FTE at SDSU (budgeted at approximately $600,000/year). Additionally, facility needs represent a critical component of the proposed program. These facility needs include an anatomy lab and surgical suite, plus dedicated student classrooms are estimated to cost $4.3 million. Initial costs, including, salary start-up costs for new faculty and staff would be ~$0.8 million (Summary Table). Annual operating expenses are estimated at $1.41 million, including approximately $997,000 yearly investment in faculty and support personnel, approximately $190,000 supplies budget for all courses, and $226,000 in indirect cost recovery for administration of the program. An estimated annual revenue of $1,034,000 from student tuition, supplemented by $408,278 of reinvestment support from the state parasiticide tax is assumed. For the first 3 years of operation, the supplemental tuition being paid for South Dakota residents at Iowa State will need to be phased out for an additional $900,000 (Summary Table).

Summary Table 2+2 Costs ($millions)			
One Time Costs		Annual Budget	
Building costs	$4.3	Revenue (tuition and parasiticide tax)	$1.44
Initial Salary	$0.8	Operating Costs	$1.41
Phase out ISU tuition over 3 years	$0.9	Net Revenue	$0.03

Logistic issues that need to be considered include: funding of student positions at ISU in the transition; establishing an SDSU SVM within the academic calendar of the UMN; integrating admissions and financial aid between SDSU and UMN; making sure there are enough South Dakota and regional students applying to the program at SDSU; and providing a single identifiable facility to house a 2+2 program at SDSU. More detailed financial analysis is provided in Section V Page 21 and Appendix 2, Page 33.

In conclusion, the SDSU VBSD Taskforce recommends that SDSU continue discussions with the UMN on the 2+2 program, and that SDSU determine if the issues described above can be overcome. If this analysis is positive, then consideration should be given to moving the proposal forward to the South Dakota Board of Regents with intent to plan. A 2+2 program that provides well-educated food animal veterinarians with stronger ties to South Dakota would be an asset to the livestock and animal industries of the state, and, as proposed, would decrease costs and time for the students. It would also contribute to several goals of the SDSU Impact 2018 Strategic Plan, including but not limited to growth in (1) academic excellence through increased retention and recruitment of outstanding students and opportunities to enhance graduate programs in food animal science, (2) increased opportunities in outreach through broader interaction with regional end-users of veterinary services and distance education, and (3) contributing to the growth of SDSU as a high-performance university through recruitment and retention of top faculty to participate in a higher-profile veterinary education, research, outreach and diagnostic program.

I. Process

A. Task Force

Task force members included volunteers from the South Dakota State University (SDSU) Veterinary and Biomedical Sciences Department (VBSD), many who teach and/or advise pre-veterinary students:

1. Chris Chase DVM, PhD, Dipl. ACVM, Professor, Chairperson
2. Russ Daly DVM, MS, Dipl. ACVPM, Professor
3. Alan Erickson, PhD, Professor
4. Jane Christopher-Hennings, DVM, MS, Department Head, Professor
5. David Knudsen, DVM, MS, Dipl. ACLAM, Professor
6. Angela Pillatzki, DVM, MS, Dipl. ACVP, Assistant Professor
7. Alan Young, PhD, Professor

Task force members met every 2-4 weeks from January through November 2015 to discuss pros and cons, program logistics (costs, facilities, faculty, etc.), white paper items, and other relevant topics related to the proposed program.

B. Visits and Communications

1. SDSU: Dean Barry Dunn, Dr. Chris Chase and Dr. Jane Hennings had an initial meeting with Provost Laurie Nichols on January 20, 2015 to discuss the SDSU 2+2 program.

   Dr. Chris Chase and Dr. Mary Kay Helling, Associate Vice President for Academic Affairs met on March 31, 2015 to discuss planning strategies. On May 28, 2015, Dr. Chris Chase and Dr. Alan Young met with Dr. Don Marshall, Associate Dean for Academic Affairs, College of Agricultural and Biological Sciences to discuss budget details.

   On April 28, 2015, the SDSU 2+2 task force members met with Dr. Kinchel Doerner, Dean of the Graduate School, to discuss the possibility of using the proposed curriculum as offerings for Graduate Students. An additional discussion on combining the first two years of SDSU 2+2 with a five-year MS Veterinary and Biomedical Sciences Degree was presented as an opportunity, but not the primary consideration for the 2+2 program.

   The task force also initiated communications with the College of Pharmacy (Dean Hedge), Biology/Microbiology Department (Dr. Volker Brozel) and the Animal Science Department (Dr. Joe Cassady) to keep them informed about the SDSU 2+2 program proposal. Additionally, they presented the program as an informational item at the Agricultural and Biological Sciences Dean's Faculty Advisory Committee and Department Head Meetings during 2015.

2. On December 14, 2014 Dean Trevor Ames (UMN) sent the UMN College of Veterinary Medicine's first two years' curriculum and course descriptions to the SDSU 2+2 task force for consideration. On February 20, 2015, task force members, Dr. Russ Daly, Dr. Jane Hennings, Dr. Angela Pillatzki, Dr. Alan Young, Dr. Chris Chase, Dr. David Knudsen and Dean Barry Dunn attended a meeting with the UMN-St. Paul Administrators at the UMN College of Veterinary Medicine. The meeting included a tour of the facilities. Following the visit, UMN sent the SDSU 2+2 task force the complete syllabi for all of the UMN program's year one and two classes.

3. SDSU 2+2 task force members Dr. Jane Hennings, Dr. Chris Chase, Dr. Russ Daly and Dean Barry Dunn met with Dr. Don Reynolds, Dr. David Hardin, and the 2+2 Program Administrators at the University of Nebraska-Lincoln (UNL), on April 8, 2015. This visit also included information about the UNL 2+2 program and a facilities tour.

4. Dr. Chris Chase met with Dean Lisa Nolan and Associate Dean Claire Andreasen at Iowa State University, Ames IA on April 22, 2015. This visit involved a discussion of the current veterinary medical student training with Iowa State and potential future interactions.

5. SDSU 2+2 task force members Dr. Jane Hennings, Dr. Chris Chase, Dr. Angela Pillatzki, Assistant Department Head Dr. Eric Nelson and Dean Barry Dunn met with administrators of the 2+2 Program at Utah State University, Logan, UT on July 27, 2015. This meeting also included a visit with students and a tour of facilities.

6. Dr. Chris Chase initiated an extended phone conference call with Dr. Todd O'Hara, Chair of the 2+2 Organizing Committee at the University of Alaska-Fairbanks on September 9, 2015.

II. Needs Analysis

A. Food Animal Veterinarians

For the last ten years, the veterinary community has debated the "shortage" or "surplus" of food animal veterinarians. One of major changes from this debate has been expanding the term "food animal medicine", which was defined as veterinarians involved in food animal production medicine, to using the term "food supply medicine" to more fully account for the broad and varied career paths and job responsibilities that veterinarians have in a modern and highly integrated food system. These responsibilities can include "...livestock health and production, product wholesomeness, and distribution and availability of products to meet the needs of global consumers" (i.e. food safety).[1] A detailed analysis published in 2006 by the Food Supply Veterinary Medicine (FSVM) Coalition, a group of nine food animal veterinary groups, recognized food supply veterinary medicine was at an uncertain juncture due to many factors, including consolidation in the food animal industries that may lessen the demand for "food animal" veterinary medicine, and that demand is forecasted to grow for "food supply" veterinarians in all food animal sectors, academia and regulatory agencies. In contrast, the American Association of Bovine Practitioners, who were members of the FSVM Coalition, issued an opinion that there was not an evident shortage of veterinarians for rural food animal veterinary private practice.[2] Since that time, there has been a substantial upturn in the animal agriculture economy but of the 17,033 veterinarians graduating in the U.S. between 2011 and 2014, only 51

[1] Andrus, D.M., Gwinner, K.P., and Prince, J.B. Food Supply Veterinary Medicine Coalition Report: Estimating FSVM Demand and Maintaining the Availability of Veterinarians for Careers in Food Supply Related Disciplines in the United States and Canada. Ch. 22. May, 2006. https://www.avma.org/KB/Resources/Reference/Pages/Food-Supply-Veterinary-Medicine-Coalition-Report.aspx. Linked December 29, 2015.

[2] Summary Opinion of the American Association of Bovine Practitioner's Ad Hoc Committee on Rural Veterinary Practice, May 20, 2011. http://www.aabp.org/resources/pdfs/Summary_Opinion_of_the_AABP-Rural_Vet_Practice-5.19.11.pdf

veterinarians (0.3%) entered food animal practice.[3] In 2014, food animal exclusive/predominant veterinary practice represented 7.2% of employed veterinarians.[4]

Within South Dakota, the Economics Division of the American Veterinary Medical Association (AVMA) (Figure 1) has mapped food animal numbers and food animal veterinarians.[5] Even though this map cannot indicate a surplus or a lack of veterinarians in a given county, it does give a good indication of animal numbers in relation to food animal veterinary service proximity. The red flags on the map imply that those counties have a shortage of food animal veterinarians, though it is recognized that veterinarians in South Dakota may service multiple counties. The USDA National Institute of Food and Agriculture designates six South Dakota regions as in "high" or "critical" need for food animal veterinary services and is soliciting applications for the Veterinary Medicine Loan Repayment Program.[6] Although there was an estimated excess capacity of food animal veterinary services in the U.S. of nearly 20% in 2012, estimated excess capacity had declined to close to 8% by 2014.[7] Forecasted increases in U.S. livestock numbers portend further increases in demand for food animal veterinary services[8]. Furthermore, upward trending U.S. disposable income is expected to pressure demand for animal protein and a subsequent robust demand for food animal veterinarians by the livestock sector and increased starting salaries from an estimated $80,000 in 2020 to $87,000 in 2014.[9]

The AVMA 20/20 Vision Commission was charged with creating a progressive vision for the AVMA. In their 2011 report they stated, "The veterinary profession is important to the economic wellbeing of this country by protecting immense U.S. food and agricultural assets, enhancing agricultural trade and export markets, and protecting the many jobs and industries dependent on a safe, reliable, and dependable food supply." Certainly, an argument could be made that as South Dakota's food animal's industry grows, steps ought to be taken to increase the number of veterinarians who can help protect the accompanying agricultural assets. During the last two years, for example, the South Dakota Animal Disease Research and Diagnostics Laboratory diagnosed four new, highly contagious diseases in the state and region. Increasing the number of food animal veterinarians in the field will increase the likelihood that such diseases will be contained, if not prevented, thus protecting our region's economy and safe, reliable food supply.

