

APPENDIX
Multimedia Projects Funded by CONVINC Consortium

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The projects described below were supported through a grant to CONVINC from the Geraldine R. Dodge Foundation. Contact the investigator directly for more information on the availability of the programs.

1. An Interactive Laser Videodisc and Educational Programs for Veterinary Ophthalmology and Comparative Ophthalmic Pathology

Dr. Alan H. Brightman
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Kansas State University

This project will be developed by a multi-institutional group. The group will develop an archival disc of visuals and two lessons, one focussing on ophthalmic pathology and one on extraocular diseases, as well as a number of problem-oriented case presentations.

2. Surgical Procedures in the Dog: Cranial Cruciate Ligament Repair

Dr. Michael H. Sims
Phone 615-546-9230
University of Tennessee

This project will produce an interactive videodisc program on cranial cruciate ligament repair in the dog. The program will include the diagnostic process, presurgical workup, surgical techniques, and postsurgical care. The student will make decisions relative to each of these phases and will have to respond to a series of pertinent questions.

3. Peripheral Neuroregulation Interactive Videodisc Course

Dr. Clifford R. Swanson
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North Carolina State University

Information relating to anatomy, physiology, and pharmacology will be presented in the context of an unusual storyline incorporating scenarios requiring student to master and then use the information to solve clinical problems. The program will be designed as a maze / game approach.

4. Clinical Anatomy of the Pig

Dr. Phillip R. Garrett
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Auburn University

This project will produce interactive videodisc mini-lessons on clinically relevant pig anatomy. Some examples of mini-lesson titles are post-mortem, reproduction and obstetrics, and hernia repair. The design of the program will feature 3 instructional modes; directed inquiry mode, interactive instruction mode, and lecture mode.

5. Surgical Anatomy in Small Animals

Dr. Michael H. Sims
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University of Tennessee

The group will design an interactive level 3 covering 12-15 surgical procedures in small animals. For each surgical procedure, submenus will be available for gross anatomical overviews, reviews of regional anatomy, surgical approaches demonstrated on a cadaver, and examples of surgical approaches during live surgery. Motion video, graphics, photographs, radiographs, and drawings will be included.

6. Dairy Dilemmas

Dr. Ken Nordlund
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University of Wisconsin

Simulations of production medicine problems in dairy herds including such topics as replacement heifer rearing, cow culling, mastitis, genetics, reproduction, and nutrition will be presented through examination of farm records, still images, and videotape of farm operations. The student will gather the information and record appropriate findings in a notebook and generate a problem list. The student list will be compared to an internal list.

7. Bovine pregnancy: A Multi-Media Learning Module

Dr. Alastair JS Summerlee
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University of Guelph

A learning module on bovine pregnancy will be developed using Toolbook. Screens may include text, graphics, animation, sound, and digitized images, including radiographs, ultrasounds, and histological sections. The module will include basic information on anatomy, histology, physiology and endocrinology in relation to reproduction from fertilization to parturition. It will also contain information on pregnancy diagnosis, pathology, and clinical scenarios related to fertilization, pregnancy and parturition.

8. Development of an Interactive Video Program (Lamexam) for the Diagnosis of Lameness in the Horse

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This project is an extension of an existing project for the development of an instructional videotape and problem-solving exercise for diagnosis of lameness in the horse. The new project will create LAMEXAM, an interactive videodisc program designed to teach the principles of equine lameness diagnosis. The viewer will obtain the medical history, examine the standing and moving horse, and perform ancillary diagnostic procedures. Videotapes of lame horses will be obtained primarily from clinical accessions. The computer programs will be authored using Toolbook software.

9. Surgical Techniques Auto-Tutorial Program III

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The goal of this project is to produce a videodisc and accompanying lessons to provide instruction on selected small animal surgical procedures. The new project will extend the training to include procedures commonly performed in small animal Practice. Procedures will include skin excision and reconstruction, celiotomy and closure, ovariohysterectomy, castration, cystotomy, enterotomy, and the application of intramedullary pins, wires and external skeletal fixation devices to long bone fracture management.

