

### **#3: Appendices Supporting the Teaching Portfolio:**

*The appendices “should consist of judiciously chosen evidence that adequately supports the narrative section of the Teaching Portfolio.” P. Seldin, et al 2010*

Educators’ activities and responsibilities will vary widely, depending on their individual appointments and their department or college. FEW if any individual portfolios will provide evidence for ALL categories or for all indicators listed under each category. Please limit these items to those with relevance in your current teaching, supporting this current snapshot of your activities.

**For the reviewer: see domain 1a**

1. The educator actively engages in practices that promote continual improvement.
2. The educator reflects on these activities and thoughtfully considers new information/perspectives regarding teaching and learning.
3. The educator transforms his/her own professional development activities into action – i.e. into experiments and/or change in his/her teaching.
4. If applicable: the educator transforms his/her own professional development activities into action in other domains – e.g. assessment, curriculum/program development, educational leadership, etc.

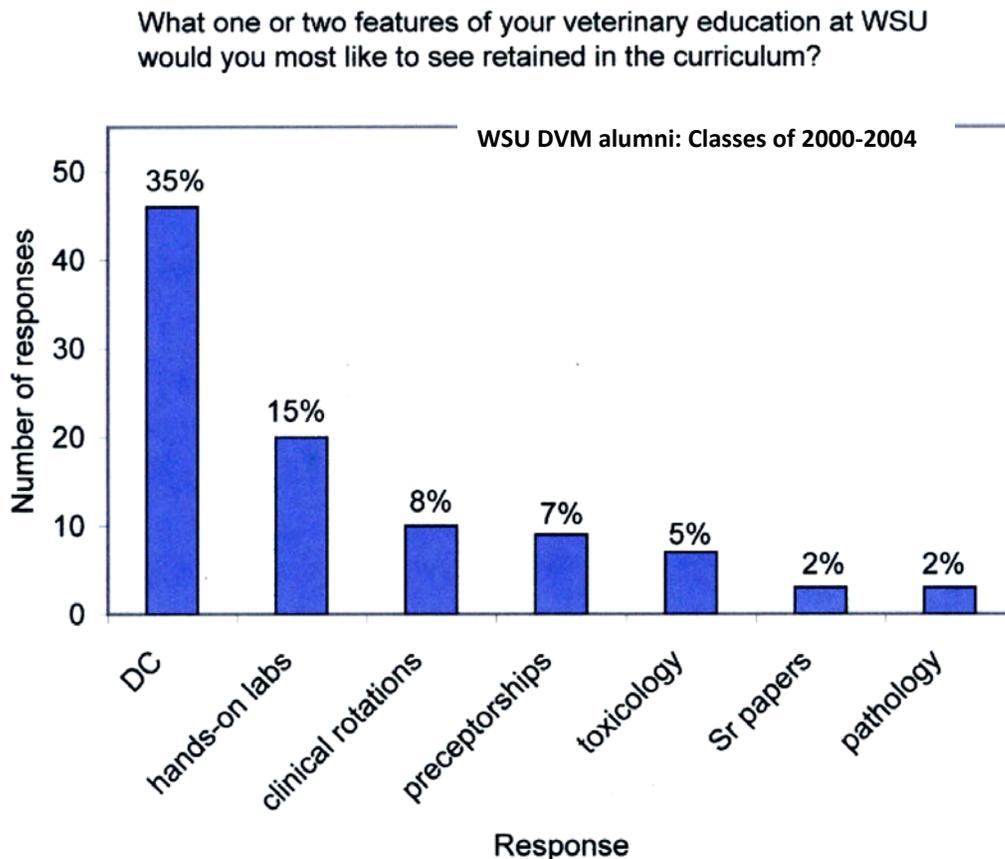


## The Diagnostic Challenge exercises.

The DCs were started in collaboration with my colleague Guy Palmer in 1991 and have since grown into one of the flagship programs of the WSU DVM curriculum. The program was recognized by a national teaching award from Merck-Merial in 1995 and has been a significant reason for the individual teaching awards I have received – notably WSU's Marian E. Smith Award. I have been invited to speak about the DCs at multiple veterinary schools.

