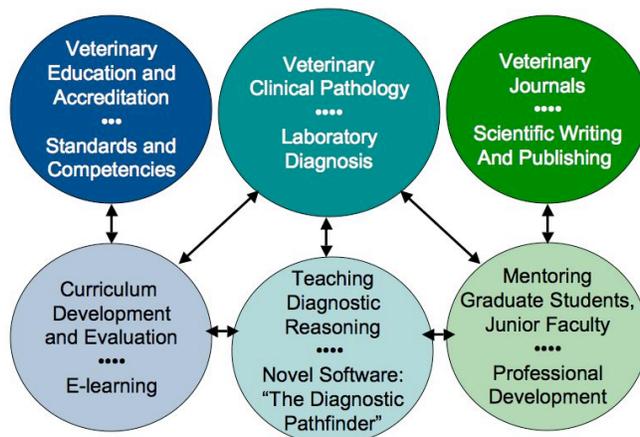


Veterinary Medicine in Egypt: Laboratory Diagnosis, Educational Standards, and Scientific Writing

Veterinary medicine plays a central role in Egypt's national and economic security and in the protection of the public health; its network of 12 veterinary faculties is larger than in any other country in the Arab world. Alexandria University's Damanhur branch is the newest Faculty of Veterinary Medicine, founded in 2005 to meet animal health needs in Behira governorate, and linked closely with its sister faculty in Alexandria city. Many veterinary graduates in Egypt enter careers in farm animal practice (livestock, poultry, fish) or food hygiene under the Ministry of Agriculture, with added opportunities in companion animal practice and veterinary research. Diagnostic laboratory testing is critical for disease diagnosis and monitoring and therefore is an integral component of veterinary curricula and clinical outreach. Egypt has made important advancements in educating its veterinary workforce to meet societal needs. National funding has stimulated curricular innovation and helped advance strategic plans in e-learning and postgraduate education. Accreditation standards established with the Ministry of Higher Education are an important new benchmark and a model for the Arab Association of Veterinary Medical Faculties. Staff are held to high academic standards and contribute individually and collectively to a rich academic environment that promotes dissemination



of veterinary research through scientific congresses and publication. The vital importance of laboratory diagnosis in animal disease, leadership in educational innovation and accreditation, and a legacy of scientific research and academic publishing make Egypt an ideal environment and match for my interests, experience, and expertise in clinical pathology, education, and scientific writing. An exceptional opportunity exists to contribute to the new curriculum, education center, diagnostic laboratory, and professional development at Egypt's newest faculty.

My veterinary career of nearly 30 years comprises a diverse range of experience in mixed-animal practice, basic research, academic pathology, academic administration, and international leadership. Rural veterinary practice was critical in shaping my early understanding of the vital links between humans and animals, the everyday need to make medical decisions, and economic, ethical, and public health implications. While running an in-clinic laboratory and attending continuing education courses in hematology and microbiology, I developed a strong interest in clinical pathology, leading to a PhD in veterinary pathobiology and postdoctoral research on the biochemical pathology of sickle cell disease in humans. As a clinical pathology faculty member my teaching is informed by the pragmatism of clinical practice, the essential contributions of basic research to clinical medicine, and educational scholarship. I value and excel in mentoring, proffering ideas, support, guidance, and optimism. My national and international leadership and dedication to international cooperation are magnified in my role as journal editor, where I shape the direction and quality of scientific discourse, and in accreditation, where I help veterinary programs achieve their goals for quality education. Throughout my career, I've sought and thrived on transitions and new experiences for growth and inspiration, including a yearlong sabbatical in Crete where I effected strong collaborations in Europe while immersed in a new culture, language, and academic medical environment. I seek a challenge now that will enable me to re-envision my teaching and enhance my disciplinary expertise and leadership through a culture representative of the future global needs of veterinary medicine.

Veterinary Clinical Pathology: Teaching Laboratory Diagnosis

Few abilities are more critical to a veterinarian than the accurate use and interpretation of laboratory tests. Laboratory diagnosis underlies the detection, monitoring, and control of disease, including infectious and zoonotic diseases that can impact human health. Clinical pathology (also known as laboratory medicine) is the discipline focused on effective use and interpretation of laboratory tests.