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[3] Nolen, S. Profession's Economic Health Coming into Focus: Summit elucidates strengths and weaknesses of veterinary markets. J Am Vet Med Assoc. 2015; 247:1338-1341.
[4] Market Research Statistics - U.S. Veterinarians – 2014, AVMA website. https://www.avma.org/KB/Resources/Statistics/Pages/Market-research-statistics-US-veterinarians.aspx
[5] Food Supply Veterinary Medicine - South Dakota, Food Animal Concentration per Food Animal Veterinarian AVMA website https://www.avma.org/KB/Resources/Reference/Pages/Food-Supply-Veterinary-Medicine-South-Dakota-maps.aspx.
[6] The Veterinary Medicine Loan Repayment Program. United States Department of Agriculture National Institute of Food and Agriculture. http://nifa.usda.gov/program/veterinary-medicine-loan-repayment-program. Linked December 28, 2015.
[7] AVMA Report on Veterinary Capacity: Summary. October 2015. https://www.avma.org/PracticeManagement/BusinessIssues/Documents/2015_Report_on_Veterinary_Capacity_Summary_Final.pdf. Linked December 28, 2015.
[8] Ibid.
[9] AVMA Report on the Market for Veterinarians. July 2015. https://www.avma.org/PracticeManagement/BusinessIssues/Documents/2015_Report_on_Market_for_Veterinarians_Executive_Summary_Final.pdf. Linked December 28, 2015.

In summary, the issue of whether there is a need for food animal veterinarians is complex and dependent on many factors, including location of the shortages, ability to maintain a quality of life and livable wage in areas where there are shortages, numbers of students interested in food animal medicine, and economic growth of the livestock industry as it continually restructures. One of the conundrums facing schools of veterinary medicine is the lack of students with agricultural backgrounds, which often requires curriculum changes and other approaches to recruit non-agriculture students into large animal medicine.[10] Fortunately, it may be easier for an SDSU 2+2 SVM to recruit students that *have* food animal experience, especially with the advantage of the strong, rural, agricultural economy in South Dakota and the surrounding region. The SDSU College of Agriculture and Biological Sciences also has the largest number of students in majors attracting "agriculture oriented" undergraduates who could continue their studies at SDSU in a 2+2 SVM. Enrolled veterinary students have options to choose their "species emphasis" throughout their education and career, so the number of students entering and maintained with "food animal" interests cannot be guaranteed unless they observe economic incentives and job opportunities early in their education.

Figure 1. South Dakota Food Animal Concentration per Food Animal Veterinarian

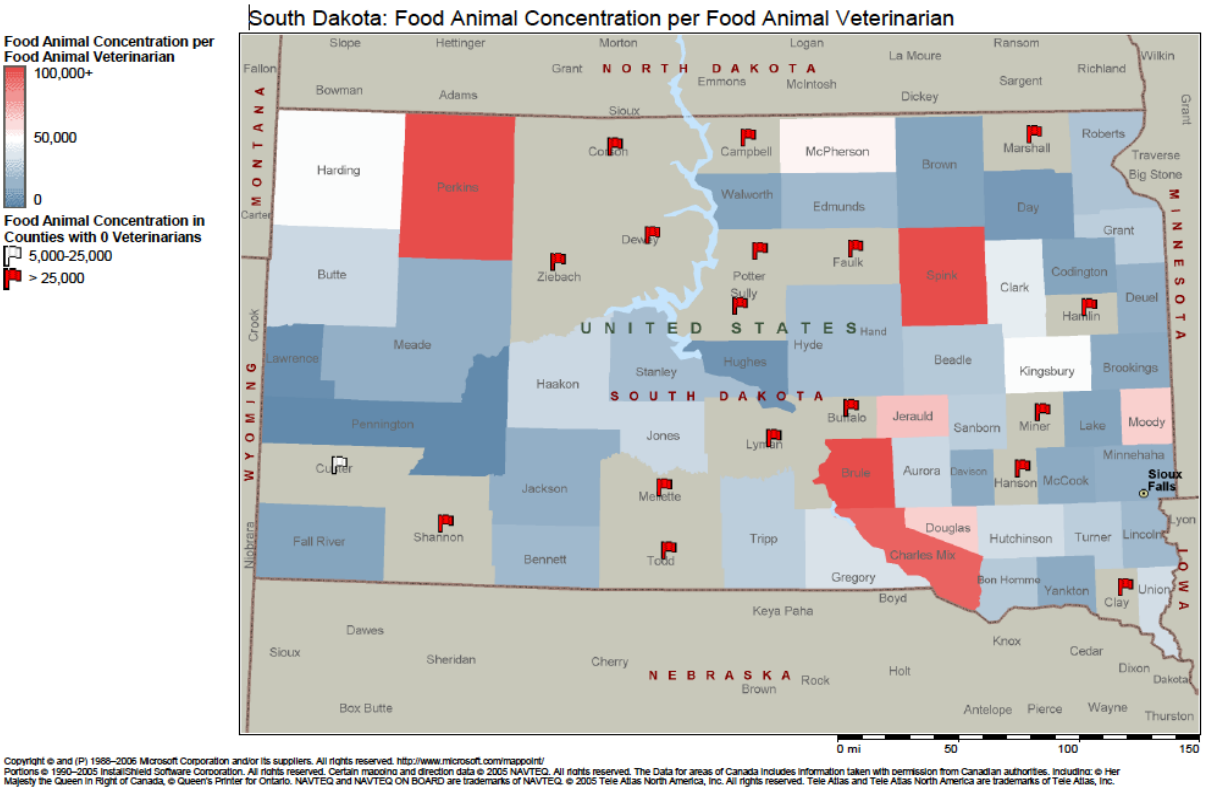

Figure 1 Legend: Red flags indicate that there are more than 25,000 food animals in those areas but zero veterinarians with a listed address there. Counties colored red have food animal veterinarians, but may not have enough to provide services to all the animals. White flags indicate that there are 5,000-25,000 food animals in those areas but zero veterinarians with a listed address there. The colors of the county indicate food animal concentration/food animal veterinarian.

[10] Is there a shortage of food animal veterinarians? Beef Magazine, October 21, 2015 http://beefmagazine.com/blog/there-shortage-food-animal-veterinarians

B. Veterinary Student Seats

Recent veterinary market and education analysis by the AVMA states, "Demand does indeed exceed supply in veterinary education, where those applying for veterinary school outnumber available seats and where the number of veterinarians entering the workforce is equal to the number of seats that were available four years prior."[11] A more recent AVMA market analysis, however, indicates that the number of veterinary school applicants may have peaked in 2014 with a ratio of available seats to applicants at 1:1.6.[12] Nearly 6,700 applicants applied in 2014 for about 4,200 seats in the Class of 2019. Roughly 3,200 of those seats are available in the U.S. with the remainder being seats at U.S. accredited international schools of veterinary medicine.[9] Historically seats to applicants peaked at 1:3.3 in 1980 and were 1:2.1 in 2009. The long-term trend of an increase in the number of seats at existing schools continuing and the two new schools in Arizona and Tennessee (any possibly Texas?) are added, then the combination of new seats and declining applicants will bring the applicant-to-seat ratio to an estimated 1.04:1 by 2025. While this is likely to be a worst-case scenario, the competitive environment at veterinary schools is currently increasing from highly competitive to extremely competitive; in the near term, veterinary schools will have to compete for students. With the addition of even more seats, the market for veterinary education would become a buyer's market, meaning that each applicant (i.e. "the buyers") would face less competition for seats at veterinary colleges (i.e. "the sellers").[12] In addition, there has been concern over the overall quality of the veterinary applicant pool, whose members must be capable of successfully completing a rigorous academic program. Even though the number of student seats is increasing, having a 2+2 program that focused on food animal medicine would take advantage of SDSU's unique student demographic of students from South Dakota and throughout the US who have a specific background and interest in food animals.

The recent 2015 AVMA report on veterinary workforce and veterinary school seats concluded with this statement "Whether new schools can sustain their programs under this increasing competition will depend on their ability to produce graduates at a cost less than those currently doing so, or producing graduates with a greater ability to increase the demand for veterinary services."[6] The proposed 2+2 program targets the two areas outlined in the above summary[6] with an emphasis on food animal veterinary medicine and keeping tuition costs lower.

C. Reduction of Veterinary Student Debt

In higher education, particularly health related professions, two economic factors [key performance indicators (KPI)] have been identified that help determine whether further education costs are offset by increased income: 1) debt to income ratio (DIR) and net present value (NPV).[13,14] Veterinary medicine has the highest debt to income ratio (DIR) of any of the medical

[11] AVMA 2015 Report on the Market for Veterinarians https://www.avma.org/PracticeManagement/BusinessIssues/Documents/2015_Report_on_Market_for_Veterinarians_Executive_Summary_Final.pdf

[12] Dicks, M. Impact on the Veterinary Workforce of More Veterinary School Seats, December 15, 2015 https://www.avma.org/PracticeManagement/BusinessIssues/economics/Pages/Impact-on-the-veterinary-workforce-of-more-veterinary-school-seats-.aspx

[13] Asch et al, Are We in a Medical Education Bubble Market? N Eng J Med 369: 21, 1973-1975; http://www.nejm.org/doi/full/10.1056/NEJMp1310778

[14] AVMA 2015 Report on Veterinary Debt and Income https://www.avma.org/PracticeManagement/BusinessIssues/Documents/Veterinary-Debt-and-Income-Report-Member-Summary-Final.pdf

professions.[7] Many veterinarians carry significant student debt. Being able to reduce this debt is a key component of AVMA initiatives. The AVMA Veterinary Market report provided this definition of DIR for veterinarians. "The debt to income ratio (DIR) that provides the best measure of financial health for the new veterinarian is computed as the mean of the ratios of debt-to-income for a constant cohort (same percentage of gender, practice type and practice region) of new veterinarians that reported having accepted a full-time position in public or private practice prior to graduation and have indicated a level of debt (including no debt). For 2014, that DIR was 2.05:1, indicating a level of debt slightly greater than twice the level of starting income."[8] For medical doctors, the ratio was less than 1:1, while pharmacists have a ratio slightly higher than 1:1. Average mean debt for new veterinarians in 2014 was $135,000. The DIR for food animal veterinarians is approximately 1.7:1. The estimated salaries for food animal veterinarians are higher than those for equine, mixed animal and military and government veterinarians but slightly less than for exclusively companion animal veterinarians, which affects DIR value.[5]

DIR can be influenced by the cost of training new veterinarians, financial acumen of veterinary students, and the ability of veterinarians to improve the willingness of pet owners and the general public to pay for veterinary services. Thus, the direction and magnitude of change in the debt-to-income ratio provides an important indication of the veterinary profession's willingness and ability to improve the financial performance of the profession. There is obviously benefit in attempting to keep tuition costs low, and there is need for investigating opportunities for scholarships for veterinary medical students. A VetFAST program, which would reduce the time to obtain the DVM, would lessen the debt load, but would require finding students that have food animal experience and are able to maintain good grade point averages. Thus, it is important and justified to investigate opportunities for recruitment of students in South Dakota, North Dakota and other states with substantial rural populations.