### 1. WSU CVM ALUMNI SURVEY

As an example of the long term value our students see in the Diagnostic Challenge exercises, please see the following figure from a 2006 CVM survey of alumni who had graduated between 2000-2004. As shown, the DCs were the most answer when alumni were asked “*What one or two features of your veterinary education at WSU would you most like to see retained in the curriculum?*” The DC exceeded the second most common response by >2:1.



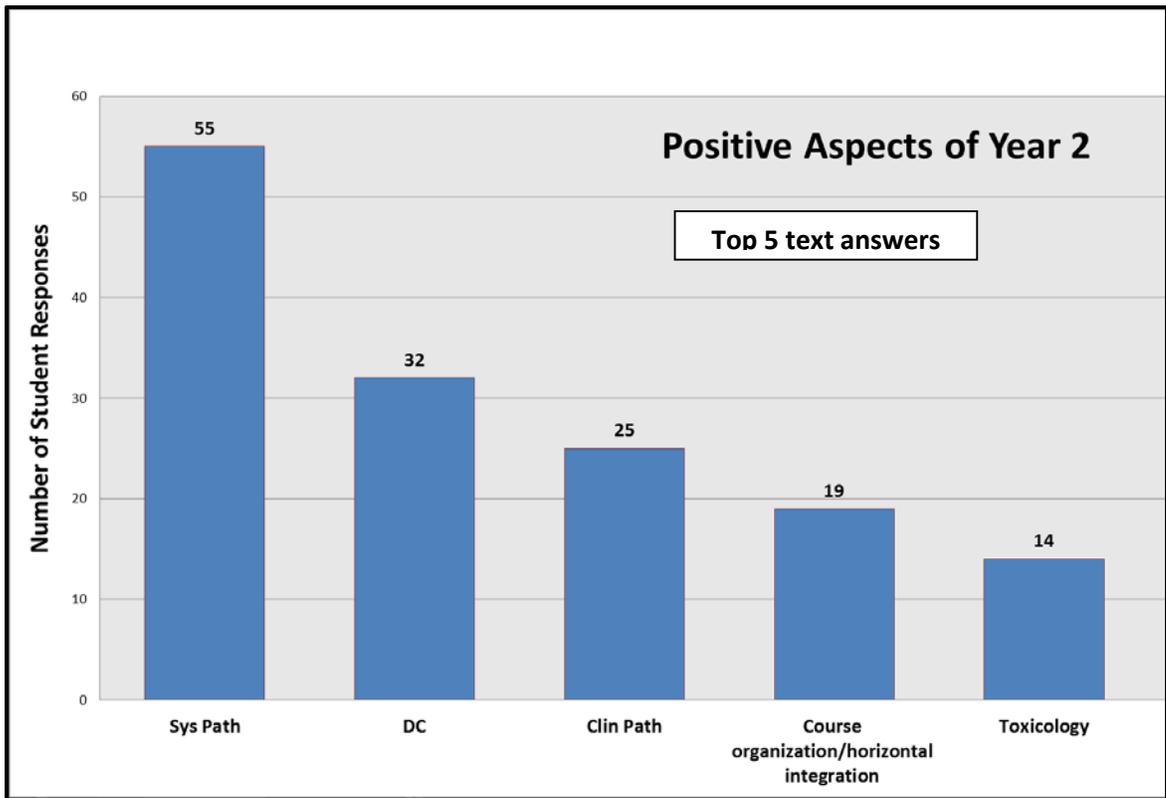
A total of 131 responses were provided. Many other responses were given 3 or fewer times. This included mention of individual rotations or courses, general comments such as 'good instructors' or 'strong basic science coursework,' availability of counseling services, lack of rigid tracking program, etc.

## 2. WSU CVM Exit Surveys – Graduating Class of 2015

At graduation, exiting 4<sup>th</sup> year students typically identify the Diagnostic Challenges and the Systemic Pathology course as 2 of the highlights of the WSU DVM curriculum – at least for year 2 of the program.

Below is a tally of the top 5 positive aspects of Year 2 listed by graduating seniors in the Class of 2015. As is common, the Sys Path course and Diagnostic Challenges are the top 2 listed highlights.