10. Diagnostic Approach to Hepatic Disease in the Dog with Clinical Case Studies

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Purdue University

This project will develop a CD-ROM CAI program emphasizing the diagnostic approach to hepatic congenital, degenerative, inflammatory, and neoplastic diseases in the dog. The programs will include three modules: 1) Normal structure and function, 2) General diagnostic approaches, and 3) Case studies. Review of normal structure and function of the liver will be made possible through operator-directed processes.

11. Development of Computer-Based Instructional Materials for Teaching Veterinary Dermatology

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This project will develop CAI materials based on a dermatology hypertext network. The developed materials will contain digitized color images representing all aspects of veterinary dermatology. Animation and compressed video playback will also be incorporated to aid in illustrating dermatologic procedures and processes (i.e., skin scraping and ear-scratch reflex). The materials will be available in both Macintosh and MS DOS computer formats.

12. Diagnostic Imaging Simulation

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This project will develop a CD-ROM CAI simulation designed to teach radiographic techniques in small animal and equine medicine. The program will give students the opportunity to set up and "take" radiographs under simulated conditions without the risks of radiation exposure. Students will manipulate factors such as animal position, KVP and MASS settings, screen type, and screen location, take the radiograph, and then see the resulting "image" displayed as a digitized radiograph. The images used will consist of actual digitized radiographic images stored on the CD-ROM. As originally proposed, the computer program would be developed using Toolbook. Current plans are to use Authorware, for compatibility with the other radiography project.

13. Radiographic Techniques and Interpretation of Abdominal and Thoracic Disorders of Dogs and Cats

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This project will develop an interactive CD-ROM computer program on radiographic technique and interpretation of abdominal and thoracic radiography of dogs and cats. The program, designed for use by individuals or small groups in a laboratory setting, will provide case-based material to supplement the basic radiology taught to second-year professional students. Technique information will be presented in the form of actual radiographs consisting of digitized images on CD-ROM. The user will select technique parameters and see the influence of these parameters on the radiograph. The user will describe radiographic features and make interpretations based on those findings.

THERAPEUTIC INFORMATION ON THE INTERNET

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The internet, and specifically that portion of the internet referred to as the World Wide Web (WWW), is evolving into a tenable source of biomedical information. Unfortunately, it is not clear to most of us whether this evolution has proceeded sufficiently to justify the capital and intellectual expense needed to access WWW sources. When we choose a source of information to support our therapeutic decisions, we literally balance the value of the information we seek against the monetary cost of the access and the cost, in time, for our efforts. This paper was conceived from a simple question: Does the Internet currently provide access to Information of adequate value to make the costs of connection "worthwhile"?

Using standard tools and techniques for information retrieval from World Wide Web servers, the internet was sampled for the kinds of information required for therapeutic decision making. The first type of information service examined was the Gateway site. Gateway sites provide links to other servers, sorted in a variety of different ways. Gateway sites often include boolean and hypertext search and retrieval capabilities. A number of commercial gateway sites (they run paid advertisements or operate by subscription) exist and these can certainly be used to find any of the sites listed in this paper. For the purposes of this paper, these "general library" sites were not examined in detail. The gateway sites listed here are those dedicated to medicine, pharmacy, pharmacology, and clinical pharmacology. The other category of WWW site could be referred to as "information rich". If we invoke a library analogy, gateway sites are the card catalogues; information rich sites are the books. Specific information rich categories include: drug references and formularies (most of which include some descriptive information), patient pharmacokinetics sites, teaching resources, and sites with electronic versions of traditional bioscience journals and reference materials.