The other economic measure, the "net present value" (NPV), provides the best measure for capturing the lifelong value of the medical degree- what is the "return on investment" of veterinary medical education expense from potential income until age 65. NPV is based on a series of calculations that are not intuitive to students in contrast to DIR, which is value that prospective students understand. "The mean NPV for new veterinarians was $260,568 for 2014 and it provides a measure of the value added to what might have been gained from the bachelor's degree after all veterinary education expenses are paid".[8] In comparison, NPV in human medicine ranges between $81,000 to $4.3 million with most medical NPV >$500,000.[15] With employment in food supply medicine, NPV for veterinarians should be higher than the average veterinarian.

[15] Roth, Nicholas. 2009. "The Costs and Returns to Medical Education."
UC Berkeley Department of Economics.
https://www.econ.berkeley.edu/sites/default/files/roth_nicholas.pdf

III. Current Number and Funding of South Dakota Veterinary Professional Students

Currently, South Dakota State University has a pre-professional program in pre-veterinary medicine. Students typically attend SDSU for three to four years prior to admittance in a professional veterinary medical program in another state that has a College of Veterinary Medicine. The SDSU VBSD does not currently have an undergraduate academic program, but declared pre-veterinary students are assigned a pre-veterinary advisor within the department. Most pre-veterinary students major in Animal Science or Biology/Microbiology. An "Animal Health" minor is also available to students.

A. History

The State of South Dakota has supported the education of veterinary medical professionals since at least 1972. Initially, this support was in the form of six contracted slots per year (24 total) at Iowa State University and two to three slots per year at Kansas State University. The cost of a contracted slot is defined as the support provided by the State of South Dakota, i.e. the difference between in-state and out-of-state tuition. South Dakota residents are assured admission into these slots. Additionally, the South Dakota-Minnesota reciprocity agreement, first adopted in 1978 and revised in 1983, provides up to five veterinary medicine slots/year at UMN. In 1993, legislation was enacted to fund the South Dakota Veterinary Student Tuition Grants by removing the tax exemption on animal endoparasiticides and ectoparasiticides. These tuition grants support the contracted slots to ISU (See below) and for the operations and activities conducted by the State Animal Disease Research and Diagnostic Laboratory (SD ADRDL).

B. Current Funding and Placement of SD Students Accepted to Veterinary Colleges at ISU and UMN

The number of supported slots and additional financial assistance for veterinary medical students from SD has varied over the last forty years and is currently at six contracted slots per each year (4 years X 6 students=24 total students at a tuition of $21,098) at ISU and 0-3 students per year at the UMN. The UMN tuition is determined by the South Dakota-Minnesota reciprocity agreement; without the reciprocity agreement, UMN tuition is higher than most of the Colleges of Veterinary Medicine in the US).[16] Those students accepted to ISU as non-slot students pay out-of-state tuition ($45,281), which amounts to approximately an additional $100,000 tuition debt per student. The "contracting" of slots for South Dakota residents to ISU results in an annual cost to the State of South Dakota of approximately $600,000 per year in 2015 and rising an average of ~$40,000/year for the past five years (Table 1). Selection of the "contracted" students is determined by the SD Board of Regents and has based primarily on the rankings of the ISU admissions committee with typically the top 6 students receiving the "contracted slots". Students that receive a contracted slot must either practice in South Dakota for four years or pay back the difference of the contract to the State of South Dakota.

[16] US Veterinary Schools, Cost of Attendance, Veterinary Information Network (VIN) Foundation. http://www.vinfoundation.org/AppUtil/document/default.aspx?pid=0&catid=&objectid=21833&objecttypeid=10&redirectFromMiscDefault=1

Table 1. Supplemental Tuition Payments to Iowa State 2010-2015 for SD Veterinary Student Slots

Academic Year	Freshmen	Sophomores – Seniors	Total
2014-15	$ 148,524	$ 442,200	$ 590,724
2013-14	$ 142,128	$ 423,162	$ 565,290
2012-13	$ 137,316	$ 408,840	$ 546,156
2011-12[a]	$ 135,204	$ 359,352	$ 494,556
2010-11[b]	$ 132,984	$ 287,709	$ 420,693
Total	$ 696,156	$ 1,921,263	$ 2,617,419

[a] *Senior cohort had four students.*
[b] *Senior cohort had three students; Junior cohort had four students.*

IV. Visits and Discussions with the UMN, Iowa State and current 2+2 Schools of Veterinary Medicine

SDSU 2+2 task force members visited the follow three sites: the four-year College of Veterinary Medicine at the UMN-St. Paul, and the current 2+2 veterinary schools at University of Nebraska-Lincoln and Utah State University in Logan. The task force also initiated phone conversations with the University of Alaska-Fairbanks. Details from these visits are documented below.

A. UMN College of Veterinary Medicine-St. Paul, 4-year program

Task force members visited Dean Trevor Ames, Laura Molgaard, Associate Dean for Academic and Student Affairs at the University of Minnesota CVM and Dr. Margaret Root-Kustritz at UMN-St. Paul. The primary concern of the UMN administrators was with enrolling more students interested in Food Animal Medicine. The SDSU 2+2 program (if initiated) would need to meet the same accreditation standards as the UMN for AVMA –American Association of Veterinary Medical Colleges (AAVMC) Council of Education Accreditation. In particular, SDSU would be expected to meet Standards 1, 2, 3, 5, 6, 7, 8, 9, 10, plus 11 to a limited extent. The standards and considerations for how to meet them for a 2+2 program are listed.

Standard 1, Organization – Identification of the primary Director of the program and assurance that they have effort available to fulfill the duties is necessary. Expectations for this role includes harmonizing admissions and curriculum (Appendix 1)

Standard 2, Finances – Both institutions would need to show the clear expectations for expenses and revenue as UMN adds this cohort of students (and potentially decreases the number of Caribbean Island students), while SDSU would need to show sustainability.

Standard 3, Facilities – UMN would need to demonstrate that they have enough space in current facilities to meet the increased student numbers and that SDSU would have facilities for teaching

the 2+2 curriculum.

Standard 4, Clinical Resources – This would not be a major concern for SDSU since most of the classes in the first two years are non-clinical; however UMN may need to show some kind of between-school comparison to make it clear that the UMN caseload is high enough to accommodate students from SDSU.

Standard 5, Library Accommodations – This would be a minor consideration since most of the support could be documented through the existing UMN Veterinary Medicine Library.

Standard 6, Students – As part of the UMN accreditation process, it would be essential to demonstrate integration of the SDSU students into the UMN program from year one, to make sure their physical transition to Minnesota is facilitated.

Standard 7, Admissions – SDSU and UMN will need to demonstrate compatible admissions processes.

Standard 8, Faculty – Between UMN and SDSU, shared faculty would be of concern only if UMN teaches some of the courses for the SDSU students in the first two years.

Standard 9, Curriculum – There will be a definitive need to show coordination between UMN and SDSU curricula.

Standard 10, Research – Engagement of students in research early in their program would be important to investigate at SDSU.

Standard 11, Outcomes Assessment – Since SDSU students become Minnesota students in year three, SDSU assessments will be part of the UMN regular long-term outcomes. It probably would be important for UMN to demonstrate how they will specifically evaluate the SDSU cohort as they complete the entire curriculum to show there is no difference in competencies and pass rates between the SDSU 2+2 group and the UMN-only group.

B. Iowa State University

Dr. Chris Chase met with Dean Lisa Nolan and Dr. Claire Andreasen, Associate Dean of Academic and Student Affairs to discuss the possible 2+2 program. ISU made it clear that they did not have capacity for additional 2+2 students in the VM3 class. They were open to possibilities of VM4 students in their clinical facilities. They made it clear that they valued the integrity and work ethic that the South Dakota students brought to ISU.

C. University of Nebraska-Lincoln – Iowa State University, 2+2 Program

Curriculum

The UNL has a curriculum that is "separate but equal" to ISU as it consists of 37 required credits in the first year and 38 required credits the second year. All courses are taught at UNL with the exception of Clinical Pathology, which originates at ISU. One 1-credit elective can be taken each semester in veterinary medicine year one (VM1) and year two (VM2). Within the curriculum, there are 44 elective courses offered to students in VM1 & VM2. The vast majority of these "courses" are clinical experiences. Only one VM2 elective course is offered exclusively by UNL. UNL offers 13 courses for fourth year (VM4) students through the Great Plains Veterinary Education Center and Meat Animal Research Center in Clay Center, NE. Both schools try to

achieve the same objectives for these classes, but different instructors residing at the two respective schools teach them.

Class size, tuition, admissions and applicant pool

At UNL, the class size is 25 students who are all Nebraska residents, and the tuition is at the same rate as ISU for all four years. The applicant pool for the 2+2 program is 60 students (up from 45 applicants in the first year of the program) with progressive increases since the inception of the UNL program. Enrollment in the pre-veterinary program increased at NE following the establishment of the program. UNL has its own admissions committee, which is separate from the ISU admissions committee. There is no requirement for students to practice in Nebraska or "payback" tuition if they leave the state following graduation.

How long has the program been in existence?

The first class began at UNL in 2006. Prior to the initiation of the program, Nebraska had 25 contracted slots at Kansas State University.

Organization

The Department of Veterinary and Biomedical Sciences became the School of Veterinary Medicine and Biomedical Sciences and the Department Chair became the "Dean". The School is an administrative unit of the College of Agricultural Sciences and Natural Resources in the Institute of Agriculture. One faculty member has 50% of their appointment as administrative director of the veterinary curriculum. Two additional support staff were hired for the program, and the admissions process for the school requires over one additional FTE.