EXIT SURVEY QUERY: *Looking back, what are the 3 most positive aspects of year 2 of our DVM curriculum?*



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## Future vets practice problem solving, communication

PUBLISHED ON NOVEMBER 30, 2011



*Watch out the patient bites. Second year veterinary students discuss Betsy the cat's medical symptoms during WSU's Diagnostic Challenges. (Photos by Hanks, WSU Photo Services)*

PULLMAN, Wash. – Your first-ever patient is Max, a 75 pound wolf hybrid energy and exhibiting only one testicle. Max's owner is deployed in Afgt his bewildered mother brought Max in to see you. She calls you "Doctor you do look like one in a crisp white coat with shiny stethoscope – you're at Washington State University.

## WSU Announcements



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And Max is a big stuffed animal. His symptoms, however, are ones that veterinarians see in the real world. What questions do you ask the owner? Which tests should you order for Max? What if the mother can't afford to pay? What if she cries?

## Human skills, science skills

Welcome to step one of Diagnostic Challenges, a series of clinical exercises. WSU's second-year veterinary students become "doctors" for four days. Each year, the DC plucks students away from science books and immerses them in clinical settings with pretend sick pets and their pretend caregivers play the role of veterinarians. Students are evaluated by real veterinarians seated behind windows of an adjoining room.

In each case, the challenges posed to students are to communicate with the pet caregiver, find out what's wrong with the pet and then determine the best treatment plan, said DC organizer **Steve Hines**, WSU professor of veterinary microbiology and pathology.

"As second-year students, they've been sitting in classes and labs and they're smart. Our aim is to also help them become good problem solvers and communicators," he said.

Hines created the program in 1991 with **Guy Palmer**, director of WSU's Allen School for Global Animal Health. Each year, they recruit "actors" from the community to serve as pet caregivers.

But others must take planes to get here.

## Alumni participate to give back



*Peter Vellutini, left, Linda Fineman and Kyle Frandle are veterinarians practicing in California who graduated from WSU's veterinary school and return each year as Diagnostic Challenges facilitators.*

**Suzanne Russo**, a veterinarian with Pfizer Animal Health, flew from Sar to play pet owner to a 9-year-old cat named Betsy (student groups don't actors' true identities until later). Clutching the stuffed toy cat to her chest, she told the five students seated around her that Betsy had spent the past three days sleeping under the bed and not eating.

Oh, and by the way, Betsy bit a veterinarian once, so be careful, Russo told the students.

Oh, and one more thing, Russo told them – Betsy recently brought home a bat. A clue or a red herring? That's for the students to figure out.

Later in the week, Russo gave students feedback on how they did, as she also served as their professional facilitator.

The facilitators are faculty members from the College of Veterinary Medicine and alumni veterinarians who leave their practices to assist with the DC.

## Learning your limitations

One of them is **Peter Vellutini**, here from the Sacramento area for his role as a facilitator – a big change from 2001 when he participated as a veterinarian in the first challenge, coincidentally, was the wolf hybrid scenario used this year.

"I was definitely nervous," Vellutini recalled. "It's a dramatic change from a classroom setting where you are listening to endless lectures and memorizing information."

But the experience was so valuable that Vellutini repeatedly participated. As a facilitator, he said.

"I try to make their experience as real-life as possible and pass along so much knowledge and tools that I have found helpful as a practicing veterinarian."

Another returning facilitator is **Linda Fineman**, a 1992 alumna who worked as a veterinary oncologist in California's Silicon Valley. During the DC, she teaches students how to communicate compassionately and how to say, "I don't know," she said.

"Learning what your personal limitations are in terms of experience and knowledge is one of the fundamental skills needed to be a good veterinarian," said

## More popular, more loved

People in the U.S. own roughly 82 million cats, 72 million dogs, 43 million horses, according to the American Veterinary Medical Association to mention the countless hamsters, rabbits, pet snakes and turtles. And so, masses of pet owners are wanting top-notch medical care, said **Frandle**, a 1980 WSU veterinary graduate who runs a large dog and cat hospital in Los Gatos, Calif.

"Pets have become a more integral part of people's lives and their bond with them is profound," said Frandle, back for his 10th year as a DC facilitator.

"Our focus is on the pet, but a good veterinarian never loses sight of the people we work in a people profession," he said. "We want to get this across to students early in their training. Believe me, it will benefit them."