Teaching Veterinary Clinical Pathology. I will teach a clinical pathology course to veterinary students that emphasizes pathophysiologic mechanisms of disease and facilitates a systematic, hypothesis-driven approach to the interpretation of laboratory data, including hematology, clinical chemistry, and urinalysis data. At completion of the course, students will understand why a test is done, the principles underlying the test, factors affecting test results and accuracy, and how to interpret and integrate laboratory abnormalities with other patient and herd information. Parallel lectures, discussions, and laboratories link key didactic concepts with case-based problem solving and technical skills. Course materials support the cognitive expectations of students: a logically organized set of reference notes drawn from multiple sources; a workbook of cases and problems that facilitate active learning through laboratory data interpretation; small-group exercises to learn concepts of test selection and cost-benefit; and laboratory specimens for analysis and microscopy. Assessments gauge the gradual development of skills and knowledge and encourage active use of resources.

Clinical pathology in Egypt is taught in the 4th year of the veterinary curriculum, in the 2010-11 academic year at Alexandria University, Damanhur. Teaching a course in a new curriculum is a unique opportunity as well as a responsibility to work closely with new staff and within curricular guidelines in modeling a course for the future. While core concepts (such as test accuracy and quality control) transcend boundaries of species and regions, critical and key differences in veterinary and laboratory medicine in Egypt will be considered in optimizing course relevance and applicability:

- *Important animal species in Egypt.* Already inclusive of a wide range of domestic and nondomestic species, I will incorporate cases and content into the course that emphasize the unique blood cells, response to disease, and laboratory test results of the principal species in Egypt, including buffalo, sheep, goats, donkeys, cattle, camels, poultry, and fish;
- *Important regional diseases in Egypt.* Infectious, parasitic, and zoonotic diseases of major consequence in the region, such as fascioliasis (liver flukes), parvovirus, and babesiosis, will be used to populate case studies that demonstrate important disease concepts in laboratory medicine, such as liver function, inflammation, and anemia;
- *Practical differences in laboratory testing in Egypt.* I will adapt curricular content to address differences in instrumentation, reagents, stains, units, technical support, and test availability.

I've developed, coordinated, and been sole or primary instructor of courses in veterinary clinical pathology for more than 20 years, demonstrating effectiveness and excellence in both small and large group teaching. My organizational skills and logical approach; ability to establish rapport, encourage self-learning, and elicit critical thinking; and my ability to clearly and effectively convey complex concepts have led to multiple teaching awards from students, peers, and superiors. My teaching materials were used as a key resource in developing a model veterinary clinical pathology curriculum in Europe and have been used in courses in Japan and Zimbabwe. Audiences whose first language is Arabic, Greek, Japanese, French, Turkish, Spanish, and Shona have lauded the clarity and comprehension of my lectures in English. I've led and contributed extensively to national and international efforts to define core content and explore effective ways to teach clinical pathology. By adapting this course to the species, diseases, and technology of Egypt, I will be better prepared to guide my own students in the realities and needs of global veterinary practice.

The Diagnostic Pathfinder (DP): Teaching Skills in Diagnostic Reasoning. I will introduce the DP as a computer-based tool for teaching diagnostic reasoning, an essential skill in the transition from novice (student) to expert and a major goal of Egyptian accreditation standards. Developed by faculty at Iowa State University, this novel software facilitates an interactive yet rigorous approach to laboratory data interpretation, development of problem lists, and differential diagnosis. As one of 3 collaborators funded by the US Dept of Education, I've implemented and assessed the DP as an integrated component of my clinical pathology course and in separate elective and graduate-level courses. The benefits are well documented: students enjoy using the program, learn medical terminology, avoid common diagnostic pitfalls (such as jumping to conclusions or ignoring data that can't be explained), and receive immediate feedback and the opportunity for self-assessment. The DP also provides faculty with new insights into student learning.

The new Education and e-Learning Center at the veterinary faculty in Alexandria facilitates digital technology and online course delivery, an optimal setting for creative and sustainable use of the DP. The DP is free, platform-independent, easily accessed, and adaptable to group instruction, independent study, or distance learning in multiple disciplines. Courses and cases can be authored and revised by local faculty and shared with other institutions. Extensive course management tools accommodate different teaching styles and venues. The DP has strong potential to contribute to educational strategies in Egypt for enhancing online curricular options.