Facilities and Startup Funding

UNL renovated facilities in two buildings: the Animal Science and Veterinary Science buildings. The renovation included space for a VM1 classroom and anatomy laboratory in the Animal Science Building and a VM2 classroom and microbiology laboratory in the Veterinary Science, for a total renovation of 7,000 sq. ft. including ~300 sq. ft. for cold storage. In addition, the classrooms had extensive an audio-visual (AV) instructional technology upgrade to allow seamless communication with ISU for jointly taught courses. Anatomy laboratory renovation and AV equipment costs were estimated at ~$750,000. UNL allocated $1.2 million for renovation from salary savings. UNL also allocated $1.2 million to startup costs for new faculty hires.

Strengths

Performance of UNL students on competency and national board exams was almost identical to ISU. The $1.5 million in funding that previously went to Kansas State University for Nebraska slots stayed in Nebraska. The presence of the 2+2 School at UNL leveraged the program to secure funding from the Nebraska Legislature for a new $50 million diagnostic facility. Also, of the nine new hires, seven had research appointments and two had NIH R01 grants, resulting in increased extramural funding. Positive cash flow occurred within the UNL program using the ISU tuition rates. Further, the UNL admissions committee allows local control over cohort selection, and some graduate students take the same classes as the veterinary students at UNL, thereby increasing enrollment in those classes. UNL students have access to ISU veterinary medical library and electronic resources. Additionally, UNL found the small class size of 25 beneficial for training.

Weaknesses

Several weaknesses were identified at UNL.

- The major weakness of this program was that the original UNL-ISU agreement was a top-down administrative decision without the input of the ISU faculty who, consequently,

expected that the UNL faculty would be inferior. This attitude, along with the hiring of Dean Reynolds, the former dean of a four-year Canadian Veterinary College, has led UNL to consider establishing a 3+1 program wherein the first three years of professional education would be at UNL.

- A second weakness involved funding sources for the startup of the 2+2 program. There were no new state funds as the startup funds were redirected from existing UNL funds. Moreover, the initial budget under-estimated videoconferencing costs and did not include an additional classroom that had to be constructed.
- Changes in ISU curriculum necessitated that UNL adjust course offerings, which would have been easier if UNL could have anticipated the changes earlier. Thus, early communication is necessary, especially during the first two years when changes to the veterinary medicine curricula may be needed.
- Another weakness of the program is that UNL classrooms for first and second year classes are in separate buildings, and students have no common eating and study space. Also, UNL veterinary students are not close to the university animal production units for additional clinical training opportunities.
- Since the academic calendars of the two universities are different, the UNL 2+2 students are on the ISU calendar.
- Finally, administratively speaking, the financial aid offices between the universities were not working together at the beginning of the program, and no additional library resources were designated for UNL SVM.

Uniqueness

This was the first true 2+2 program established in the US. The veterinary medical education provided by the program has been successful for ~10 years since it was established.

Overall Evaluation

The program has accomplished the objectives that were set out for it in 2006, providing veterinary education in a cost-effective manner and benefitting UNL with increased students and more research funding due to new faculty hires for the program and new facilities. UNL is looking at expanding to a 3+1 program and establishing a veterinary technician program at UNL. There were no regrets with establishing the program. The enthusiasm was less than what we saw at Utah State University, but may have more to do with the less than enthusiastic or initially uninformed and unengaged partners at ISU.

D. Utah State University – Washington State University, 2+2 program

Curriculum

Utah State University (USU) runs a curriculum that is "separate but equal" to that of Washington State University (WSU) in the first two years. The veterinary medical curriculum is the same as WSU and consists of 40 required credits in the first year and 38 required credits the second year. All required courses are taught at USU with the exception of two courses, Clinical Anesthesiology and Radiology, which originate at WSU. Students may take a 1-credit elective each semester in VM1 & VM2, during which the curriculum offers 17 elective courses, eight of which are clinical or experiential learning opportunities and the other nine, more survey courses. Nine of the VM1 & VM2 elective courses are offered exclusively by USU. Elective offerings at USU for VM3 and the clinical fourth year (VM4) students are unknown at this time.

Class size, tuition, admissions and applicant pool

The class size is 30 students and 20 slots are for Utah residents and 10 slots are for out-of-state students. The tuition is at the same rate as WSU, with Utah residents paying resident tuition of

~$23,000 tuition and fees/year for all four years. Out-of-state tuition and fees are ~$46,000 after subtracting an $8000 tuition waver/year that USU applies for all four years. The applicant pool for the 2+2 program is 60 students. USU has its own admissions committee. There is no requirement for students to practice in Utah or "payback" tuition if they leave the state.

How long has the program been in existence?
The first class began at USU in 2013. This class is now beginning its first year at WSU. The program originated by USU faculty asking WSU if they would be interested in having them as a part of a 2+2 program to revitalize the USU veterinary program. Previously Utah had slots through the WICHE Program at Colorado State and Washington State.

Organizational Structure
A separate unit, the School of Veterinary Medicine and Biomedical Sciences, was established within the Department of Animal, Dairy and Veterinary Sciences and the Department Chair became the "Dean". The School is located within the College of Agriculture and Applied Sciences. One faculty member has a 50% administrative assignment and is in charge of curriculum. One senior administrative staff is responsible for budgets, recruiting and admissions. There are three additional support staff. The admissions process for the school requires over one FTE.

Facilities
USU teaches veterinary medicine classes in four different buildings. USU renovated facilities are in the Veterinary Science and Microbiology Building and include space for a VM1 classroom, a student lounge, anatomy prep area and anatomy laboratory, plus a microbiology laboratory shared with the Department of Microbiology. A new Agricultural Sciences Building was opened in 2012 and provides a VM2 classroom and an additional classroom with extensive audio-visual (AV) instructional technology to allow seamless communication with WSU for jointly taught courses. The anatomy laboratory and anatomy preparatory renovation and equipment costs were estimated at >$750,000. USU uses the Utah Veterinary Diagnostic Laboratory for a pathology laboratory. The USU Department of Animal, Dairy and Veterinary Science (ADVS) have large animal teaching facilities located directly south of the campus. These facilities include an Equine Education Center, Theriogenology Barns, Large Animal Clinic, and Surgical Area. The Surgical Area is where the surgery laboratories are taught in "dry labs" (i.e. no animal surgery is performed as part of the surgery course). Students do have the opportunity to assist in surgical procedures for research and clinical cases from the ADVS animal units. USU allocated $1.5 million internally for startups and construction. USU also received $1.7 million in one-time funds from the Utah Legislature.

Strengths
Funding that went to other states for Utah slots (~$800,000) stayed in Utah for the startup of the 2+2 program. Increased morale and pride of USU faculty was observed with the startup of the program that has rejuvenated the faculty. New one-time startup funds were secured from the State of Utah. There were six new hires. Twenty of the 30 slots are students from UT, and a small class size of 30 is beneficial in training the students. Positive cash flow within the USU program exists. There is a very strong interaction with the USU Library and the SVM, which has its own designated space in the library with copies of veterinary textbooks available. Students also have access to WSU library resources. WSU faculty have experience with a regional veterinary school since 1978 with Oregon State, so WSU faculty have been very cooperative and helpful in all aspects of the USU-WSU 2+2 program. To deal with veterinary student specific counseling issues, USU uses a half-time clinical psychologist. USU and WSU also have formed an active DVM/PhD program in which students begin their graduate program at USU, work on their

projects during the summer, complete the final two years of veterinary school at WSU and then return to USU to complete the dissertation and degree. The applicant pool for the 2+2 program is ~60 students, so, after a few years, the program has more recognition for in-state students. USU has an attending veterinarian who takes care of the animal health on the ADVS production units near campus. The attending veterinarian works closely with the SVM students to provide clinical experience and more hands-on experiences. The USU animal facility has a central large animal surgery treatment and processing area, allowing student to get intensive hands-on experience. Two classes are distance classes, which use faculty expertise at WSU. In addition to USU and WSU, Montana State and University of Idaho have formed the WIMU- the Washington Idaho Montana and Utah Regional Veterinary Medical Program. Washington and Idaho students attend all four years at WSU. The first year students in the WIMU program have a one-week orientation program, Cougar Orientation Leadership Experience (COLE), in Idaho that provides an opportunity for interaction and networking with students from the other locations. USU and WSU students spend one week per semester on Diagnostic Challenges (DC), case-based exercises conducted collaboratively with faculty in pathology, clinical pathology, bacteriology, virology, immunology, and radiology. Visiting veterinary practitioners come to the college as volunteer case facilitators that work with current students. USU has developed their own competency standards and evaluation criteria to ensure that the USU students are performing adequately. USU runs a curriculum that is "separate but equal" to that of WSU in the first two years and has its own admissions committee. They have a higher emphasis at USU on food animal medicine and theriogenology than WSU.

Weaknesses

There were several weaknesses identified.

- Renovation costs for the anatomy laboratory and the preparatory anatomy laboratory were in excess of $750,000.
- USU uses shelter dogs for anatomy laboratory specimens, thus requiring their own processing facilities and supplies and increasing public exposure to animal rights and welfare groups.
- WSU students do not like it when the USU professors are leading classes from Logan, UT.
- Because of changes in WSU curriculum, USU had to make adjustments in course offerings.
- Classrooms for the first and second year classes were in separate buildings and the pathology laboratory is in a third building. The separate buildings are not adjacent to each other and there is a 5-15 minute walk from one building to the next.
- The financial aid offices of WSU and USU needed to work together prior to the beginning of the program, but did not.
- Pullman, WA is a 14-hour drive from Logan, making transportation costs high and impeding face-to-face interaction between the students.
- Not only are the academic calendars of the two universities different, but also the schools are in different time zones, further impeding scheduling.

Uniqueness

USU closely studied the UNL model to try to improve the opportunities for their program. The ability to have extensive clinical experience by using the USU Experiment Station units is a significant advantage. The enthusiasm of the USU faculty for the program was outstanding. The use of the COLE and DI learning opportunities should make the integration between the students from the three different schools (WSU, USU and Montana State University) stronger. The USU students mentioned that they had formed many social media connections with the other students.