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**Categorized** All Posts

« [235-ton crane to be delivered for Martin Stadium project](#)

November 30

**5. Implementation of the One Minute Preceptor to Improve Student Engagement in the Systemic Pathology weekly laboratory:**

**PHOTOS from 2013 labs depicting active student engagement in exercises.**



**Front of student card:**

STEP	STUDENTS
Case History:	<input type="checkbox"/> Master Problem List (MPL) <input type="checkbox"/> Key Observations <input type="checkbox"/> DfDx list (pathological processes)
Diagnostic Approach: <i>assessing a lesion</i>	<ol style="list-style-type: none"> <li>1. Identify tissue &amp; get oriented</li> <li>2. Description</li> <li>3. Morphologic Dx - presumptive             <ul style="list-style-type: none"> <li>✓ DfDx's</li> <li>✓ Most likely &amp; why ?</li> </ul> </li> <li>4. Pathogenesis</li> <li>5. Pathophysiology</li> </ol>
When starting w/ a lesion:	<input type="checkbox"/> Reverse MPL <input type="checkbox"/> Pathophysiology of problems

MORPHOLOGICAL DIAGNOSIS
<ol style="list-style-type: none"> <li>1. PROCESS/LOCATION:             <ul style="list-style-type: none"> <li>✓ e.g. prostatitis</li> </ul> </li> <li>2. MODIFIER:             <ul style="list-style-type: none"> <li>✓ e.g. suppurative</li> </ul> </li> <li>3. DISTRIBUTION:             <ul style="list-style-type: none"> <li>✓ e.g. multifocal</li> </ul> </li> <li>4. CHRONICITY:             <ul style="list-style-type: none"> <li>✓ acute or chronic</li> </ul> </li> <li>5. SEVERITY:             <ul style="list-style-type: none"> <li>✓ e.g. mild</li> </ul> </li> </ol>
<b>Disturbances of Growth: skip 3, 4 &amp; 5</b>

**Back of student card:**

<p><b>A. GET A COMMITMENT</b></p> <ol style="list-style-type: none"> <li>1. Describe the lesion</li> <li>2. Morph Dx – and reasoning</li> <li>3. PATHOGENESIS: How was this lesion produced?</li> <li>4. PATHOPHYSIOLOGY:             <ul style="list-style-type: none"> <li>✓ How do you think this lesion produced the problems on your MPL?   <b>-OR-</b></li> <li>✓ Write a reverse MPL and explain the pathophysiology of each problem.</li> </ul> </li> </ol>
<p><b>B. THE 1 MINUTE PRECEPTOR</b></p> <ul style="list-style-type: none"> <li>✓ Probe for supportive evidence</li> <li>✓ Reinforce what was done right/well</li> <li>✓ Correct mistakes</li> <li>✓ Teach general rules / concepts</li> </ul>

STEP	STUDENTS
Case History:	<input type="checkbox"/> Master Problem List (MPL) <input type="checkbox"/> Key Observations <input type="checkbox"/> DfDx list (pathological processes)
Diagnostic Approach: <i>assessing a lesion</i>	<ol style="list-style-type: none"> <li>1. Identify tissue &amp; get oriented</li> <li>2. Description</li> <li>3. Morphologic Dx - presumptive             <ul style="list-style-type: none"> <li>✓ DfDx's</li> <li>✓ Most likely &amp; why ?</li> </ul> </li> <li>4. Pathogenesis</li> <li>5. Pathophysiology</li> </ol>
When starting w/ a lesion:	<input type="checkbox"/> Reverse MPL <input type="checkbox"/> Pathophysiology of problems

Printing Instructions: The cards should be laminated and double-sided, and both sides are shown above. The size should be about 10 x 7.5 cm.

# An Evolutionary Approach to Curricular Reform: Development of an Integrated Semester and a Cross-disciplinary Simulation

S. A. Hines, I. S. Eriks and G. H. Palmer

## Introduction

Many of the recent initiatives in medical education have proposed fundamental changes in the methods by which veterinarians and physicians are trained (1-5). However, these programs typically require higher instructor:student ratios and more intensive instructor:student interaction than traditional methods. Adoption of the more labor intensive programs at colleges of veterinary medicine may be constrained by the limited numbers of faculty. Likewise, the large percentage of faculty members with concomitant clinical or research responsibilities precludes additional time commitment to classroom teaching by these individuals. Diminishing funding for higher education means that these obstacles are unlikely to be overcome by hiring additional faculty.