Each site investigated is listed below along with the address used to access the site on May 6, 1996, and a brief description of the site. Where applicable, specific comments are included that address the utility of the site for veterinary therapeutics. It should be noted here that neither of the commercial veterinary information services available at this time are included in this list. The Veterinary Information Network (VIN) and the Network of Animal Health (NOAH) are both established providers of computerized information and both include information relevant to veterinary clinical pharmacology and therapeutics. They are not considered here because both require additional subscriptions to specific commercial information providers and cannot be accessed from the Internet directly. Finally, no direct attempt was made to assign a specific value to the information derived nor were the costs associated with access calculated.

GATEWAY SITES

WWW Virtual Library: Pharmacy

<http://157.142.72.77/pharmacy/pharmint.html>

This gateway, maintained by Dr. David Bourne of the University of Oklahoma College of Pharmacy, provides links to over 400 pharmacy-related sites. Link categories include: Schools of Pharmacy, Pharmacy Associations, Journals, Jobs, Databases, Pharmaceutical Companies, Drug Stores, and "Not Classified". Very few of the links are devoted exclusively to veterinary therapeutics but this gateway is useful.

"Virtual" Pharmacy Center<http://www-sci.lib.uci.edu/%7Emartindale/Pharmacy.html>

This visually appealing resource is a subset of Martindale's Health Science Guide. It provides links to a large number of pharmacy, basic and clinical pharmacology, and therapeutics sites. The main limitation of this gateway derives from the lengths the authors have gone to in providing an attractive site. Individual pages may be as large as 100 K-bytes and need to be viewed with relatively sophisticated browsers that provide forms support. File loading times make the site frustrating to use if you connect via modem.

Veterinary Publications<http://netvet.wustl.edu/vcp.htm>

Veterinary publications is a subset of the NetVet site maintained by Dr. Ken Boschert at the Washington University St. Louis. The Veterinary Publications page provides links to over 100 sites related to Veterinary publications. Users of this site will discover that very few of the links provide either text or abstracts of veterinary articles but often advertise titles, or provide tables of contents, but it was the most complete veterinary reference library accessed for this report.

Biomedical Information Resources<http://www.mic.ki.se/Other.html>

This server, maintained by the Library & Medical Information Center at the Karolinska Institute (Stockholm, SWEDEN), provides a readily accessible list of information resource links for a wide variety of biomedical references. Pharmacology and therapeutics links are organized on a separate page. The pharmacology section of this server is not as complete as either of the preceding two servers, but additional biomedical information is likely to be of value.

NN/LM WWW Home Page<http://www.nlm.nih.gov/>

The purpose of the National Network of Libraries of Medicine (NN/LM) is to provide health science practitioners with timely and convenient access to biomedical and health care information resources. The network consists of eight Regional Medical Libraries (under contract with NLM). The NN/LM Home Page is really a specialized gateway to this library network. It provides little information on its own, but provides paths to medical library sites across the United States.

Health-related Web Server<http://www.who.ch/others/OtherHealthWeb.html>

The World Health Organization (WHO) provides this gateway site to a variety of health related sites. The main distinction for this service is the obvious international character of the selections listed. Links to a number of pharmacology-specific gateway sites are present.

DRUG REFERENCES AND FORMULARIES

Derwent Veterinary Drug File

<http://www.rs.ch/www/rs/ds/DVDU.HTML>

Knight-Ridder Information provides this subscription based pharmacology abstract service. Coverage is provided for 1,200 journal titles and conference proceedings in more than 20 different languages. Each document contains an abstract written by a subject specialist and also includes extensive indexing. Although this site does not take the place of a formulary (complete prescribing information is not collated for individual drugs), it is the only service available that provides information to support extra-label use of veterinary drugs.

FDA Center for Veterinary Medicine

<http://www.cvm.fda.gov>

This site is being developed by the Food and Drug Administration Center for Veterinary Medicine to disseminate a variety of documents. Available resources include adverse drug experience reports, Freedom of Information (FOI) summaries of approved veterinary drugs, CVM guidelines, policy letters, CVM Memos, electronic copies of the FDA Veterinarian, and consumer information. While users are cautioned that the site is "not intended to take the place of either the written law or regulations", this is a useful internet source of approved veterinary drug information.