The Veterinary Diagnostic Laboratory. Contemporary veterinary diagnostic laboratories are essential for education and service in the veterinary teaching hospital and for providing diagnostic support to veterinarians and farmers in the field. In the new laboratory at Alexandria University I will:

- Work with staff to develop teaching materials for applied learning in microscopy and case data interpretation;
- Help identify ways in which the laboratory can be used to teach sample processing and the performance of basic laboratory tests;
- Consult on laboratory and information management to optimize clinical service and research needs;
- Provide diagnostic pathology services in a learning environment by examining blood, fluid, and tissue specimens together with veterinary students, graduate students, and staff.

As Chief of the Clinical Pathology Laboratory for >10 years and former Associate Director of the Veterinary Teaching Hospital, I have extensive practical and administrative experience in the organization, management, and operation of a diagnostic laboratory. I've used the clinical laboratory creatively for undergraduate and postgraduate teaching, developed training modules and teaching slide sets, and have particular expertise in laboratory information systems. I've visited or consulted in university, government, and private laboratories throughout Europe and in Asia and Africa, and have broad appreciation for the diversity of missions and technological capabilities, challenges in resource acquisition, and use of creative options to adapt to local and regional conditions and needs.

Postgraduate Teaching in Clinical Pathology. I will teach clinical pathology in postgraduate courses to graduate students (MS, PhD) and junior faculty. I also will provide advanced diagnostic training in clinical pathology, especially hematopathology. In addition, I will:

- Mentor graduate students (MS, PhD) in their dissertation projects, including hypothesis and aims, experimental design, laboratory-based analyses, and data analysis;
- Lead a journal club to encourage and teach critical review of the literature;
- Lecture in a continuing education course for practicing veterinarians;
- Lecture at a regional scientific conference.

The laboratory diagnosis of animal disease is a global effort in which the training of qualified laboratory diagnosticians and researchers is paramount; with limited resources in developing countries and decreasing food animal caseloads in developed countries, international cooperation is essential for meeting educational needs in laboratory medicine. This need is highlighted by efforts of *The Egyptian Journal of Comparative Pathology and Clinical Pathology*, by the increasing numbers of applicants from Africa and the Middle East to residency programs in the US (postgraduate programs that emphasize diagnostic skills and clinical research), and by the imperative of the Egyptian Higher Education Enhancement Project Fund to upgrade postgraduate skills and knowledge to keep pace with international standards, and increase opportunities for specialization. Under my leadership, the residency program at the University of California-Davis has become a model for the nation. I've led national and international efforts to enhance postgraduate education in clinical pathology, and published influential training guidelines. I've organized and taught postgraduate seminars and courses, and mentored and advised on numerous research projects. As Executive Director of the International Society for Animal Clinical Pathology, I'm committed to facilitating international collaboration in research and education, supporting young investigators, organizing relevant scientific programs at meetings held throughout the world, and minimizing barriers for scientists from countries with limited resources. Teaching postgraduate students in Egypt will benefit the relevance of my own training program and enhance my ability to better serve clinical pathologists and laboratory medicine worldwide.

Veterinary Medical Education and Accreditation

I've served for 6 years on the Council on Education (COE) of the American Veterinary Medical Association (AVMA), recognized by the US Dept of Education as the accrediting body for veterinary colleges in the US and Canada. This group of academic faculty, deans, practitioners, and public members uses clearly defined Standards of Accreditation to evaluate veterinary medical programs and help schools improve veterinary education. The COE also accredits foreign veterinary schools and cooperates with accrediting bodies in Europe, the UK, Australia, and South Africa. To my knowledge, Egypt is the only other country to establish accreditation standards in veterinary medicine (published in 2009 by the National Authority for Quality Assurance and Accreditation of Education), to enhance and recognize quality education and help its graduates compete worldwide. Egypt's leadership in veterinary education is further demonstrated by its Higher Education Enhancement Project Fund, which is used to stimulate and invest in innovative projects in curricular development, e-learning, and human resource capacity. In Egypt I will:

- Give a presentation on accreditation in the US, the current status of international accreditation initiatives, and challenges and opportunities in veterinary education;
- Lead discussions on accreditation standards and educational systems in veterinary medicine;
- Assist and support local efforts to achieve national accreditation;
- Assist in the development of outcomes assessment and clinical competencies;
- Provide faculty support for curriculum and resource development.