In addition, efforts to impose a single teaching strategy on an entire faculty tend to ignore the successes of traditional curricula which permit a diversity of teaching styles and methods. In fact, traditional lecture-based curricula have a number of strengths (6, 7). These include the efficient transfer of information to large numbers of students and the provision of structure, which for many students is an important part of learning. Since 1989, a group of faculty at Washington State University (WSU) has sought to develop an approach which allows us to keep the best parts of the traditional curriculum while gradually incorporating non-traditional methods of teaching. The culmination of these efforts is a series of cross-disciplinary simulations designated the "Diagnostic Challenges."

## An Integrated Semester

Traditional curricula, including our own, organize the acquisition of medical knowledge into specific, discipline-related courses. The goal is to provide students with the information and technical skills they will need to solve clinical problems. Compartmentalization of the curriculum provides students with a framework for learning, helps to ensure that the important information is addressed somewhere within the curriculum, and fits well with the concept that each discipline should be taught by a faculty member with appropriate disciplinary expertise. However, this organization of the

curriculum also means that veterinary students are presented with discipline-specific facts out of context with other disciplines and with how the information will ultimately be applied (8). Teaching isolated facts in this manner does not foster long-term retention (9, 10). As a result, potentially useful knowledge may be learned only to be lost before it is needed. In addition, this method of accumulating medical knowledge is very different from the practice of medicine which, by definition, is multidisciplinary.

A program of limited curricular modification at WSU began as an effort by two course directors with similar teaching philosophies to better integrate their courses (Systemic Pathology and Microbiology) within a single semester (first semester of the 2nd year). It is evolving to include the majority of instructors within the semester and has stimulated some rearrangement of the curriculum to allow appropriate courses (Laboratory Diagnosis, i. e., "Clinical Pathology") and similar-minded instructors to participate (Table 1). There are now ongoing efforts among the collaborating courses to increase cooperation and cross-integration. These include efforts to align subjects (e. g., pathology, microbiology, and clinical pathology of enteric disease); place an emphasis on basic concepts rather than isolated facts; build on concepts introduced in other courses; and use a common approach to problem solving.

Table 1. Development of an Integrated Semester: Fall Semester of 2nd Year.

Course	Lecture hours/wk.	Laboratory hours/wk.	Credit hours
Systemic Pathology ***	5	3	6
Microbiology***	3	4	4
Laboratory Diagnosis**	2	3	3
Pharmacology*	4	3	5
Epidemiology*	2	0	2
			---
		Total	20

\*\*\* Participation in program includes cancellation of lectures and labs during the Diagnostic Challenges to provide necessary out-of-class time.

\*\* Participation includes alignment of topics, continued efforts to cross-integrate and involvement of faculty in the Diagnostic Challenges.

\* Will participate as "consultants" in 1995 Diagnostic Challenges.

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The program has four primary goals:

1. **Decrease discipline-based compartmentalization of the curriculum.** By making learning more interdisciplinary, students appreciate the value of their preclinical training, better understand the relationships among the disciplines, and become skilled at using basic science knowledge to solve clinical problems (11).

2. **Increase the number of opportunities for students to become actively involved in the learning process.** We have found that strategic implementation of case-based interactive learning activities increases the effectiveness of lectures, which are still the core of our teaching efforts (12-13). By coordinating exercises among classes, instructors are also less likely to assign activities that compete for students' time and energy

3. **Develop students' interpersonal and communication skills** (14). The abilities to speak, listen, and deal with conflict are likely to be just as important as knowledge and technical skill in determining whether a veterinarian will be successful in practice (15).

4. **Promote students' independent learning skills.** These skills, which will be critical to success after leaving the university, include a working familiarity with appropriate textbooks, current literature, and computer databases.