Overall evaluation
USU has a lot of similarities to SDSU, as USU is a smaller campus (~15,000 students), agriculturally oriented and situated close to university food animal farms. These campus attributes allow for smaller class opportunities that are unavailable to full-size veterinary school classes of the typical 100-120 students. The USU experiences left the SDSU 2+2 task force with a positive image of a 2+2 program.

E. University of Alaska-Fairbanks – Colorado State University

Curriculum
University of Alaska-Fairbanks (UAF) runs a curriculum that is "separate but equal" to that of Colorado State University (CSU) in the first two years. The veterinary medical curriculum is the same as CSU and consists of 43 required credits in the first year and 46 required credits the second year. All required courses in the first year are taught at UAF, with the exception of parasitology and histology, which originate at CSU. One 1-credit elective can be taken each semester in VM1 and VM2. Within the curriculum, there are 13 elective courses offered to students in VM1 and VM2. All of these courses are didactic courses. All of the VM1 and VM2 elective courses are offered exclusive by CSU. Elective offerings at UAF for VM3 and the clinical fourth year (VM4) students are unknown at this time.

Facilities and Startup
UAF renovated and rebuilt a facility exclusively for their Department of Veterinary Medicine and the 2+2 program. The facility includes two "home" study rooms containing ten cubicles and a locker room, small kitchenette, and dining area. The teaching space includes a lecture room with extensive audio-visual (AV) instructional technology to allow seamless communication with CSU for jointly taught courses, an anatomy laboratory, specimen prep area with a walk-in cooler and a freezer on a rail system, and open lab space that is used for a number of different laboratory activities. There are also offices for one faculty and three support staff. The estimated cost of startup and renovation was ~$6 million. This money was captured from UAF deferred maintenance funds and salary savings. There was no new state money, nor had the State of Alaska supported any contracts to veterinary schools.

Class size, tuition, admissions and applicant pool
The class size is ten students, with at least five slots for Alaska residents and up to five slots for out-of-state students. In the first class, there are seven Alaska residents. The tuition is at the same rate as CSU for the two years at UAF, with Alaska residents paying resident tuition of ~$27,000 tuition and fees/year for the first two years. However, for the second two years at CSU, they pay out-of-state tuition of ~$54,000/year. For the out-of-state students, tuition and fees are ~$54,000/year for all four years. Interestingly, all tuition is paid to CSU and CSU returns 90% of tuition and fees to UAF. The applicant pool for the first year of the 2+2 program was 92 applicants total, with ten Alaskan applicants. For the entering class of 2016, they had 80 applicants total, and 12 Alaskans, with more expected as applications closed on October 1, 2015. UAF does not have has its own admissions committee and uses the CSU admissions committee. There are two members of the CSU admissions committee from Alaska. Upon graduation, there is no requirement for students to practice veterinary medicine in Alaska or "payback" tuition if they leave the state.

How long has the program been in existence?
The first class began at UAF in 2015.

Organizational Structure

A separate unit, the Department of Veterinary Medicine and Biomedical Sciences, was established within the College of Natural Science and Mathematics. There are eight existing faculty with appointments in other departments along with five new faculty which make up the new department. The Dean of the College is also the Dean of the Veterinary Program. One faculty member has a 50% administrative assignment, is in charge of the curriculum, and is Associate Dean of the Professional Veterinary Medicine Program. One senior administrative staff member is responsible for budgets, recruiting and admissions. There are three additional support staff.

Strengths

Alaskan students no longer have to move to the US mainland to obtain an affordable veterinary medical education, and they can be evaluated against their fellow Alaskan students as peers. There was ~$400,000 in new money provided by the Alaska Legislature for the start-up. The program added five new faculty. The overall cost of education was reduced for Alaskan students. The program has brought new enthusiasm in the College. The program places strong emphasis on "One Health," and has strong interactions with the medical and public health community. The program has a strong emphasis on food animal agriculture, a veterinary sector that was missing in Alaska. Two members of the Alaskan Board of Regents of Higher Education were advocates and first proposed the establishment of the program. The program has increased continuing education opportunities for Alaskan veterinarians. Ongoing UAF Alaskan wildlife research and education has been added to the program.

Weaknesses

There were no ongoing state funds or tuition slot money to add to the program. The Alaska Veterinary Medical Association and the Interior Alaska Veterinary Medical Association initially opposed the establishment of the School. There were some internal UAF administrative issues that delayed implementation. The academic calendars of the two universities are different, so the UAF students are on the CSU calendar. The schools are in different time zones two hours apart, further complicating scheduling.

Uniqueness

Like USU, UAF closely studied the UNL model to try to improve the opportunities for their program. Because of the interests of many of the UAF faculty regarding wildlife, they have been working to develop their curriculum with that emphasis. In addition, they have resurrected food animal medicine in Alaska. The new program and department boosted faculty morale.

Overall evaluation

This program was presented to the UAF and to the stake holders based on two issues, fairness and equity. Since all Alaskan students had to compete for out-of-state slots, it was not fair as far as admission, and since they had to pay out-of-state tuition, it was not equitable. Students left the state and established residency in States with veterinary schools to achieve lower costs, resulting in no incentive to return to Alaska. This program is only in its first year, but does appear to be achieving the underlying goals and providing a sound veterinary medicine education. The amount of research they did to establish the veterinary medical education program was useful in our discussions.

V. Requirements for an SDSU 2+2 School of Veterinary Medicine

A. Financial Analysis

a. Annual Operating Budget

The annual operating costs of the proposed SDSU 2+2 SVM will be $1.4 million ($1.18 million direct costs and $0.22 million indirect costs) (Appendix 2). Tuition costs and how they are set are described in Appendix 2.

b. Capital Expenditure

i. Salary

Table 1 Salary

Cost	**Base Cost/FTE**	**Fringe**	**Total Cost/FTE**	**Number of FTE**	**Total Cost**
New Faculty	$112,551	$27,068	$139,619	4.3	$600,632
Administrator	$82,447	$22,553	$105,000	1	$105,000
Attending Vet	$112,551	$27,068	$139,619	0.5	$69,810
				Total	**$775,172**

ii. Facility and Equipment Expenditures

We estimate the costs of renovating and equipping office/classroom and laboratory facilities at ~$4 million and large animal clinical facility (for handling and surgeries) at $300,000 totally **~$4.3 million**.

iii. Iowa State Supplemental Tuition Costs

Since students will already be enrolled at Iowa State prior to the beginning of the program, those contracted costs will need to be covered. Using 2020 as the first year of the operation of the SDSU SVM, ~$450,000 will be required of the $600,000 State of South Dakota contribution to offset the Iowa State in-state tuition agreement (Appendix 2, Table 6). In year two, $300,000 will be required to offset the Iowa State in-state tuition agreement. In year 3, $150,000 will be required to offset the Iowa State in-state tuition agreement.

Total Iowa State Supplemental Tuition costs will be **$900,000**.

Total Capital and Startup costs of **~$6.0 million dollars**.

B. Staffing

Based on the course load and expertise available, we have determined that we will need 6.8 FTEs (4.3 new faculty + 0.5 attending veterinarian + administrative positions) (Appendix 2). Current VBSD faculty efforts (workload) will need to be evaluated and portions possibly reassigned for teaching the VM1 and VM2 classes. In addition, funded teaching support for other support classes would be sought from the faculty in the College of Pharmacy for pharmacology courses, faculty in the Departments of Animal Science and/or Dairy Science for nutrition and genetics lectures, faculty in the Department of Chemistry/Biochemistry for biochemistry lectures and

faculty in the Departments of Communication Studies and Theater, Economics, and Counseling and Human Development for lectures in professional development. We will also need an MBA level administrator, as well as Administrative and Student Services Coordinators, responsible for budgets, recruiting and admissions. Ancillary counseling and professional development services will also be needed, and can be provided by the SDSU Student Health Service and Department of Counseling and Human Development in the College of Education and Human Sciences. Student fees would fund these services. Library staff support will also be needed at SDSU.

C. Facilities

Facilities represent one of the major hurdles in the establishment of the SVM at SDSU. After reviewing all the other universities with 2+2 programs, the task force would recommend that a single site be designated for classrooms, laboratories, and office space. The most ideal location would be the existing VBSD facility, assuming that a new diagnostic laboratory was constructed. The VBSD facility could be renovated for a SVM. Based on the square footage used at the SVM at UNL, we estimate the SDSU 2+2 program would need ~10,000 sq. ft. to include two dedicated classrooms, study space, kitchenette, anatomy laboratory, multipurpose laboratory, and physiology laboratory. The anatomy and physiology laboratory space could be used for undergraduate courses as well as professional courses. Renovating the existing VBSD facility has several advantages: 1) the existing necropsy floor has a walk-in cooler and rail system that would be adaptable for an anatomy laboratory; 2) existing diagnostic laboratory space could be converted to teaching laboratory space, 3) one large classroom, along with a break room, already exists; 4) locker rooms with showers are available in the facility. We estimate these facility costs at ~$4 million. We also think it important that there be designated space in Briggs Library for the SVM. This could be a designated room of 150-200 sq. ft. that is already in the facility. In addition to a classroom/laboratory facility, the task force believes that an additional large animal clinical facility for animal handling and surgeries would be necessary for the teaching mission. This facility would have dual purpose, as in addition to the SVM; it would also be used for South Dakota Agricultural Experiment Station animal units. We estimate the costs at $300,000. This facility may also be associated with other building projects at the South Dakota Agricultural Experiment Station units. For the VM3 and VM4 students, UMN College of Veterinary Medicine has identified potential space for 20 additional students in the third year classroom space. The clinical fourth year has more potential space because of clinical rotations and capacity currently being used by non-US fourth year veterinary students. Total facility costs ~$4.3 million

D. Organizational Structure

The College of Agriculture and Biological Sciences would contain an additional administrative unit, the "School of Veterinary Medicine." The Faculty would be part of the VBSD, and there would be extensive interaction of the Director with the Department Head of the VBSD. In other 2+2 institutions, the Department Head is also the Director/Dean of the School of Veterinary Medicine; however, at SDSU, we have the unique position where the Department Head is also the Director of the Diagnostic Laboratory, unlike any other 2+2 institution. The linkage of the VBSD research program and the Diagnostic Laboratory with emerging and re-emerging animal health diseases is one of the innovative organizational approaches that have kept the VBSD and SDSU Diagnostic Laboratory as leaders in diagnostics and preventative measures for food animals in the US and the world. Either adding additional responsibilities to the Department Head and/or having a separate Diagnostic Director are not an approach the SDSU 2+2 task force favors. Instead, one faculty member would have 50% of their appointment as administrative in directing the veterinary curriculum and as the Director of the School of Veterinary Medicine (Appendix 4). One senior administrative staff member would be Administrative and Student Services Coordinator, responsible for budgets, recruiting and admissions. Two additional support staff will be needed for the program. Six graduate teaching assistantships (GTA) are also budgeted.