As member and Chair of the AVMA-COE, I've led accreditation site visits to Sydney, Utrecht, Dublin, and many schools in the US, and consulted for schools in Mexico, Jordan, and South Africa. I've gained strong appreciation for the breadth and diversity of veterinary medical programs, the barriers to curricular change, the importance of outcomes assessment, and benefits of educational standards for students, faculty, and public stakeholders. I've acquired enormous insight into how administration, physical facilities, clinical and human resources, curriculum, and research intersect to create a quality educational program. I recognize that accreditation standards are dynamic and must continually evolve to remain relevant to changing and emerging priorities in the veterinary

profession. Through my work on the COE, on the AVMA Task Force on Educational Standards, and on the Pew Foundation–funded North American Veterinary Task Force, I've actively addressed major contemporary issues affecting veterinary education, including the impact of specialization on accreditation, alternatives to teaching hospitals for clinical training, and implications of the gender shift, an important demographic change that has been recognized recently in Egypt.

The COE has been a capstone to my extensive experience in curricular development at two major universities. As Assistant Dean of Academic Programs I oversaw a complex and diverse veterinary curriculum, initiated expansion of clinical training, directed the computer learning facility, and implemented online course evaluations. I've embraced education as a scholarly endeavor and published peer-reviewed articles on the attributes and competencies of veterinary graduates and on student-faculty evaluations. I've participated in national conferences on teaching innovation and methodology and actively engaged in planning classroom and instructional space, including the design of multipurpose teaching laboratories that have proven highly effective in facilitating dual-headed microscopy, laptop use, and group learning in the veterinary curriculum.

Veterinary Journals: Scientific Writing and Publishing in Veterinary Medicine

Teaching Scientific Writing and Publishing. Publication of scientific research is the cornerstone of academic advancement and English is the primary language of communication. I will teach a workshop in scientific writing and publishing to graduate students and junior faculty that emphasizes hypothesis development and study design, organization and key elements of a manuscript, submission and peer review processes, and ethical aspects of publication. Organized around a monograph I've been invited to co-author on "Writing for Publication in Veterinary Medicine", I will assemble my experience, presentations, and articles into a comprehensive whole and use practical examples and the participants' own work. In addition, I will:

- Mentor graduate students in writing and publication of their dissertations and manuscripts;
- Provide professional development for veterinary journal editors and faculty on topics such as mentoring authors, indexing, and impact factor, and share editorial resources;
- Explore collaborative opportunities between the National Library of Medicine (NLM), the Library of Alexandria, and Alexandria University. (The NLM History of Medicine Division offers strong support for using a shared collection of rare medieval Islamic manuscripts as a nidus for educational resources on the history of veterinary medicine and publication.)

I bring extensive experience and expertise to scientific writing, editing, and journal development. As Editor-in-Chief of *Veterinary Clinical Pathology*, I've led all aspects of journal publication; forged agreements with European and Australian societies to expand international commitment and scope; and achieved MEDLINE indexing and an 8-fold increase in submissions (including papers from Egypt). I actively and generously mentor authors, especially postgraduate students and those for whom English is a second language, helping them transform their research into publishable work. I'm the founding leader of the International Association of Veterinary Editors and disseminate resources, organize conferences, and manage a network of >200 editors on 6 continents. I understand the challenges faced by editors of small journals and have both learned from and advised them in their efforts to enhance workflow, visibility, and quality. As the first veterinarian appointed by the National Institutes of Health/NLM to select journals for inclusion in MEDLINE, the premier biomedical database in the world, I evaluate >400 journals annually in every language and subsdiscipline in medicine, dentistry, nursing, public health, and veterinary medicine. I play a key role in the dissemination of biomedical research and value this opportunity to help enhance representation of research publications from this important region of the world.