A key component of the program is that each participating course retains its identity. Therefore, course directors remain responsible for their courses' outcomes and are ultimately free to utilize the methods they find most effective. Even within a course, there are instructors who are most comfortable with traditional teaching methods. Since many of these instructors are very effective in the classic lecture/laboratory format and are valuable members of the teaching team, the program allows them to continue to do what they do best. However, these instructors are also exposed to less traditional methods; become aware of what is being taught in collaborating courses; and are encouraged to experiment.

Although the majority of class meetings during the first 10 weeks of the semester are lectures, the lectures are meant to be benchmarks rather than the source of all necessary knowledge. Throughout the 15-week semester, instructors in each course also conduct case-based group discussions and laboratories, in which students are required to apply principles across disciplines (16, 17). All participating courses use a common approach to clinical problem solving that is based on the Problem-Oriented Medical Record (18, 19). This well-known clinical reasoning process is based on the premise that medical problems, like mathematical problems, have certain strategies associated with solving them. The application and practice of those strategies allow students to solve problems not previously encountered.

### **The Diagnostic Challenges**

The Diagnostic Challenges are 2 one-week-long case simulations conducted by the collaborating courses near the end of the semester. For these exercises, the students are divided

into 16 "group practices" of approximately 6 members each. Each practice is presented with one of 4 clinical cases. Cases require the application of background knowledge from multiple courses and are selected to emphasize the diagnostic process and underlying disease principles. Several animal species are represented, including at least one herd/flock situation. Each case requires multiple steps to reach a diagnosis and concerns a topic that has not been discussed directly in lecture. Therefore, students cannot rely on previous lectures but are compelled to utilize the problem-solving strategies and kind of reference material they can access following graduation.

Each Diagnostic Challenge is initiated with a client interview and mock physical examination. Each group practice keeps an accurate medical record and makes independent decisions regarding diagnostic procedures and therapy. The group receives results for only those tests for which they submit completed request forms and must make their own interpretations of the data. There are 3 rounds of submissions. At the end of each round, the group also receives a clinical update on the case. The updates reflect the progression of the case and are written specifically for each group practice in response to any therapy (or lack of therapy) the group may have chosen. Accordingly, the outcome of each case depends on the group's decisions, and inappropriate decisions can have unfavorable results.

Participating faculty do not serve as facilitators but role play as "clients" with which the students must interact at each step of the process. It is the practice's responsibility to educate the client; keep the client informed on the status of the case; and obtain permission for diagnostic or therapeutic procedures. Client issues such as euthanasia, financial limitations, and the ethics of breeding an animal with a heritable disease are a part of every case. For example, each practice must solicit client approval for all case expenses and submit a final bill. The cost of available services and clients' willingness to pay for those services are issues that are not often discussed in the preclinical years of most curricula.

For some Diagnostic Challenge cases, selected clinical faculty are designated as "consultants," especially when students receive data, such as a radiograph or feed analysis, which they are not yet trained to interpret. However, as in real life, the practice may be "billed" for a consultation and that cost must be passed on to the client. The participation of additional faculty who normally do not teach in the collaborating courses are a valuable contribution to the success of the simulation. These "guest" faculty have viewed their own involvement favorably and have offered to participate in future Diagnostic Challenges.

Provision of appropriate time for students to focus on the simulation is a critical element in the success of the Diagnostic Challenges. During the week of the Challenges, students are released from approximately 15 hours of lecture and laboratory. Likewise, instructors in other courses have agreed not to schedule examinations during this time.

Participating faculty believe that the benefits of the simulation far outweigh the costs of a few lost lectures and often design cases that address topics not covered specifically in lectures. In addition, the break in the lecture routine enhances student enthusiasm for learning.

At the end of the exercise, each group prepares a 1- to 2-page case summary and gives a 15-minute presentation to group practices that worked on the other 3 cases. The students assume an important teaching role at this point and are instructed to emphasize the basic lessons learned from each case. Invariably, the groups take very seriously their responsibility to share the lessons learned from their own case with other groups.

Following the presentations, all students are also required to evaluate, on a scale of 1 to 10, each member of their group and the presentations of the other three practices. These numbers are factored into the students' grade for the simulation. Although the students' grades for the Diagnostic Challenge remain a small part (<5%) of their overall grades for each course, the small number of points allotted to the Challenge's do not appear to have a negative effect on student performance or enthusiasm.