E. Admissions

The emphasis of the professional veterinary medical program would be the training of food animal medicine veterinarians. A VetFAST Program would be implemented to recruit potential veterinary medical students with food animal experience beginning in high school. This program would be modeled on a similar program at the University of Minnesota[17]

VetFAST requires extensive food animal experience prior to entry at SDSU and a solid high school background in sciences and math. Students apply at the end of the freshman or sophomore year at SDSU. Students accepted into VetFAST must continue to take animal production courses, complete all required pre-veterinary coursework, maintain a GPA of 3.4 or higher, and continue to participate in food animal related activities and experiences. They would enter veterinary school after their 3rd year of undergraduate studies, thus by reducing their education costs by 1 year.

Twenty students would be accepted into the professional veterinary medical program each year. This number is based on the financial projects for a positive cash flow, teaching efficiencies, and capacity at the UMN. This number exceeds the number of students that South Dakota typically has accepted to veterinary school (8-15/year) (Appendix 3, Table 1). We would have a minimum of ten South Dakota slots. Our discussion with North Dakota State and the North Dakota Veterinary Medical Association (NDVMA) has revolved around their interest in filling the additional slots. Currently, North Dakota students can apply to seven different veterinary schools. There is desire by the NDVMA to streamline the process and to train more food animal veterinarians. Another possibility would be to fill additional SDSU slots with Minnesota students and/or other food animal students from the region. The admission process would need further investigation. There was a sentiment that SDSU would have its own admissions committee. However, the University of Alaska-Fairbanks has representation on the Colorado State University admission committees and cautioned against a separate committee. Dean Ames at the UMN had also initially mentioned that his vision would be to have a single UMN admissions portal with representation from SDSU for simplifying the admissions process and reducing redundant costs. The criteria and the process for admission would be consistent with the UMN, while allowing for SDSU veterinary students to be selected partially on the basis of food animal interests.

VI. How a 2+2 SDSU School of Veterinary Medicine achieves SDSU Impact 2018 Strategic Goals

A SDSU 2+2 SVM would contribute to SDSU's Impact 2018 strategic goals. The overall objective of a veterinary program at SDSU will be to provide local students with an excellent, affordable, food animal-based veterinary education that will provide benefits to the state's veterinary and animal agriculture professions. However, certain ancillary benefits to the university may accrue. These may include benefits that meet SDSU strategic goals as follows:

A. Academic Excellence

- The retention rate of undergraduates may increase, as undergraduates with direct exposure to a professional school may be better motivated to succeed in the veterinary profession.
- The implementation of a VetFAST Program that targets outstanding freshman and sophomore undergraduate students with demonstrated interest and experience in food animal medicine would increase academic excellence at SDSU. This program may also reduce the time required to

[17] Veterinary Food Animal Scholar's Track, UMN College of Veterinary Medicine website. http://www.cvm.umn.edu/students/prospective-dvm-students/preparing-for-admission/VetFASTProgram/index.htm)

complete both a Bachelor of Science and a Doctor of Veterinary Medicine (DVM) degree from eight years to seven years (and possibly six years).

- There would be an opportunity to crosslist professional and graduate classes to increase Graduate School offerings.
- There would be potential for a BS in Veterinary Medicine and combined DVM/MS DVM/PhD, and DVM/MPH programs in the 2+2 program at SDSU.
- There would be broadened faculty expertise in areas of importance to the South Dakota Animal Disease Research and Diagnostic Laboratory (ADRDL) through contributions in diagnostics and research.
- The SVM program would be an accredited program, contributing to academic excellence at SDSU.

B. Outreach
   - An SDSU 2+2 SVM would utilize state-of-the-art distance education equipment in the veterinary classroom facility to improve course and education delivery for veterinary continuing education and distance education of graduate and 2+2 students.
   - An SDSU 2+2 SVM would increase extension offerings to producers and veterinarians through a broader based faculty and improved delivery methods.
   - An SDSU 2+2 SVM would involve veterinary clinics, universities, tribal colleges and technical institutes in the SVM teaching mission to provide additional experiences for veterinary students.

C. High Performance University
   - An SDSU 2+2 SVM would allow for recruitment of new faculty and retain faculty. The program may reinvigorate current faculty by providing them a new mission to be "vested" in the program, potentially increasing morale and productivity.
   - An SDSU 2+2 SVM would increase the visibility of SDSU and potentially enhance the ability to raise private funds for endowed faculty, student scholarships and state of the art facilities and equipment.
   - An SDSU 2+2 SVM would enhance collaborative education and research efforts at SDSU and throughout the region.

VII. Proposal

The SDSU VBSD 2+2 Task Force recommends that SDSU continue discussions with the UMN on the 2+2 program and that SDSU determine if the challenges described in the white paper can be overcome and if startup and facilities costs can be funded through reinvestment opportunities. If this analysis is positive, then consideration should be given to moving the proposal forward to the South Dakota Board of Regents with "Intent to Plan." The committee overall believes that a 2+2 program that provides well-educated food animal veterinarians with stronger ties to South Dakota would be an asset to the livestock and animal industries of the state, while decreasing costs for the students. It would also contribute to several goals of the SDSU Impact 2018 Strategic Plan.

VIII. Timetable

Fall 2016:	Evaluation of white papers (UMN, SDSU), Memorandum of Understanding
Spring 2017:	Intent to plan, strategic re-investment proposal two or three-year plan
Fall 2018:	Hiring of administrator, key faculty
Fall 2019:	Building renovation for School of Veterinary Medicine, Hiring of key faculty
Spring 2020:	Hiring of key staff
Fall 2020:	Start of first Freshman class application process
Fall 2021:	Start of first Freshman class VM1

IX. Additional 2+2 Considerations

1. Workload: The student credit load at the UMN increases greatly in the second year, particularly in the Spring Semester. The workload equivalents for SDSU will need to be determined based on the UMN curriculum.

2. Terminal Degree: Currently Animal Science majors from SDSU that leave prior to obtaining a BS degree from SDSU and enroll in a College of Veterinary Medicine, have an opportunity to obtain a BS degree in Animal Science typically by crediting courses taken in the College of Veterinary Medicine back to the SDSU BS Degree. It is likely that students admitted to the 2+2 program will be spending 3 years or less in an undergraduate major, so meeting all of the major requirements for an established major would be difficult. The establishment of a terminal degree at the end of the 2 years at SDSU, could be established (e.g. SDSU BS Degree in Veterinary and Biomedical Sciences). This would be similar to the BS in Pharmacy given to Pharmacy students in the Phar.D. program

3. Shared Courses: It is likely that a few courses, such as Veterinary Imaging, will require full integration with the UMN course, depending on resources and faculty available at SDSU. Thus the UMN faculty may need to teach those classes through a distance education video link, in which case, some tuition dollars may need to be allocated to the UMN.

4. Business Analysis: All of the budgets and financial considerations need to be further analyzed. The SDSU Office of Finance and Business will need to be consulted for this analysis.

5. Early Admission from High School: Although the UMN uses the VetFAST program, we would like to consider an early admission program where students would be conditionally accepted into SDSU 2+2 program as Freshman and would enter the professional 2+2 program by meeting the stated grade point and prerequisite conditions. Such programs typically decrease the number of years needed to complete the DVM Degree by one year

6. Partnership with Surrounding States that Do Not Have Veterinary Schools: The number of students admitted to veterinary schools is currently < 20 per year, which is the minimum needed for the 2+2 program. Therefore, other rural states including North Dakota and Wyoming that have food animal agriculture intense economies may be possible partners in this program. Further discussions with these states are warranted if the proposal moves forward.

X. Appendices

Appendix 1. First and Second Year Curriculum SDSU

Year 1 Fall	Course#	Credits
Anatomy I	CVM 6903	5
Clinical Skills I	CVM 6904	1
Microscopic Anatomy	CVM 6900	4
Veterinary Biochemistry, Nutrition, and Genetics	CVM 6902	3
Physiology I	CVM 6901	5
Professional Development I	CVM 6905	1
Gopher Orientation and Leadership Experience (GOALE)	CVM 6000	1
Foundations of Interprofessional Communication and Collaboration	CVM 6005	1
TOTAL CREDITS		21

Year 1 Spring	Course#	Credits
Anatomy II	CVM 6908	3
Clinical Skills II	CVM 6909	1
Physiology II	CVM 6910	5
Professional Development II	CVM 6907	1
GOALE	CVM 6000	1
Critical Scientific Reading	CVM 6906	1
Clinical Correlations	CVM 6003	2
Immunology	CVM 6911	2
Basic Pathology	CVM 6912	2
Agents of Disease I	CVM 6913	4
Preventive Medicine	CVM 6914	4
TOTAL CREDITS		26

Year 2 Fall	Course #	Credits
Agents of Disease II	CVM 6917	5
Pharmacology I	CVM 6918	3
Systemic Pathology	CVM 6919	5
Clinical Pathology I	CVM 6920	2
Clinical Skills III	CVM 6921	2
Clinical Epidemiology	CVM 6922	2
Public Health	CVM 6923	2
Small Animal Medicine I	CVM 6924	2
Diagnostics Laboratory	CVM 6925	2
TOTAL CREDITS		25

Year 2 Spring	Course #	Credits
Small Animal Medicine II	CVM 6926	5
Small Animal Surgery I	CVM 6927	3
Large Animal Medicine I	CVM 6928	4
Large Animal Surgery I	CVM 6929	2
Veterinary Imaging I	CVM 6935	3
Clinical Pathology II	CVM 6942	3
Clinical Skills IV	CVM 6936	2
Clinical Correlations	CVM 6003	2
Pharmacology II	CVM 6937	5
Professional Development III	CVM 6938	2
Non-traditional Pets	CVM 6939	1
Avian Core	CVM 6941	2
TOTAL CREDITS		34