FDA Approved Animal Drug Searchable Database <http://borg.lib.vt.edu/ejournals/vetfda.html>

The Approved Animal Database, produced by the Drug Information Laboratory at Virginia Tech, is comprised of a text file for each of the more than 1400 veterinary pharmaceuticals approved by the FDA Center for Veterinary Medicine. A hypertext search engine is provided to access the files. Each text file includes trade name, NADA number, sponsor, ingredients (generic name not formulation), species for which the drug is approved, regulatory status (Rx or OTC), route of administration, dose form, withdrawal time (if applicable), tolerance in food animals (if applicable) and an abstract of the CFR information pertinent to the specific drug (specifications, product description, indications and limitations). This site is the only complete source of approved animal drug information on the internet.

FARAD

<http://www.reeusda.gov/agsys/adds/farad.htm>

The Food Animal Residue Avoidance Database provides electronic access to the FARAD Trade Name File: A Comprehensive Compendium of Food Animal Drugs. A table of contents is provided and the database can be searched by keyword. Each text entry includes product name, sponsor, active ingredients, classification, formulation, product type, approved species, withdrawal time, indications, directions, "further information" (limitations, warnings, etc.) and references. This site is similar to the FDA searchable database, but applies only to drugs approved for food animals.

Physicians' GenRx

<http://www.icsi.net/GenRx/>

Physicians' GenRx is a commercial subscription-based service that provides access to prescribing information. The drugs can be accessed by generic name, trade name and therapeutic class. The search capabilities are relatively simple but provide adequate response. Although GenRx includes all FDA approved drugs, information provided does not include drugs approved only for animals.

This site provides searchable index of human pharmaceuticals. Additional sections include class-based drug indications and side effects. The shortcomings of RxList include the phonetic search engine and grouping of indications and side-effects by drug class rather than by individual drug. Simple searches for known pharmaceuticals tend to return long lists of drugs that bear only subtle phonetic or spelling similarity to the original request.

PharmInfoNethttp://pharminfo.com/drugdb/db_mnu.html

The Pharmaceutical Information Network (PharmInfoNet) is an online drug information resource provided by VirSci Corporation. Regulatory and clinical users can access diverse information including full text articles from (human) clinical publications, economic data, symposium information as well as links to other relevant sites.

Drug Database - ISMPhttp://pharminfo.com/drugdb/db_mnu.html

The Institute for Safe Medical Practice sponsors this database as a subset of PharmInfoNet. The database can be browsed by generic or trade name, but extended searching capabilities are not provided. Most entries provide links to one or more Medical Science Bulletin reports which provide more depth of information than available at this address.

FORMULARY - U Wisconsin<http://www.intmed.mcw.edu/drug.html>

This site, produced by the Medical College of Wisconsin and Froedtert Memorial Lutheran Hospital, provides a model of a site that would be particularly valuable to veterinary practitioners. It includes a simple formulary (trade name, generic name, average wholesale price), cost comparisons, an antibiotic guide and also includes links to other related sites.

PATIENT PHARMACOKINETICS**Laboratory of Applied Pharmacokinetics**http://www.usc.edu/hsc/lab_apk/

The Laboratory of Applied Pharmacokinetics, USC, provides access to a demonstration version of its USC*PACK collection of PC Programs. USC*PACK is a resource for optimal study and control of pharmacokinetic systems and for individualized drug therapy, supported in part by the National Library of Medicine. The programs in the collection include a module to create and store patient files, a general modeling and Bayesian fitting program, aminoglycoside therapy modules, population PK modeling, and a collection of general research programs for 3-compartment linear models and an 8-compartment combined Michaelis-Menten and linear model.