## Outcome

Each year students are asked to evaluate the program after each Diagnostic Challenge and as part of the course evaluations at the end of the semester. All participating courses have been well reviewed and are rated above the college mean in the standardized student evaluations conducted by the college. In addition, by the end of the semester students become strong advocates for increased integration of the semester and for the Diagnostic Challenges, in particular. Although some students find the Diagnostic Challenges "too much work," the vast majority have reported that it is an exciting way to learn and incorporates "real life issues" often missing in the curriculum. When asked specifically if there should be more Diagnostic Challenges in the semester, students have stated overwhelmingly that two simulations at the end of the semester seems appropriate. They also have noted that the background knowledge and problem-solving practice gained in the first 10 weeks of the semester were critical to their success in the Challenges. When asked if the semester should switch completely to a problem-based learning format (20) and de-emphasize or eliminate lectures in favor of exercises similar to the Diagnostic Challenges, the students have indicated strong support for the mixture of traditional lectures, case-based exercises, and two Diagnostic Challenges.

Student-faculty discussion of how to work effectively within a group has become an integral part of the Diagnostic Challenges. To encourage students to consider and deal directly with these issues, they are advised at the beginning of the exercise: "Problems regarding the division of responsibilities, how your clinic will make decisions, designations of clinicians to present rounds, working around prior commit-

ments, dealing with dominant personalities or colleagues who don't contribute, etc., are up to your clinic to solve." Invariably, however, one or more clinics develop problems they are unable to resolve by themselves. Small group discussions of the interpersonal and client aspects of the case are conducted by taking a "time-out" after meeting with a client or by meeting with a second faculty member. Individual students who seem to have particular difficulty in working in a group are referred to the college's on-site counselor. The counselor's special training in interpersonal and communication skills is a valuable resource. In the future the counselor's involvement in the exercise will be increased by including one or more training sessions before the first Diagnostic Challenge begins.

Faculty peer evaluations of the participating courses and the Diagnostic Challenges have also been favorable. Faculty observing the Challenges have noted student enthusiasm for the simulation and expressed surprise at the sophistication of presentations and the demonstrated level of understanding. The observers also indicated that the simulation required students to "utilize information from multiple classes to solve relevant problems" that would be encountered by veterinarians. One internist has noted that modification of the semester has improved the performance of students the following semester when they begin the Small Animal Medicine I course. As a result, she has modified her own teaching strategy to assume more background knowledge and better problem-solving skills.

Integration and cross-application of principles across discipline-based boundaries is an attempt to help the students build a network of interconnected knowledge (20, 21). Under these conditions, new knowledge is more likely to be retained, recalled when necessary, and integrated appropriately with other knowledge (9, 10). The case-based laboratory exercises which are conducted throughout the semester allow students to understand better how the goals of each course are related to their final goal of becoming a veterinarian. These exercises also provide important opportunities for students to practice the problem-solving skills that will be needed in the Diagnostic Challenges and in clinics. The Diagnostic Challenges are an excellent way to raise interpersonal and ethical issues.

A disadvantage of the program and, in the Diagnostic Challenges particularly, is the requirement for additional faculty time as compared to traditional teaching methods. However, the effort works within the current curriculum and is focused on two designated weeks of the semester. As a result, there has been no need for a net increase in the number of faculty assigned to courses taught during the semester. Although the number of tenure-track faculty participating in the program has grown from two in 1989 to ten in 1993, six of the ten had pre-existing teaching assignments in the collaborating courses whereas four were volunteers acting only as clients or consultants during the Diagnostic Challenges. The involvement of additional instructors has not been man-

dated by the college administration but reflects growing faculty interest in the program. In turn, college and department administrators have recognized the efforts of faculty who participate in the program.

As a result of the advocacy of students and participating instructors, another outcome is the planned involvement of additional course directors in the next 2 years (Table I). It is anticipated that participation of the Veterinary Pharmacology and Epidemiology course will stimulate increased use of Diagnostic Challenge cases that contain therapy and population medicine issues. The course director for Veterinary Medicine and Human Health has adapted the Diagnostic Challenge format to teach part of their course in the third year. This simulation allows student group practices to continue to build their problem-solving and interpersonal skills while working on cases that have a public health component. The students' familiarity with the format enhances the groups' abilities to focus on case issues. Efforts by collaborating faculty to coordinate teaching strategies and to stay abreast of what is being taught in other courses have been simplified by the increased use of electronic communication (e-mail) within the college.