UMN CVM First and Second Year Course Descriptions

Year 1 – Fall semester – Core courses
CVM 6000 Gopher/Jackrabbit Orientation and Leadership Experience (GOALE) (1 cr) Orientation to the veterinary program, introduction to academic and personal skills necessary for success in the curriculum and profession, peer and faculty mentoring. Small group
CVM 6005 Foundations of Inter-professional Communication and Collaboration (FIPCC) (1 cr) Knowledge of other health professions and experiential team-based communications in inter-professional groups including medicine, nursing, pharmacy, dietetics, clinical laboratory science, public health, dentistry, and veterinary medicine. Small group
CVM 6900 Microscopic Anatomy (4 cr) Introduction to microscopic/ultrastructural morphology of cells, tissues, organs and organ systems. Lecture / Laboratory
CVM 6901 Physiology I (5 cr) Fundamental principles of systemic physiology through survey of major organ systems including neurobiology. Lecture / Laboratory
CVM 6902 Veterinary Biochemistry, Nutrition, and Genetics (3 cr) Metabolism, structure and metabolic function of cells and tissues, nutrients and nutrition basics, overview of general, molecular, and cytogenetics. Lecture
CVM 6903 Anatomy I (5 cr) Gross and developmental anatomy of domesticated mammals. Carnivore dissection uses the dog as a model with comparative features of the cat. Lecture / Laboratory
CVM 6904 Clinical Skills I (1 cr) Basics of animal handling and restraint, foundational clinical skills in large and small animals. Lecture / Laboratory
CVM 6905 Professional Development I (1 cr) Introduction to the veterinary profession, personal management and personal finance. Lecture

Year 1 – Spring semester – Core courses
CVM 6906 Critical Scientific Reading (1 cr) Introduction to critical analysis and review of scientific literature, statistical analysis, evidence-based medicine. Lecture / Small group
CVM 6907 Professional Development II (2 cr) Social, economic, legislative, and health consequences of human / animal interaction. Introduction to production agriculture, population medicine, veterinary career paths. Lecture / Experiential
CVM 6908 Anatomy II (3 cr) Gross and developmental anatomy of domesticated mammals. Ungulate dissection focuses on the horse with emphasis on clinically important aspects of ruminant and swine anatomy. Lecture /Laboratory
CVM 6909 Clinical Skills II (1 cr) Basics of animal handling and restraint, foundational clinical skills in large and small animals. Lecture / Laboratory
CVM 6910 Physiology II (5 cr) Fundamental principles of systemic physiology through survey of major organ systems including reproductive biology. Lecture
CVM 6911 Immunology (2 cr) Introduction to immunology including innate and adaptive immunity, cells and molecules involved in protection against infectious agents and cancers. Overview of antibody-antigen-based testing, immune-mediated diseases. Lecture
CVM 6912 Basic Pathology (2 cr) Reactions of cells / tissues to injury including retrogressive changes, cell death, pigments, circulatory disturbances, inflammation, alterations of cell growth.
CVM 6913 Agents of Disease I (4 cr) Virology, bacteriology, parasitology of common domestic species. Lecture / Laboratory
CVM 6914 Preventive Medicine (4 cr) Preventive care of common domestic species including poultry. Behavior, nutrition, vaccinology, parasite control, reproduction control, management of neonates, biosecurity. Lecture / On-line
CVM 6003 Clinical Correlations (2 cr) Problem-based assessment of common concerns in domestic animal with peer teaching and curricular integration. Small group

Year 1 –Elective courses
CVM 6001 Opportunities in International and Cultural Immersion (0.5 cr) Cultural competence and travel safety, funding opportunities for international education. Lecture / Experiential
CVM 6560 Introduction to Public Health Issues and Veterinary Medicine Opportunities (1 cr) Introduction to public health practice and association with veterinary medicine. Career options. Public health principles in context. Lecture
CVM 6721 Neonatology (1 cr) Introduction to medical care of critically ill foals. Seasonal participation in clinical management of hospitalized foals. Lecture / Experiential
CVM 6865 Introduction to Swine Production Medicine (1 cr) Contemporary approaches to swine practice including production, disease management, and preventive care. Lecture
CVM 6930 Medical Management of Wildlife Animals (1 cr) Wildlife animal handling techniques and preventive medicine for wildlife species. Lecture / Discussion

Year 2 – Fall semester – Core courses
CVM 6917 Agents of Disease II (4 cr) Virology, bacteriology, parasitology of common domestic species. International diseases. Lecture / Small group
See options listed under CVM 6913
CVM 6918 Pharmacology I (3 cr) Principles of pharmacokinetics and clinical applications in animal patients. Pharmacology of drugs affecting the autonomic nervous system, cardiovascular system, respiratory and digestive tracts, and kidneys, and anti-allergic / anti-inflammatory drugs. Clinical pharmacology of antimicrobials, antifungals, anthelmentics and chemotherapeutic drugs. Lecture
CVM 6919 Systemic Pathology (5 cr) Reactions of specific organs systems to injury. Applications to diagnosis of specific diseases at gross / microscopic level. Lecture / Laboratory
CVM 6920 Clinical Pathology I (2 cr) Hematology, cytology. Integration of diagnostic plan, generation of clinical pathology data, statistical concepts, interpretation of results to guide patient management. Lecture
CVM 6921 Clinical Skills III (1 cr) Advanced clinical skills in large and small animals. Experiential learning at the CVM and external sites. Experiential
CVM 6922 Clinical Epidemiology (2 cr) Statistical and epidemiological concepts applied to veterinary medicine. Lecture
CVM 6923 Public Health (2 cr) Epidemiological approach to veterinary public health. Major zoonoses, animal sentinels, meat/milk inspection, food safety, environment, occupational health / safety, euthanasia and carcass disposal methods, cruelty investigation, animal welfare issues. Lecture
CVM 6924 Small Animal Medicine I (2 cr) Metabolic disorders, pediatrics / geriatrics, infectious diseases of dogs and cats. Lecture
CVM 6925 Diagnostics Laboratory (2 cr) Hands-on diagnostics laboratory including sample handling, parasitology, microbiology, urinalysis, serologic testing. Laboratory

Year 2 – Spring semester – Core courses
CVM 6926 Small Animal Medicine II (5 cr) Common disorders of organ systems within the abdomen in small animals. Lecture / Laboratory
CVM 6927 Small Animal Surgery I (3 cr) Orthopedic disorders and lameness, and abdominal surgery in small animals. Lecture / Laboratory
CVM 6928 Large Animal Medicine I (4 cr) Common disorders of organ systems within the abdomen in large animals. Lecture
CVM 6929 Large Animal Surgery I (2 cr) Orthopedic disorders, lameness, hoof and foot disorders, and abdominal surgery in large animals. Lecture / Laboratory
CVM 6935 Veterinary Imaging I (3 cr) General principles of interpretation of diagnostic radiographs, musculoskeletal and abdominal radiography in large and small animals. Lecture / Laboratory

CVM 6936 Clinical Skills IV (1 cr) Advanced clinical skills in large and small animals. Experiential learning at the CVM and external sites. Experiential
CVM 6937 Pharmacology II (4 cr) Pharmacology of drugs affecting the central nervous system. Principles of toxicology, diagnosis and case management. Lecture
CVM 6938 Professional Development III (2 cr) Communications basics, experiential communications training, cultural literacy. Small group / Experiential
CVM 6939 Nontraditional Pets (1 cr) General and reproductive biology, behavior, husbandry, nutrition, restraint and handling, and anesthesia, diagnosis and management of common disorders of special species commonly encountered in small / mixed animal practices including mammals and basic aquarium species. Lecture / Laboratory
CVM 6941 Avian Core (2 cr) Avian anatomy, physiology, nutrition, and disease. Lecture
CVM 6942 Clinical Pathology II (2 cr) Serum chemistry analysis. Integration of diagnostic plan, generation of clinical pathology data, statistical concepts, interpretation of results to guide patient management. Lecture
CVM 6003 Clinical Correlations (2 cr) Problem-based assessment of common concerns in domestic animal with peer teaching and curricular integration. Small group

Year 2 – Elective courses
CVM 6001 Opportunities in International and Cultural Immersion (0.5 cr) Cultural competence and travel safety, funding opportunities for international education. As above
CVM 6222 Advanced Clinical Epidemiology (1 cr) Application of epidemiologic principles to control of infectious diseases in animal populations. Global impact of infectious disease, disease outbreak investigation, economics of disease control / surveillance. Lecture
CVM 6512 Zoo and Wildlife Rounds (0.5 cr) Selected topics in conservation, management, and pathology of zoo animals, wildlife, and exotic pets. Discussion
CVM 6560 Introduction to Public Health Issues and Veterinary Medicine Opportunities (1 cr) Introduction to public health practice and association with veterinary medicine. Career options. Public health principles in context.
CVM 6718 Large Animal Community Based Practice Mentoring (1 cr) Experiential handling and management of large animals, mentoring.

Potential Electives for VM3 & VM4 to be offered by SDSU

1) Elective Coursework for professional veterinary students falls into three main categories:

    - Clinical "rotations" for third and fourth year students, one to two weeks in length (not discussed here)
    - Practicum laboratory or field experience (not discussed here)
    - Didactic lectures with limited (but significant) field exposure for first and second year students

2) One credit lecture electives could meet once per week for 14 weeks (one semester), or twice per week for seven weeks (the latter would allow students to take up to two electives per semester)

3) Lecture electives given at SDSU for 2+2 students could be open via distance learning to CVM students at UMN (and elsewhere?)

Potential Topics for SDSU 2+2 Lecture Electives (1 credit each; meet 2x per week for seven weeks):

Food Animal Medicine

Beef Cow/Calf Medicine	Health and disease issues in beef calf production, including conditioning and backgrounding programs.
Grass-Fed Beef Production	Nutrition, pasture management and animal health issues for grass-fed beef production.
Small Ruminant Health	Sheep, goat, and camelid husbandry and medicine for small and large-scale production.

Wildlife Medicine

Population Medicine of Waterfowl	Health and disease interface of wild waterfowl with domestic poultry, swine, and humans.
Health & Mgmt. of Wild Ruminants	Population management, disease, and nutrition of wild cervids and bison.
Wildlife Farming & Propagation	Principles and practices of captive wildlife breeding and production.

Special Species Medicine

Mixed Farmstead Medicine	Husbandry, management, and animal health of mixed species on the small suburban or rural farmstead, including poultry, rabbits, and small ruminants.
Aquaculture Diagnostic Medicine	Concepts and procedures for preventive health and disease surveillance of commonly cultivated aquatic species.
Honeybee Health & Disease	Principles of bee management and production; Survey of infectious, nutritional, and toxicological diseases of economic significance to the pollinator and honey industries.