TEACHING RESOURCES

Pharmacokinetics Guide

http://aisr.lib.tju.edu/CWIS/OAC/pharm_guide/intro2.html

This site provides a simple glossary of pharmacokinetic terms. The material presented is inadequate to provide an in-depth understanding of pharmacokinetics. However, it is an adequate review of pharmacokinetic terminology and may provide an appropriate introduction to pharmacokinetics for practitioners and veterinary students.

Talaria

<http://www.stat.washington.edu/TALARIA/TALARIA.html>

Talaria, brought to the Internet by the University of Washington, is a hypermedia WWW implementation of the AHCPR Guidelines on Cancer Pain. The site includes a variety of informative text, figures, and tables. A particularly interesting feature is an "Opioid Calculator" that calculates equipotent doses for various routes and doses of clinically important opioids. This sophisticated site provides a very positive example of how tools of the web can be used to teach therapeutic principles.

Bovine Respiratory Dz

<http://www.vetmed.iastate.edu/lectures/andrews/bovine.html>

Prepared by Dr. John J. Andrews at Iowa State University, this site is an example of a hypertext-based tool for teaching veterinary and it does include a discussion of therapy for bovine respiratory disease. Although this is not an comprehensive reference on the treatment of bovine respiratory disease, it serves as an interesting example of veterinary teaching material on the internet.

Self Assessment in Pharm

<http://www.cs.umn.edu/Research/GIMME/ISAP/intro.html>

This resource is provided by the University of Minnesota's Departments of Pharmacology and Computer Science. The material includes lecture materials, pharmacologic information for a list of 300 drugs, and a multiple choice exam system. This is a site that could be recommended to veterinary students and practitioners for review of basic pharmacology.

BIOSCIENCE REFERENCES

Medical Sciences Bulletin

<http://pharminfo.com/pubs/msb/msbmnu.html>

The Medical Sciences Bulletin, published by Pharmaceutical Information Associates, Ltd., is presented in electronic form by VirSci Corporation. Online contents include drug reviews for analgesics and anesthetics, anti-infectives, anti-inflammatories, cardiovascular drugs, endocrine drugs, gastrointestinal drugs, therapeutic agents for oncology, ophthalmologics, psychopharmacologic agents, respiratory drugs and other classes of pharmacological agents.

This site is a full-text presentation of the British Medical Journal. The online collection includes back issues to March 1995. Although it obviously not veterinary specific in its orientation, this is one of the few full text journals that could be located.

Veterinary Journals

<http://brise.ere.umontreal.ca/~jettejp/vetjr.html>

“Veterinary Journals: Tables of Contents”, maintained at the University of Montreal, provides the user with the ability to browse the tables of contents of issues of over 125 journals of veterinary interest. Users can also search for titles of articles using keywords or search for articles by author. There are, unfortunately, no text or abstracts available on-line.

Assessment

- 1) There are unique references on the internet which would be difficult to access by other means. Further indexing of the internet provided by the commercial gateways occasionally locates valuable information that may have been beyond the scope of the intended search.
- 2) There are several non-veterinary clinical pharmacology sites that clearly demonstrate the potential of the World Wide Web for effective delivery of useful therapeutic information. Such sites exist in all of the categories evaluated.
- 3) Many sites that are currently accessible are disappointing. Many are in the very early stages of construction. Many turn out to be electronic descriptions for, or advertisements of, print versions of the information being sought.
- 4) We certainly have not gained desk-top access to clinical pharmacologic information of sufficient breadth or depth to provide comprehensive support for therapeutic decision making in veterinary medicine.

Conclusion

The internet is probably nearing a “break-even” point as concerns its value to veterinary therapeutics. Adequate veterinary formularies and therapy “guides” such as that provided by the “Formulary - U Wisconsin” site have not been developed. These resources would be the most valuable to veterinary practitioners. At the same time, access to the information available at the two FDA sites and at the FARAD site have never been easier to access. One should anticipate that the internet will cross this value threshold very soon, and become a valuable resource to practicing veterinarians.