## Conclusion

The evolutionary growth and, to some extent, spread of this program at WSU reflects its benefits as perceived by faculty and students. Faculty who advocate more active or vertically-integrated methods of learning are not proposing drastic curriculum-wide changes. Instead, a growing number of individual instructors are experimenting with nontraditional methods within the traditional framework. Many of these methods require significant blocks of time and work best when conducted by a committed team of faculty. We hope that our program will be a paradigm for evolutionary change at WSU and other universities by providing a mechanism to bring together like-minded faculty and allowing them to control small blocks of time within the curriculum. Such an approach fosters experimentation, including the development of active learning strategies. However, it also preserves many of the advantages of the lecture-based curriculum and allows instructors with more traditional views of medical education to continue using the methods they favor. Good teaching is more a product of dedicated teachers than of great curricular design (22). Likewise, change is more likely to be accepted if it comes from within the faculty rather than if it is imposed (11). We believe that evolutionary curricular change and curricular flexibility are the best ways to pragmatically address many of the perceived problems of veterinary medical education within the context of current institutional limitations.

## Summary

A group of faculty of Washington State University have developed a collaborative program to modify a single semester of a traditional veterinary curriculum. The goal of this pro-

gram was to address many of the perceived problems with veterinary medical education. Accordingly, the collaborative program sought to integrate discipline-based courses within the semester, teach the basic and preclinical sciences in the context of how that knowledge would be used, increase active learning, develop students' interpersonal skills, and promote independent learning. The culmination of these efforts was a series of cooperative case simulations named the Diagnostic Challenges. The characteristics and outcome of the program are discussed. The authors believe that this program can be a paradigm for evolutionary reform of a veterinary curriculum. Evolutionary change could preserve the best parts of the traditional curriculum, while fostering experimentation and implementation of nontraditional teaching methods.

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## Employment in International Veterinary Medicine: A Survey of Requirements and Opportunities

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Veterinary students and veterinarians in the United States have expressed considerable interest in international veterinary medicine (1-8). Opportunities for veterinarians in international veterinary medicine include activities in clinical veterinary medicine, public health and epidemiology, research, economics, animal production and health, and interdisciplinary roles in numerous other fields. Opportunities are offered by service and religious organizations, e.g., the Peace Corps and the Christian Veterinary Mission; government service, e.g., the U.S. Department of Agriculture and U.S. Agency for International Development (USAID); and other private and government organizations.

The purpose of this survey was to obtain information about employment opportunities for American veterinarians interested in international veterinary medicine, and the requirements, training, and compensation for such activities.

### Materials and Methods

The practices and attitudes of international organizations towards employment of veterinarians were surveyed from May to September, 1992. A mail survey was chosen for convenience and cost.

A veterinarian involved in international veterinary medi-

cine was arbitrarily defined as a graduate veterinarian in private practice, industry, government, academia, or other organizations, including nonprofit organizations, for whom 20% or more of professional services either take place in an international setting or deal with international matters. In some cases, the veterinarian's effort may be international while his/her office is in the USA. In other cases, the veterinarian may actually work abroad.

Listings of international job opportunities were obtained from the Career Planning and Placement Office of North Carolina State University. All nonprofit organizations judged by the investigators to be potential employers of veterinarians were obtained, including international organizations with a focus on the biomedical or agricultural sciences. In some instances, several centers of the same organization were surveyed (e.g., World Health Organization, United Nations) and each was considered independently, because large organizations may have different headquarters for different areas of competence and employment perspectives may vary.

The survey was designed to obtain information on characteristics of organizations which may employ veterinarians in international veterinary medicine; their hiring practices relative to veterinarians; required qualifications; training provided by the employer; and potential compensation. Questions included in the survey relevant to this report are included in Table 1. The questionnaire was developed and pilot-tested initially by veterinarians with the College, and was later evaluated by selected individuals who represented potential respondents. Questions were both closed and open-ended (9). The layout of the questions allowed respondents not in-

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