Diagnostic Medicine

Diagnostic Methodology	Overview of animal diagnostic testing with an emphasis on infectious disease, including sample selection, submission and shipping, test methodology, and interpretation.
Milk Quality Technology	Innovations in bulk milk quality analysis, and interpretation of bulk indices in the context of dairy herd health management.
Food Safety	Quality standards for food safety, including hazard analysis and critical control points (HACCP), microbiologic monitoring, and drug residue expectations.

Practice Dynamics

Pharmacy Mgmt. & Practice	Practical pharmacy management, inventory control, external prescriptions, and regulatory responsibilities.
Rural One Health & Disease	The rural interface of human and animal health, with discussion of zoonotic and anthroponotic disease, common environmental exposure, and collaboration with other health professions.
Herd Disease Investigation	Basic principles of problem-oriented disease investigation, focused on population epidemiology.

Appendix 2. 2+2 Program Cost Estimates.

Curriculum

SDSU curriculum would be "separate but equal" to that of the UMN in the first two years. The veterinary medical curriculum is the same as UMN and consists of 47 required credits in the first year and 59 required credits the second year and six elective credits (112 total). The budget was prepared assuming that all required courses are taught at SDSU. It is likely (as was seen in the other 2+2 programs), that some of the courses would be delivered from the UMN and would reduce the number of instructed hours provided by SDSU. For example, Veterinary Imaging I would most likely require a board-certified radiologist from the UMN and the "Gopher Orientation and Leadership Experience (GOALE)" would most likely be a "combined" SDSU/UMN course for students from both universities to be oriented to veterinary school and become acquainted with each other for additional interactive experiences throughout the first two years of veterinary school (Appendix 1). Within the UMN curriculum, there are five elective courses offered to students in VM1 and five elective courses in VM2. Five of these "courses" are clinical or experientially learning opportunities and the others are survey courses. We have also developed a list of potential VM3 & VM4 clinical courses that could be offered at SDSU (Appendix 1, pages 31-32). These classes are not included in the cost of the program. They will be presented as a consideration to the UMN. Existing livestock units both at SDSU and at the state experiment stations could provide additional experiential learning opportunities throughout all four years.

Total Running Direct Costs/year: $1,187,712
Total Indirect Costs: $225,891
Total Cost: $1,413,603

Breakdown:

Total Course Credits: 112
Total FTEs Required: 4.8 FTE (4.3 New Faculty, 0.5 Attending Veterinarian)
Total Administrative: 2.0 (Administrator; Administrative and Services Coordinator)
Total GTAs: 6.0 GTA

Direct Costs

Total Salaries: $997, 412
Total Supplies: $190,300
Total Direct Costs: $1,187,712

Indirect Costs

Indirect Expenses for 2+2 Program	$356,664
Less Decrease in other Ag/Bio units	($130,773)
Total Indirect Costs (Net Change for Ag/Bio)	$225,891
Total Operating Expenses for 2+2 Program	**$1,413,603**

Tuition Calculations for 2+2 Program

Revenue and University Fees: The assumptions that we are making is tuition costs for 6 "contract SD students" will be equal to current Iowa State tuition ($21,098/yr) and that for all SD students, tuition will not be higher than current SDSU SD resident Graduate School tuition. For this estimate, we assume a maximum of 10 SD resident students/ year, with the remaining 10 consisting of "Minnesota" students paying Minnesota in-state tuition. For the SD residents, 6 students will continue to receive reduced

tuition equivalent to Iowa State current fees "scholarship students" ($27,345-$6,247=$21,098), whereas the other 4 will receive a reduced in-state tuition rate calculated based on our graduate SD resident fees ($27,345, a savings of $20,000/yr over Iowa State out of state tuition; $40,000 savings for year 1 and 2). These tuition breaks for SD students will be recovered from redirected funds from the Pesticide Tax (approx. $600,000/year). Minnesota students will receive tuition rates equivalent to UMN Veterinary School Tuition (Table 1). Out of state students are not in the following calculations, but will be charged an equivalent fee to the UMN Out-of-State Veterinary School Tuition. In practice, non-scholarship SD students will pay a tuition of $27,345 for the two years at SDSU, whereas MN residents will pay a tuition rate of $30,828. Using 10 SD and 10 MN residents enrolled in each of two years, total revenue is therefore 20x$27,345+20x$30,828 = $1,163,456. In addition, the University will redirect the $600,000 pesticide tax towards the program for a total revenue of $1,763,460. The "scholarship" costs will be $191,722 which reduces the revenue to $1,571,734. If the current ISU "contract" selection criteria were used, these scholarships would be awarded to the top 6 entering students as determined by the admissions committee.

Table 1: Revenue per student/year, SD versus Minnesota.

	SD Resident	MN Resident
Tuition	8,768	12,251
General Activity Fee	949	949
Program Fee	17,627	17,627
Total Year Cost	**27,345**	30,828
Pesticide Fee to Operations	*3,483*	
Revenue Per Student	**30,828**	**30,828**

To keep 6 students/year at the current Iowa In-State tuition rate ($21,098), we will need to dedicate $191,722 of the current Pesticide Tax to funding scholarships for these 6 students/year. (Table 2). This assumes that the remaining 4 of the 10 SD students will pay full ($30,828) tuition upon enrollment at UMN, whereas SD will continue to subsidize the 6 scholarship recipients through their final 2 years at UMN. For the non-subsidized SD students this is a $17,000/year reduction in tuition over ISU Out of State ($34,000/total for year 3 and 4 and a total of $74,000 less for the 4-year program than ISU Out of State).

Table 2: Scholarship costs to keep 6 students at current Iowa Tuition Rate

	2 Cohorts @ SDSU	2 Cohorts @ UMN	Total
Per Student	6,247	9,730	N/A
Number of Students	12	12	24
Total Need	**74,962**	**116,760**	**191,722**

An additional $3,483 (Table 1 and Table 3) will be required to subsidize SD students for each of the 10 enrolled SD students/year (20 total) at SDSU so that their tuition would not exceed in-state graduate school rates, for a total of $69,660. As a result, the amount of the Pesticide Fee/Tax remaining for Vet School operations will be $600,000-$191,722-$69,660 for a total of $**338,618**. Total operating revenue for the program after scholarships will therefore be $1,571,734 (Table 4)

Table 3: Revenue Breakdown per student including student costs, and support from SD Parasiticide tax for tuition reduction of SD Students (Scholarship, All SD).

		Student Costs paid from Pesticide Tax		
Student Type	**Paid by Student**	**Scholarship SD Student**	**All SD Students**	**Total Program Cost/Student**
SD Scholarship (6)	21,098	6,247	3,483	30,828
SD Non-Scholarship (4)	27,345	-	3,483	30,828
MN Resident (10)	30,828	-	-	30,828

Table 4: Revenue *before* Indirect University cost and Decentralized Budget Taxes.

Fiscal Year University Revenue				
	SD, MN *Students	Revenue-SD	Revenue-MN	Total Revenue
Tuition	20,20	175,364	245,028	420,392
General Activity Fee	20,20	18,984	18,984	37,968
Program Fee	20,20	352,548	352,548	705,096
Total Tuition Revenue		546,896	616,560	1,163,456
Pesticide Fee to Operations	20	69,664		69,664
Additional Pesticide Fee (after Scholarships)				338,614
Total Revenue				**1,571,734**

*There are two classes of 20- Year 1(20) and Year 2(20) for a total of 40 students

Taking those values into account, the actual College of Ag/Bio operations revenue based on a class size of 20 students (10 SD, 10 MN) less all SD administrative fees and general activity fee ($90,770 +$37968=$128,738) is $1,442,996 (Table 5).

Table 5: Net Yearly Operating Revenue to College of Ag.

Fiscal Year Net Revenue to College of Ag	
	Revenue
Tuition	329,621
General Activity Fee	-
Program Fee	705,096
Total Tuition Revenue	*1,034,717*
Pesticide Fee to Operations (SD Student Reduction)	69,664
Additional Pesticide Fee (After Scholarships)	338,614
Total Revenue	**1,442,996**

The total operations revenue for the program therefore becomes $1,442,996. With costs estimated at $1,413,603, it leaves a surplus of **$31,393**.

Table 6. Transition Tuition Support for the Iowa State Slots

	Classes at Iowa State	Tuition Support to Iowa State	Cumulative Cost of Iowa State Support
2020	VM2, VM3, VM4	$450,000	$450,000
2021	VM3, VM4	$300,000	$750,000
2022	VM4	$150,000	$900,000
2023		0	$900,000

Appendix 3. Enrollments in College of Veterinary Medicine by SDSU students and SD Residents

	SDSU	Non SDSU	SDSU	SDSU	Total Students	SD
	SD resident	SD resident	MN resident	Other resident		Resident
Entering 2011- Graduating 2015						
Iowa State	6	7		2	15	13
Minnesota			2		2	0
K-State	2				2	2
Georgia				1	1	0
London				1	1	0
					21	15
Entering 2012- Graduating 2016						
Iowa State	9	10		1	20	19
Minnesota		4	1	1	6	4
K-State				1	1	0
Miss. State				1	1	0
Ross			1		1	0
Missouri				1	1	0
					30	23
Entering 2013- Graduating 2017						
Iowa State	7	7		3	17	14
Minnesota		4	1	1	6	4
Missouri	1				1	1
					24	19
Entering 2014- Graduating 2018						
Iowa State	8	5	4		17	13
Minnesota	1	1			2	2
Ross	1		1		2	1
Colo St.			1		1	0
Missouri			1		1	0
					23	16

	SDSU	Non SDSU	SDSU	SDSU	Total Students	SD
	SD resident	**SD resident**	**MN resident**	**Other resident**		**Resident**
Entering 2015- Graduating 2019						
Iowa State	1	4	3	1	9	5
Minnesota			3		3	0
					12	5
Entering 2016- Graduating 2020						
Iowa State	3	2		1	6	5
Minnesota			3		3	0
Mississippi St.				1	1	0
Ross	1				1	1
					11	6
Entering 2017 Graduating 2021						
Iowa State	3	*		2	5	3
Minnesota			2	1	3	0
Missouri			1		1	0
Ross	1		2		3	1
					12	4

- Data not available yet

Appendix 4. Possible Organizational Chart School of Veterinary Medicine at SDSU